Ministry of Health

Department of Health

National Tuberculosis Programme

SUPPLEMENT TO:

FIVE YEAR NATIONAL STRATEGIC PLAN FOR TUBERCULOSIS CONTROL

2011-2015

Myanmar, August 2012

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Abbreviations

3DF	Three Diseases Fund
3MDG	Three Millennium Development Goals Fund
ART	antiretroviral therapy
CAP-TB	care and prevention of TB
CPT	cotrimoxazole preventive therapy
DOTS	the basic package that underpins the Stop TB Strategy
DST	Drug susceptibility testing
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
JICA	Japan International Cooperation Agency
KAP	knowledge, attitudes and practices
MDG	Millennium Development Goal
MDR-TB	multidrug-resistant TB
MMA	Myanmar Medical Association
NGO	nongovernmental organization
NTP	National Tuberculosis Programme
PPM	public-private mix / public-public mix
PSI	Population Services International
SLD	second-line anti-tuberculosis drug
TB	tuberculosis
TB TSG	TB Technical and Strategic Group
UNITAID	international facility for the purchase of drugs and laboratory commodities for HIV/AIDS, malaria and tuberculosis
USAID	United States Agency for International Development
WHO	World Health Organization

Executive summary

In 2010, the National Tuberculosis Programme (NTP) of Myanmar published a *Five Year National Strategic Plan for Tuberculosis Control, 2011-2015* (referred to as National Strategic Plan), in close collaboration with partners.[1]

In 2011, the results of the 2009-2010 nationwide tuberculosis (TB) prevalence survey were finalized.[2] The survey confirms a much higher TB burden than previously estimated by the World Health Organization (WHO) and gives insights into the health-seeking behavior and profile of TB patients as well as a better understanding of TB risk factors. With the results of the prevalence survey, the NTP has revised the TB epidemiological data, impact targets, policies and control strategies and funding requirements to be better equipped to reach the Millennium Development Goals (MDGs). Apart from the revisions needed to the National Strategic Plan due to the higher TB burden, the pace of the scale-up of the diagnosis, treatment and care for patients suffering from multidrug-resistant TB (MDR-TB), and efforts to reduce the dual burden of TB and HIV/AIDS among populations at risk and affected by both diseases, was felt to be too slow.

While the National Strategic Plan has not been completely revised, this update includes three new/revised plans. The first plan, on active TB case-finding, has been developed as a direct result of the outcomes of the TB prevalence survey. With additional interventions to find the many undetected/unreached TB cases in Myanmar, such as screening of risk groups, contact investigations and mobile team activities in high-prevalence communities, it is envisaged that 33 000 additional TB cases will be detected in 2012-2015. The two other plans on MDR-TB and TB/HIV offer a much more ambitious scale-up than that outlined in the National Strategic Plan. Almost 10 000 MDR-TB cases will be managed during the five-year period, and MDR-TB services will be available in 100 townships compared to 22 in 2011. By the end of 2015, TB/HIV collaborative activities should be available all over the country, and as much as possible TB and HIV health services should be integrated at the township level.

With the three new/revised strategies, the funding requirements for TB control have increased by US$ 26 million, to US$ 186 million for 2011-2015. Updated estimates on

[1] Ministry of Health, Department of Health, National Tuberculosis Programme. *Five Year National Strategic Plan for Tuberculosis Control, 2011-2015* (http://myanmarccm.org/images/stories/pdffiles/national_strategic/tb_nsp_web.pdf)

[2] Ministry of Health, Department of Health. *Report on National TB Prevalence Survey, 2009-2010, Myanmar* (http://myanmarccm.org/images/stories/pdffiles/epidemiology/tb/prevelence_report.pdf)

funding availability from the government and donors show that an estimated US$ 119 million is expected to be available, predominantly from the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund) with US$ 79 million or 66% of the estimated funding availability. The funding gap remains huge, with a US$ 67 million shortfall, but increased future commitments are envisaged especially from the government, Three Millennium Development Goals Fund (3MDG), bilateral donors, UNITAID and possibly development banks.

The target for MDG 6 of halting and beginning to reverse the TB epidemic by 2015 is on track, since the TB incidence rate has been declining since 1995.[3] Likewise, the target of halving the rate of TB mortality compared with 1990 levels has already been met (in 1990 there were 110 TB deaths per 100 000 population, compared to 41 in 2010). However, the prevalence must decrease further to reach the MDG target of 447 TB cases per 100 000 population in 2015 (in 2010 the prevalence rate was estimated at 525 TB cases per 100 000 population). Additional implementation targets guided by the Global Plan to Stop TB, 2011-2015, indicate that the case detection and treatment success rates as well as geographical/population coverage targets have to be further improved by 2015.[4]

[3] World Health Organization. *Global Tuberculosis Control 2011.* (http://www.who.int/tb/publications/global_report/en/index.html)
[4] Stop TB Partnership and World Health Organization. *The Global Plan to Stop TB 2011-2015.* *(http://www.stoptb.org/global/plan/)*

1. Background

In 2009-2010, the NTP developed a *Five Year National Strategic Plan for Tuberculosis Control, 2011-2015*. The plan was developed with support from the TB Technical and Strategic Group (TB TSG) and has been circulated widely to partners and donors.

From 2009 to 2010, the NTP conducted a nationwide TB prevalence survey in which 51 367 people were screened for TB from 70 clusters in the country. The survey identified 123 smear-positive TB cases and 188 smear-negative/culture-positive TB cases, totaling 311 bacteriologically confirmed pulmonary TB cases. Smear-positive TB prevalence was calculated as 242.3 per 100 000 population aged 15 years and above, whereas bacteriologically confirmed TB prevalence was 612.8 per 100 000 population aged 15 years and above. The prevalence survey showed that:

- The majority of TB sufferers are young males
- The prevalence is almost two times higher in urban than in rural areas
- TB rates are significantly higher in states than in regions, which suggests that there are issues with access to health care
- The majority of TB cases found in the survey remained undetected
- The majority of TB cases did not present with classic TB symptoms
- Pharmacies/drug-sellers and traditional healers are the first line of contact for most TB cases
- The TB control programme in Myanmar has been successful in diagnosing and treating symptomatic smear-positive TB patients under DOTS, but the impact on the TB burden is not sufficient with current case-finding and diagnostic methods.

The final results of the prevalence survey were available in 2011 and were used by WHO to update the 2010 estimates of the TB burden. The National Strategic Plan was based on the WHO TB estimates of 2007, which significantly underestimated the burden (Table 1). The National Strategic Plan stressed that figures shown for TB burden were underestimated and that once the results of the 2009-2010 nationwide TB prevalence survey were finalized, these figures would need to be adjusted.

Table 1. WHO estimates of the TB burden in Myanmar, 2007 and 2010

WHO estimates of burden of TB	2007		2010	
	Number (thousands)	Rate (per 100 000 population)	Number (thousands)	Rate (per 100 000 population)
Prevalence	79	162	250	525
Incidence	83	171	180	384

Source: Global TB Control Reports 2008 and 2011

The NTP is facing critical gaps in ensuring diagnosis, treatment and care for people suffering from MDR-TB and people co-infected with TB and HIV/AIDS. The National Strategic Plan includes the treatment of 4000 MDR-TB patients from 2011 to 2015 and does not mention geographical scale-up beyond 10 MDR-TB pilot project townships. With the annually estimated 9000 MDR-TB cases emerging or 5200 MDR-TB cases estimated in 2010 among notified pulmonary TB cases, this scale-up was felt insufficient by the NTP and partners.[3,1] Global commitment to accelerated MDR-TB management was reinforced by the time the National Strategic Plan was developed, first at the ministerial meeting of high multi/extensively drug-resistant TB burden countries in Beijing, China, 2009, and then with the subsequent resolution passed by the World Health Assembly in May 2009 (WHA 62.15).[2] Based on this renewed global commitment, the NTP decided to be more ambitious in the scale-up of MDR-TB management. Likewise for TB/HIV, the National Strategic Plan outlines that only 26 out of 325 townships would deliver complete TB/HIV activities by the end of 2015 (by April 2012, 17 townships and one public hospital were implementing activities), while an additional 45 would ensure HIV voluntary counselling and testing for TB patients. The slow pace of TB/HIV scale-up is largely due to the historical and present lack of antiretroviral therapy (ART) and HIV test kits.

Based on the 2009-2010 nationwide TB prevalence survey and the increased commitment to care for people suffering from MDR-TB and TB/HIV co-infection, the NTP and partners (including the National AIDS Programme for the TB/HIV plan) have developed three strategic plans supplementing the 2011-2015 National Strategic Plan:

1. Strategic plan on active case-finding, 2012-2015 (developed in 2012)

[1] World Health Organization. *Multidrug and extensively drug-resistant TB (M/XDR-TB): 2010 Global Report on Surveillance and Response.* (http://whqlibdoc.who.int/publications/2010/9789241599191_eng.pdf)
[2] World Health Assembly resolution WHA62.15 on prevention and control of M/XDR-TB (http://www.who.int/tb/features_archive/wha62_15_tb_resolution/en/index.html)

2. Expansion plan for the programmatic management of drug-resistant tuberculosis 2011-2015 (developed in 2011)
3. Nationwide scale-up plan for TB/HIV collaborative activities, 2012-2015 (developed in 2012)

The development of these strategic plans including budgets as parts of the National Strategic Plan was recommended by the review of the NTP that took place in Myanmar, 7-15 November 2011.[3] All plans have been developed in line with WHO recommendations and with input from partner agencies through the TB TSG. With the plan to intensify TB case-finding it is expected that an additional 33 000 TB cases will be diagnosed and put on treatment from 2012 to 2015. In 2015, the case notification rate (all forms of TB) could therefore be higher than 300 TB cases per 100 000, representing a case detection rate of 80%. Furthermore, the MDR-TB and TB/HIV plans follow the targets set in the Global Plan to Stop TB, 2011-2015 (Table 2).

Table 2. MDR-TB and TB/HIV implementation targets set forth in the Global Plan to Stop TB, 2011-2015

Indicator	2015 target
Previously treated TB patients tested for MDR-TB	100%
New TB patients tested for MDR-TB	20%, all at high risk
MDR-TB patients treated following WHO guidelines	100%
TB patients tested for HIV	100%
HIV-positive TB patients on cotrimoxazole preventive therapy (CPT)	100%
HIV-positive TB patients enrolled on antiretroviral therapy	100%
Percentage of people living with HIV attending HIV care services who were screened for TB at their last visit	100%
Percentage of people living with HIV attending HIV care services who were enrolled on isoniazid preventive treatment, among those eligible	100%

As a result of the new interventions to improve TB case-finding and the more ambitious MDR-TB and TB/HIV scale-up plans, the funding requirements and targets will need to be adjusted. This supplement to the National Strategic Plan therefore also includes a revision of funding needs, availability and gaps, resource mobilization efforts as well as revised indicators and targets.

[3] World Health Organization. *Review of the National Tuberculosis Programme, Myanmar, 7-15 November 2011.* (http://www.whomyanmar.org/LinkFiles/TB_Review_report_Book.pdf)

2. Summary of the three new/updated strategies of the National Strategic Plan

2.1. Strategic plan on active case-finding, 2012-2015

The strategy is based on the 2011 WHO guidelines on "Early detection of Tuberculosis" and WHO guidelines being developed for contact investigation.[4] The strategy foresees building capacity for active case-finding in an incremental fashion resulting in finding at least an additional 33 000 TB cases from 2012 to 2015.

Basic interventions that need continuous strengthening and are not part of the plan include: scale-up of basic TB services (remote and conflict areas), improvement in basic diagnostic and treatment practices, and expansion of engagement of private practitioners, informal provider and NGOs. The interventions included in the strategy are:

- Improving suspect identification and diagnosis in health facilities
- Screening in risk groups
- Contact investigation
- Screening of prisoners
- Mobile clinics for TB screening in high-prevalence communities including poor urban settlements

It should be noted that although the incidence of TB was highly underestimated in the National Strategic Plan, the first-line anti-TB drugs budgeted for are sufficient to treat the higher number of TB patients in the country, including the additional cases found through the implementation of the active case-finding strategy. In the last National Strategic Plan close to 800 000 TB cases were included for treatment for the five-year period, ranging from 150 631 in 2011 to 168 619 in 2015.

[4] World Health Organization. *Early detection of Tuberculosis. An Overview of Approaches, Guidelines and Tools.* 2011 (http://whqlibdoc.who.int/hq/2011/WHO_HTM_STB_PSI_2011.21_eng.pdf)

The cost of the additional activities to intensify TB case finding amounts to US$ 6 million, with the most expensive activity being the mobile clinics to screen high-risk communities, particularly in remote or rural areas.

2.2. Expansion plan for the programmatic management of drug-resistant tuberculosis, 2011-2015

Based on the results of the MDR-TB pilot project that was launched in 2009, MDR-TB management is being scaled up. Revised MDR-TB guidelines are being published in 2012 with expanded eligibility criteria for drug susceptibility testing (DST) and treatment and with a revised model of care with more focused on community-based MDR-TB management.

The MDR-TB expansion plan states that all retreatment cases, contact to MDR-TB cases and people living with HIV/AIDS should be tested for MDR-TB. Moreover, all patients diagnosed with MDR-TB should be treated under WHO-endorsed treatment protocols.

From 2011-2015, almost 10 000 MDR-TB cases will be enrolled for treatment. The annual number of MDR-TB patients to be enrolled and the scale-up of diagnostic and clinical facilities are presented in Table 3. By the end of 2015, 100 townships would have MDR-TB facilities, covering 41.5% of the population.

Table 3. Geographical expansion of MDR-TB diagnostic and clinical facilities

Year	MDR-TB patients enrolled on treatment	Reference laboratories with culture/ with DST	Centres with Xpert MTB/ RIF	Regions or states with MDR-TB treatment centre	Townships with MDR-TB treatment centre	Town-ships covered (%)	Popula-tion covered (%)
2011	500	2/2	2	2	22	6.7%	9.3%
2012	1 200	3/2	6	6	37	11.2%	14.6%
2013	1 800	4/3	12	9	62	18.8%	26.3%
2014	2 400	5/4	17	11	72	21.8%	31.6%
2015	3 395	5/5	23	13	100	30.3%	41.5%

The cost of MDR-TB patient management is calculated at US$ 5000 per patient, including second-line anti-TB drug costs of US$ 2500. The total patient costs are therefore calculated at US$ 46.7 million. The total costs of the MDR-TB scale-up plan are US$ 55.3 million and include the MDR-TB patient costs plus the programme costs of US$ 8.6 million.

2.3. Nationwide scale-up plan for TB/HIV collaborative activities, 2012-2015

The plan was developed following the 2012 WHO guidelines on TB/HIV collaborative activities.[5] The major challenges to scaling up collaborative TB/HIV activities in Myanmar include:

- Limited availability of commodities such as rapid HIV test kits, drugs for opportunistic infections including cotrimoxazole, and ART
- Centralization of HIV diagnosis, care and treatment services including ART mainly at state/region and district levels
- Inadequate human resources

The severe lack of ART in Myanmar (only one-third of people living with HIV/AIDS that are in need receive ART, leaving 80 000 people without life-saving treatment) has a negative impact on the TB epidemic as it has been shown that early initiation of ART reduces TB incidence. The NTP will therefore also support resource mobilization efforts for ART scale-up as described in the National AIDS Programme's strategic plan, 2011-2015.

As detailed in the TB/HIV scale-up plan, collaborative activities will be gradually scaled up to all townships and public hospitals by 2015 (Table 4). In scaling up collaborative TB/HIV activities, the National AIDS and TB Programmes will aim to decentralize and integrate TB and HIV services, preferably at the same time and location through a "one stop service". Due to concentrated nature of the HIV epidemic, the efforts to scale up collaborative TB/HIV activities will also cover people who inject drugs and other drug users. Total cost for the nationwide scale-up plan for collaborative TB/HIV activities over the four-year period is estimated at US$ 12 million, including infection control measures, ranging from US$ 1 million in 2012 to US$ 5 million in 2015. The plan includes rapid HIV test kits for TB patients and cotrimoxazole and antiretroviral drugs for HIV positive TB patients for a one-year duration.

Table 4. Geographical scale-up of TB/HIV collaborative activities

	2011 (baseline)	2012	2013	2014	2015
Number of new townships (cumulative)	17	28	31	70	182
Number of public hospitals (cumulative)	1	8	24		
Total (cumulative)	18	54	109	179	361

[5] World Health Organization. *WHO policy on collaborative TB/HIV activities: Guidelines for national programmes and other stakeholders.* 2012 (http://whqlibdoc.who.int/publications/2012/9789241503006_eng.pdf)

3. Updated financing of the National Strategic Plan, 2011-2015

3.1. Total costs for tuberculosis control, funding availability and gaps

The funding requirements for the new interventions to improve TB case-finding and the more ambitious MDR-TB and TB/HIV scale-up plans are US$ 74 million (Table 5).

Table 5. Funding requirements for the three new/updated strategic plans. Figures are in US$.

	2011	2012	2013	2014	2015	Total
Active case-finding		342 802	1 229 230	2 365 280	2 200 111	6 137 423
TB/HIV		1 126 077	2 266 338	3 526 591	5 295 022	12 214 027
MDR-TB	3 206 133	8 488 401	11 544 180	13 324 496	18 748 207	55 311 417
Total	**3 206 133**	**9 957 280**	**15 039 748**	**19 216 367**	**26 243 340**	**73 662 867**

The total costs for TB control from 2011-2015 as described in the National Strategic Plan were US$ 160 million. With the three new/updated plans, the total cost will increase by US$ 26 million to US$ 186 million. Table 6 shows the funding requirement per service delivery area split down into 19 different activities/interventions, while Figure 1 show the total costs as well as the summary costs for different activities/interventions (19 activities/interventions grouped into 9 activities/interventions). The most costly interventions during the five-year period are:

- MDR-TB (including second-line drugs or SLDs and Xpert MTB/RIF machines): US$ 55 million
- Human resources (staff, training and technical assistance): US$ 28 million
- First-line drugs procurement and management: US$ 25 million
- Improving diagnosis: US$ 24 million
- Programme management, supervision, monitoring and evaluation, operational research: US$ 17 million
- TB/HIV collaborative activities: US$ 16 million

Table 6. Total costs for TB control in Myanmar according to 19 service delivery areas, 2011-2015. Figures are in US$. Figures in blue are updates to the National Strategic Plan.

Service delivery area	2011	2012	2013	2014	2015	Total
Improving diagnosis	4 897 228	4 814 959	4 449 532	4 937 003	5 230 909	24 329 631
Patient support	200 600	351 397	351 235	356 535	357 135	1 616 902
First-line drugs procurement and management	7 921 999	4 194 591	4 289 258	4 387 899	4 443 960	25 237 706
Monitoring and evaluation	123 967	82 566	120 666	112 706	1 106 982	1 546 887
Programme management and supervision	2 917 624	3 209 051	3 141 628	3 071 682	3 126 254	15 466 239
Human Resource Development: Staff	3 350 118	3 817 750	3 881 891	3 939 623	3 858 825	18 848 209
Human Resource Development: International TA	449 000	185 000	195 000	175 000	205 000	1 209 000
Human Resource Development: Training	1 538 683	1 533 861	1 561 212	1 609 657	1 513 873	7 757 284
Active case-finding		342 802	1 229 230	2 365 280	2 200 111	6 137 423
Collaborative TB/HIV activities	3 576 304	1 126 077	2 266 338	3 526 591	5 295 022	15 790 332
MDR-TB (including SLDs)	3 206 133	8 488 401	11 544 180	13 324 496	18 748 207	55 311 417
High risk groups	155 450	141 830	141 890	138 450	138 540	716 160
Infection control	229 312	132 876	73 464	73 892	62 900	572 444
Childhood TB	10 000	10 000	10 000	10 000	10 000	50 000
PAL	15 500	15 800	20 800	15 800	12 300	80 200
PPM/ISTC	187 732	204 950	218 671	262 775	319 583	1 193 711
ACSM	919 979	990 463	1 196 133	1 238 955	1 236 581	5 582 112
Community involvement	496 918	878 134	939 964	985 890	822 552	4 123 458
Operational research	44 600	44 600	44 600	44 600	44 600	223 000
Other	42 500	42 500	42 500	42 500	42 500	212 500
TOTAL	**30 283 647**	**30 607 609**	**35 718 191**	**40 619 333**	**48 775 834**	**186 004 615**

Figure 1. Total funding required per year as well as the summary costs of the different TB control activities/interventions (grouped into 9 intervention areas)

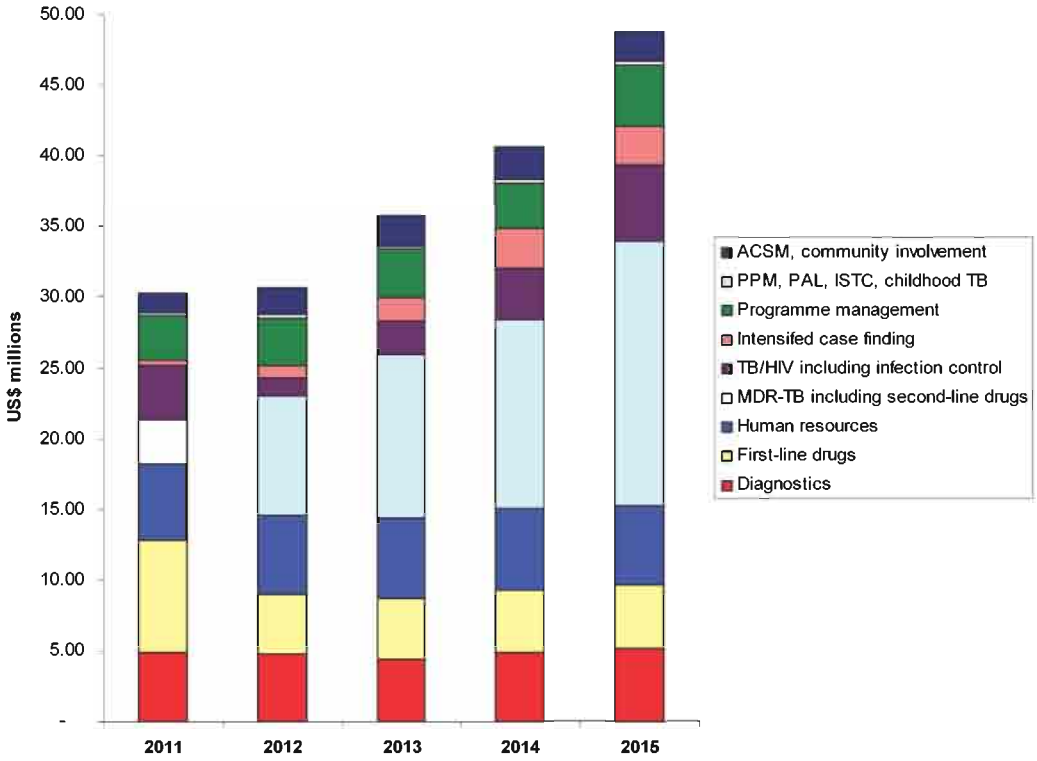

Table 7 shows the estimated available funds for TB control in Myanmar during the five-year period. This table was updated in July 2012 and is different from the estimated funding sources in the National Strategic Plan. The vast majority of funding for TB control is expected from the Global Fund (US$ 79 million) followed by the Government (US$ 9 million) and the emerging 3MDG Fund (US$ 8.4 million). Nongovernmental organizations' (NGOs) resources for TB control are coming predominantly from the Global Fund, the Three Diseases Fund (3DF), TBREACH and the United States Agency for International Development (USAID) (funding already included in Table 7). However, some NGOs have funding for overall health development (including from multinational and bilateral donors and from their own organization's resources). Anti-TB medicines are provided by the NTP to all collaborating organizations including Population Services International (PSI) and Myanmar Medical Association (MMA) affiliated private practitioners.

Based on the estimated available funds, the funding gap for 2011 to 2015 is US$ 67 million, ranging from US$ 4 to 25 million per year.

Table 7. Estimated funding sources for TB control in Myanmar, 2011-2015. Figures are in US$.

	2011	2012	2013	2014	2015	Total
Government[a]	1,233,147	1,938,561	1,938,561	1,938,561	1,938,561	8,987,391
Global Fund[b]	14,597,710	15,541,588	14,730,587	16,115,181	17,610,073	78,595,139
3DF	4,371,170	1,712,757				6,083,927
3MDG[c]			2,800,000	2,800,000	2,800,000	8,400,000
JICA[d]	160,113	191,238				351,351
USAID[d,e]	2,000,000	2,000,000				4,000,000
TBREACH		2,422,588				2,422,588
WHO	148,401	137,000	137,000	137,000	137,000	696,401
UNITAID[f]	197,913	197,913				395,826
GDF[g]	845,000	935,000	1,030,000			2,810,000
NGOs	243,822	1,871,991	1,345,000	1,345,000	1,300,000	6,105,813
TOTAL	**23,797,276**	**26,948,636**	**21,981,148**	**22,335,742**	**23,785,634**	**118,848,436**
Funding gap	6,486,371	3,658,973	13,737,043	18,283,591	24,990,200	67,156,179

[a] The funds mentioned here are for vertical TB activities only, including: salaries of TB-specific staff, cost for three government TB hospitals and anti-TB drugs. Although TB control is mainly implemented through the primary health-care services and relies heavily on basic health staff, apportioned costs related to general infrastructure, staff and services have not been included.

[b] It is expected that 90% of the Phase II funding will be available as a result of good performance (A1 rating in the first 18 months of the grant).

[c] While it has been indicated that 15% of the 3MDG Fund will be allocated for HIV, TB and malaria, the division of funding for the three diseases is not clear. This amount is therefore uncertain.

[d] Donor support will most likely continue but funding not yet secured/agreed and therefore no funding has been included for 2013-2015 (as preferred by the donors).

[e] USAID support is provided to PSI, FHI360 and WHO.

[f] UNITAID support includes support under EXPAND-TB.

[g] Support covers paediatric drugs with donations to the Global Drug Facility from the Canadian International Development Agency and USAID.

The major funding gaps for TB control are:

- Diagnosis, treatment and care for 8200 MDR-TB patients (US$ 41 million, out of which half would be needed for second-line anti-TB drugs plus US$ 2.5 million for infrastructure support)
- Implementing the TB/HIV scale-up plan (US$ 6 million gap)
- Implementing the active case-finding plan (US$ 6 million)
- Expanding laboratory services, including three additional culture and drug-resistance testing laboratories and 20 Xpert MTB/RIF machines in each state/region
- Programme management costs (supervision, training, monitoring and evaluation, human resources)

3.2. Resource mobilization

The principles for resources mobilization as outlined in the National Strategic Plan still hold, and the possible solutions are:

- **Patients/households:** The cost of TB, HIV-associated TB and MDR-TB diagnosis, treatment and care cannot be expected to be financed by patients and therefore collective financial mechanisms are required. Efforts should continue to minimize as much as possible out-of-pocket payments to avoid catastrophic health expenditures.
- **Government:** The Department of Health has announced that the health budget will more than double in 2012-2013 compared to fiscal year 2010-2011 (250 billion Kyats compared to 97 billion Kyats). By 2015 the government aims to allocate 5% of the gross national product to health. The financial contribution to TB control needs to be significantly increased by filling vacant positions and additionally by support for supervision, monitoring and first-line anti-TB drugs to all townships.
- **Global Fund:** The Global Fund contribution to TB control covers more than 70% of the available funding. The Global Fund grant will ensure funding for medicines, laboratory equipment and supplies, human resource development, monitoring and supervision, advocacy activities, engagement of all health-care providers, community based care etc. The NTP and partners aim to secure a 90% funding of the Round 9 Phase II grant budget (2013-2015). The NTP developed a proposal to the Global Fund Round 11 to cover for the shortfalls for the three priority areas. The cancellation of Round 11 has been devastating to TB patients, their families and the community. Likewise, the cancellation of Round 11 was devastating for people living with HIV/AIDS in Myanmar. For possible future Global Fund funding oppotunities, the NTP would be ready to apply.
- **3MDG Fund:** As a result of the return of the Global Fund to Myanmar, 3DF will change its scope of work and will in 2012 become the 3MDG Fund (a donor consortium of the governments of Australia, Denmark, the Netherlands, Norway, Sweden, United Kingdom and the European Commission). The three targets of the 3MDG Fund are: to reduce the mortality rate among children under five, to reduce maternal mortality rates, and to halt and begin to reverse the spread of HIV and AIDS, TB and malaria. It has been announced that US$ 300 million is available from the 3MDG Fund for the next five years. Although the bulk of funds will support maternal and child health activities, about 15% of the funds

will support TB, HIV and malaria. For TB, US$ 2.8 million per year has been indicated from the 3MDG Fund for 2013-2015. However, it is hoped that additional funding will be available. Moreover, synergies will be explored for TB control among children (almost 25% of Myanmar's TB cases occur among children) and women and also for health system strengthening support.

- **USAID:** USAID has been providing funds to WHO and PSI for the last few years. The funding to WHO has ensured technical assistance and capacity development needed to manage MDR-TB, laboratory strengthening and infection control. In addition to this support and in 2011, USAID launched through FHI360 the project: *Greater Mekong Subregion Multidrug-Resistant Tuberculosis Prevention and Management Project,* also known as CAP-TB (Care and Prevention of TB) project. This project will support China, Thailand and Myanmar. It is expected that USAID will continue to support WHO, PSI and the CAP-TB project also from 2013- 2015.

- **UNITAID:** UNITAID has been a key partner for the management of MDR-TB in Myanmar through the renovation/upgrading of the two National TB Reference Laboratories to biosafety class III laboratories (EXPAND-TB) and provision of second-line anti-TB drugs to the initial 200 MDR-TB patients treated. Moreover, UNITAID has supported the provision of pediatric anti-TB drugs. At the end of 2011, a consortium of partners including WHO, Stop TB Partnership, Foundation for Innovative New Diagnostics, Global Laboratory Initiative and TBREACH submitted a Letter of Intent and proposal to UNITAID for procurement of Xpert MTB/RIF machines and cartridges. Myanmar is included on the list of beneficiary countries. Should UNITAID agree to this proposal, the Xpert MTB/RIF cartridge price will drop from US$ 17 to US$ 10 per cartridge. Until now, no decision has been taken by the UNITAID board. In addition to the Xpert MTB/RIF machines and cartridges, UNITAID is considering supporting second-line anti-TB drugs to high MDR-TB burden countries including Myanmar.

- **Japan International Cooperation Agency (JICA):** Longstanding support has been provided by JICA and it is expected that future support will continue and possibly increase. JICA is also providing important technical support to the NTP with the presence of technical staff in country.

- **Other donors:** TB REACH will launch its third wave of funding in June 2012 and discussions will be held in the TB TSG to maximize the quality of TB proposals from Myanmar (support is given to increase TB case-finding). Private-sector

funding for TB control (as currently provided mainly to HIV/AIDS by the Yadana Consortium) should be further explored. NGOs also have their own core funds, although they rely heavily on the Global Fund and the 3DF/3MDG Fund.

- **Development Banks:** Assessments are currently carried out by the Asian Development Bank and the World Bank for future support to development in Myanmar. Should collaboration emerge on health development, TB should be included as one of the main causes or morbidity and mortality.

4. Updated indicators and targets

Table 8 indicates the revised impact targets (WHO and NTP estimates and data updated as a result of the prevalence survey) according to the overall goal and targets set forth for the planning period to reach the MDG and Stop TB Partnership targets.

Table 8. TB impact targets with baseline value and target for year 2015

Impact indicators	Baseline			2015 target
	Value	Year	Source	
TB prevalence per 100 000 population	894	1990	WHO Global TB report, 2011	447
TB mortality (all forms of TB) per 100 000 population	110	1990	WHO Global TB report, 2011	55
TB incidence per 100,000 population/year	393	1990	WHO Global TB report, 2011	<393
Prevalence of MDR-TB among new smear-positive TB patients	4.2%	2007	National drug resistance survey	<4%
Outcome indicators				
Case detection rate (all forms of TB)	71%	2010	WHO global TB report, 2011	≥ 80%
Case notification rate (all forms of TB)/100 000 population/year	274	2010	WHO global TB report, 2011	≥ 300
Treatment success rate	85%	2009	NTP, Myanmar	≥ 85%
Treatment success rate among MDR-TB cases	N/A	N/A	N/A	≥ 75%

Table 9 illustrates the monitoring and evaluation of programmatic targets or outcome targets for the planning period, structured according to the key Stop TB Strategic components.

Table 9. Programmatic indicators for the activities to be conducted 2011-2015 by the NTP of Myanmar in close collaboration with partners

Stop TB Strategy Component	Indicators	Baseline	Year	2015 Target
Pursue high-quality DOTS expansion and enhancement				
Ensure early case detection, and diagnosis through quality-assured bacteriology	Number of microscopy laboratories monitored under the external quality control system.	50	2009	447
	Number of laboratories with fluorescence microscopes.	4	2009	109
	Number of culture laboratories available.	2	2009	5
	Number of laboratories conducting quality-assured DST to second-line drugs.	0	2009	1
	Number of laboratories performing molecular line probe assays for the rapid detection of MDR-TB.	2	2010	2
	Number of laboratories/clinics using Xpert MTB/RIF.	0	2009	23
	Number of new TB patients (all forms) registered for treatment.	134 023	2009	161 354 (all cases) 154 577 (new and relapse)
Provide standardized treatment with supervision, and patient support	Number of community health workers trained and actively involved in TB case-finding and/or treatment activities at community level (cumulative).	NA	2009	13 500
	Number of TB patients families receiving community support/ incentives.	7 696	2008	52 790
Ensure effective drug supply and management	Number of treatment units reporting no stock-out of first-line anti-TB drugs (adult and child formulations) at the last day of each quarter (including PPM).	336	2009	351

Provide efficient programme management including monitoring and evaluation	Number of townships supervised and feedback provided by NTP during each quarter.	175	2009	304
	Proportion of new smear-positive TB patients successfully treated among all new smear-positive TB patients detected.	85%	2009	>85%
Ensure availability of trained and motivated human resources	Number of basic health staff trained on selected modules of management of TB for health facility staff (cumulative).	3 059	2008	18 059
	Number of laboratory technicians trained (cumulative).	618	2008	1 218
	Number of community health volunteers trained (cumulative).	NA	2009	40 110
	Number of private practitioners trained (cumulative).	1 500	2009	1 395
Address TB/HIV, MDR-TB, and the needs of poor and vulnerable populations				
Scale up collaborative TB/HIV activities	Number of TB patients tested for HIV.	4 174	2009	121 000 (100% of adult TB patients)
	Diagnosed TB/HIV patients received CPT in areas where comprehensive TB/HIV services are in place.	97%	2009	100%
	Diagnosed TB/HIV patients eligible for ART receiving.	65%	2009	100%
Scale up prevention and management of multidrug-resistant TB	Number of laboratory confirmed MDR-TB patients enrolled in the MDR-TB treatment programme.	64	2009	3 395
	Proportion of MDR-TB patients successfully treated.	N/A	2009	75%
Ensure treatment of TB in children	Number of <15 years childhood TB patients diagnosed and registered for treatment.	27 692	2007	41 518
Address the needs of poor and vulnerable populations	Number of new smear-positive TB patients registered in targeted border townships.	243	2007	959

	Number of sites in which active TB case-finding activities by mobile teams is conducted (focusing on high-prevalence areas such as urban townships with high level of poverty and/or internal migration as well as rural townships with poor access to health care).	N/A	N/A	28
Strengthen infection control in health services, other congregate settings and households	Number of TB/HIV and MDR-TB management units implementing infection control measures.	6	2009	325
Engage all care providers Involve all public, voluntary, corporate and private providers through Public-Private Mix approaches and promote the use of the International Standards for Tuberculosis Care	Number of private practitioners involved in DOTS.	1 500	2009	2 058
	Number of TB patients (all types) registered for treatment by private practitioners (Scheme 3).	17 123	2009	28 900
Empower people with TB, and communities through partnership Pursue advocacy, communication and social mobilization	Population with correct knowledge about TB (mode of transmission, symptoms, treatment and curability). Based on KAP* survey results.	38%	2009	50%
	People who correctly identify "cough of 2 weeks or longer" as symptom of TB. Based on KAP survey results.	66%	2009	80%
Foster community participation in TB care, prevention and health promotion and promote use of the Patients' Charter for Tuberculosis Care	Proportion of new smear-positive TB patients successfully treated among all new smear- positive patients supervised by community health workers.	NA	2009	85%
Enable and promote research Conduct programme-based operational research	Operational research studies completed and results disseminated through national/global TB monitoring and evaluation systems.	2	2009	6

*KAP – Knowledge, attitudes and practices

STRATEGIC PLAN FOR ACTIVE CASE-FINDING

2012-2015

ANNEX 1
TO
FIVE YEAR NATIONAL STRATEGIC PLAN
FOR
TUBERCULOSIS CONTROL

2011-2015

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Abbreviations

ACF	active case-finding
AFB	acid-fast bacillus
AIDS	acquired immunodeficiency syndrome
BHS	basic health staff
C.I.	confidence interval
CXR	chest X-ray
DOTS	the basic package that underpins the Stop TB Strategy
GP	general practitioner
HIV	human immunodeficiency virus
IPT	isoniazid preventive therapy
MDR-TB	multidrug-resistant tuberculosis
MOH	Ministry of Health
MOHA	Ministry of Home Affairs
NGO	nongovernmental organization
NTP	National Tuberculosis Programme
PPM	public-private mix / public-public mix
RHC	rural health centre
SCC	sputum collection centre
TB	tuberculosis
US$	United States dollar
WHO	World Health Organization

1. Introduction

Based on the 2009-2010 prevalence survey, the prevalence of bacteriologically confirmed tuberculosis (TB) in Myanmar is estimated at 434/100 000 in all age-groups combined, and the prevalence of smear-positive TB at 172/100 000.[1] The prevalence of active TB is higher in urban areas than in rural, higher among men than among women, and higher among the elderly than among young adults. Among adults in urban areas, the prevalence is close to 1%. The prevalence rate is also higher in states, which are dominated by ethnic minority groups. The States are mostly rural and less densely populated, with generally weaker health care access than other parts of the country (regions). The lowest prevalence (though still high) is thus in rural areas in the regions.

Table 1. Prevalence of TB among people aged 15 years and above

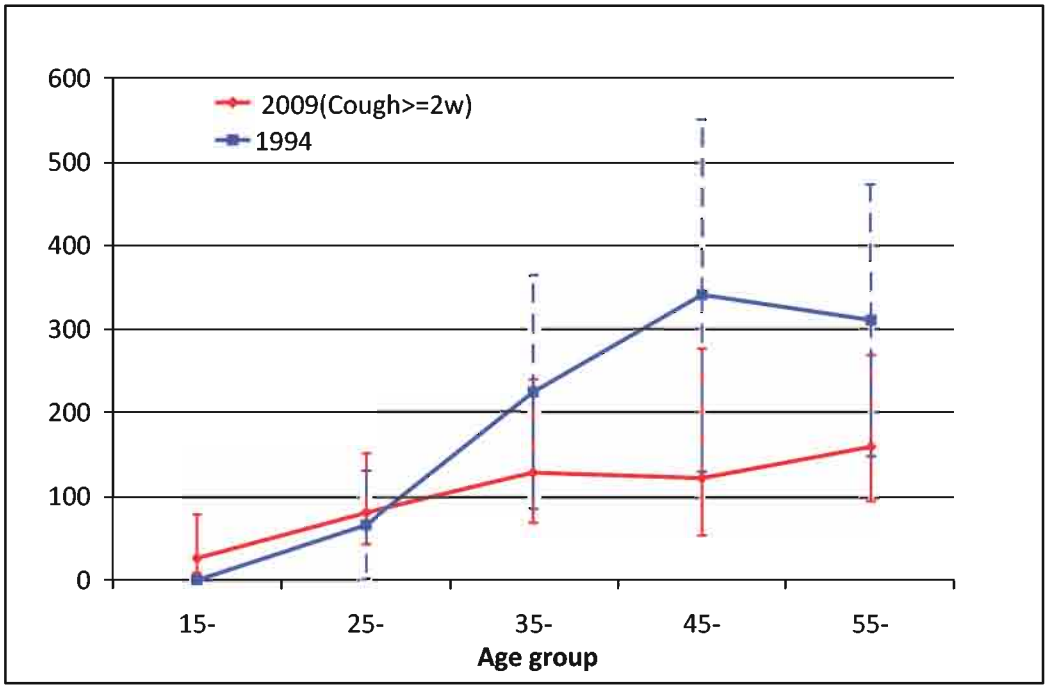
		Smear-positive cases			Bacteriologically confirmed cases		
		n	/100 000	95% C.I.	n	/100 000	95% C.I.
All participants		123	242.3	186.1-315.3	311	612.8	502.2-747.6
Strata	**Region**	70	191.6	137.4-267.3	192	522.8	420.9-649.1
	State	53	369.0	235.6-577.5	119	838.0	560.3-1251.5
Urban/rural	**Urban**	38	330.7	216.2-505.7	103	903.2	66.8-1231.5
	Rural	85	216.1	153.6-304.0	208	526.8	410.1-676.5

Source: Nationwide TB Prevalence Survey (2009-10) Report

A comparison of survey findings in 2009-2010 with a 1994 TB prevalence survey (adjusting for differences in screening methodology) suggests that there has been a substantial decline in prevalence of smear-positive TB cases with chronic cough between 1994 and 2009-2010. The decline, however, was only seen among people aged over 35 years while it was unchanged for people between 15 and 35 years (Figure 1). Programme monitoring data shows that paediatric TB cases represented 23% of all notified TB cases in the country. High rates of TB among the young, and a lack of decline over time in the age groups with higher likelihood of TB resulting from recent transmission, than reactivation of latent TB, suggests that the rate of transmission remains high in the community.

[1] *Review of the National Tuberculosis Programme, Myanmar, 7-15 November 2011*. WHO

Figure 1. Comparison of two survey results with same screening and diagnostic criteria – Smear-positive: Prevalence Survey 2009-10 (cough ≥ 2 weeks) vs 1994

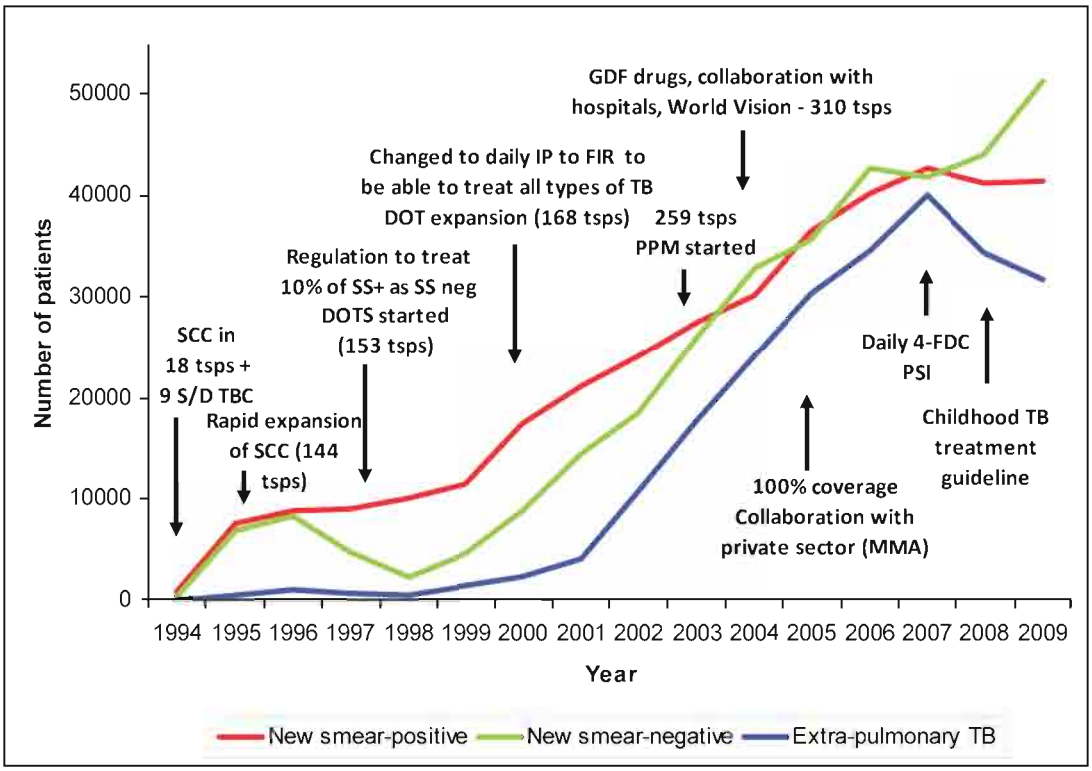


Source: Nationwide TB Prevalence Survey (2009-2010) Report

In the 2009-2010 survey, 123 smear-positive cases were identified, which represented only 40% of the 311 bacteriologically confirmed TB cases detected (Table 1). Among all cases with bacteriologically confirmed TB, only 21% fulfilled the "TB suspect" criterion of cough >2 weeks, while 62% reported at least one symptom compatible with TB. Only 34% of the smear-positive cases fulfilled the TB suspect criteria. Only 40 cases (13%) of the total number of confirmed cases had both cough >2 weeks and positive sputum-smear microscopy. Thus, applying the standard TB suspect criteria and performing only sputum smear microscopy for TB suspects would have detected only 13% of all bacteriologically confirmed cases, and only a third of the smear-positive cases.

Case notification of smear-positive cases increased steadily from 1994 when DOTS was introduced, until 2007. It has since levelled off (Figure 2). The trend correlates closely with DOTS expansion efforts, including increased geographical coverage, public–private or public–public mix (PPM) scale-up (now contributing 20% of all cases), engagement of partners, and number of individuals investigated with sputum smear microscopy.

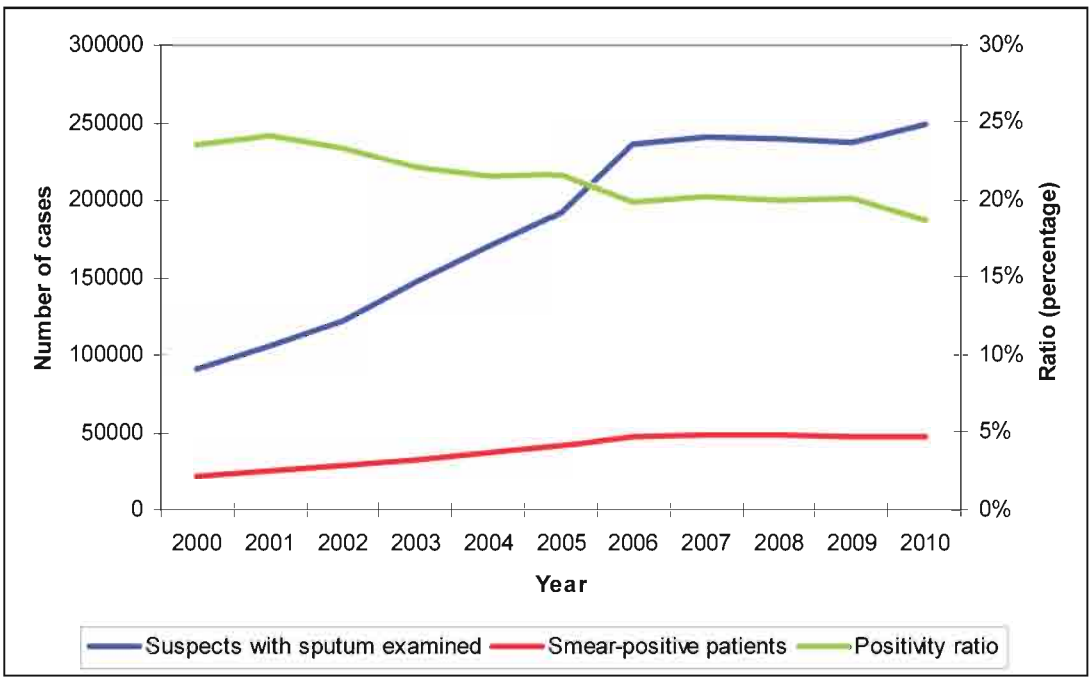
Figure 2. Case notification trends (1994-2010)



Source: NTP

The sputum positivity ratio (the proportion that is smear-positive among those tested with sputum microscopy) has decreased slightly over the past 10 years, and with inverse correlation to the increase in the number of people investigated with sputum smear microscopy (Figure 3). However, the positivity ratio is still very high, at 19% in 2010. This confirms that the background prevalence of smear-positive TB is high, and may also suggest that people are being diagnosed at rather late stages of the disease after long delays. The slow decline in the positivity ratio further underscores that there has so far been only limited expansion of testing with sputum smear microscopy to target also people with less apparent TB symptoms.

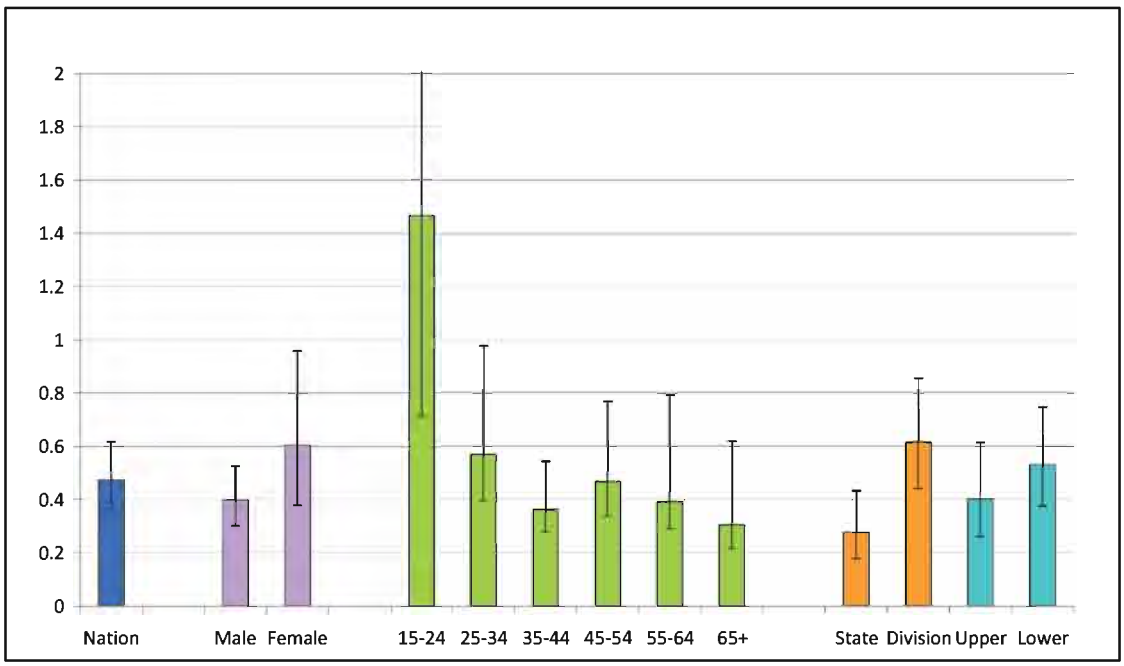
Figure 3. Trends in number of people investigated with sputum smear microscopy, smear-positive cases detected, and sputum positivity ratio



Source: NTP

The ratio of case notification rate in 2009 to prevalence of smear-positive cases in the survey was 0.5 overall, but varied greatly between different groups (Figure 4). There is a tendency for case notification to be comparatively lower in relation to prevalence in states, among older age groups, and among men. Low case notification in states, especially in remote areas and conflict zones, seem closely correlated with lack of (or poorly functioning) TB centres in those areas, and/or very long distance to the nearest facility.

Figure 4. Notification/prevalence ratios for smear-positive TB by different groups



Source: National TB Prevalence Survey (2009-10) Report

A prevalence survey conducted in Yangon Region in 2006, as well as several operational research studies, have shown that people in the urban areas who are seeking care with TB symptoms normally first turn to the private sector, when they do seek care. However, the 2010 national prevalence survey showed that the majority of people do not seek formal health care, at least early in the disease course. The survey also showed that people in rural areas seek care in the public sector more often than in the private sector, while it confirmed the reverse pattern in urban areas.

Among people with smear-positive TB detected in the prevalence survey, 35% had not taken any action, 27% had self-medicated, 17% had gone to a pharmacy or traditional healer, 11% had gone to a public health care facility, and 10% to a private general practitioner (GP). A study of health-seeking behaviour among people with chronic cough identified through the prevalence survey reported similar findings. Only 19% had sought care from a trained provider. No action, self-medication, or attending a traditional healer or drug shop were significantly more common among the poorest, among people in rural areas (especially in the states) and among men.[2]

[2] Zaw Win, Marc Theuss, Norio Yamada, Tin Aung, Hnin Wai Lwin Myo, Thandar Lwin. *Patterns of Health Seeking Behavior Related to Long-term Cough: Evidence from Myanmar.* Poster presented at the Forty-Second Union World Conference on Lung Health (Lille, 2011).

2. Implications for further action to improve early TB case detection

2.1. Beyond the basics

The above observations indicate that the National Tuberculosis Programme (NTP) has been successful in diagnosing and curing many smear-positive cases through scaling up high-quality DOTS in the public and private sectors in most parts of the country. This seems, however, to have had limited impact on transmission. This probably results from a combination of high transmission from smear-positive TB cases whose TB diagnosis is delayed, and moderate transmission from the relatively less infectious cases (including smear-negative TB). The latter group is more numerous and more likely to be missed by the current case detection strategy. More attention needs to be paid to early diagnosis of smear-positive as well as smear-negative cases.

The first priority to achieve this is to complete the scale-up of basic (TB) services where these are not in place (i.e. in remote areas and conflict zones, when possible), and ensure basic diagnostic and treatment services of good quality. Continued and expanded engagement of relevant private sector providers, informal providers, and local and international nongovernmental organizations (NGOs) is also essential.

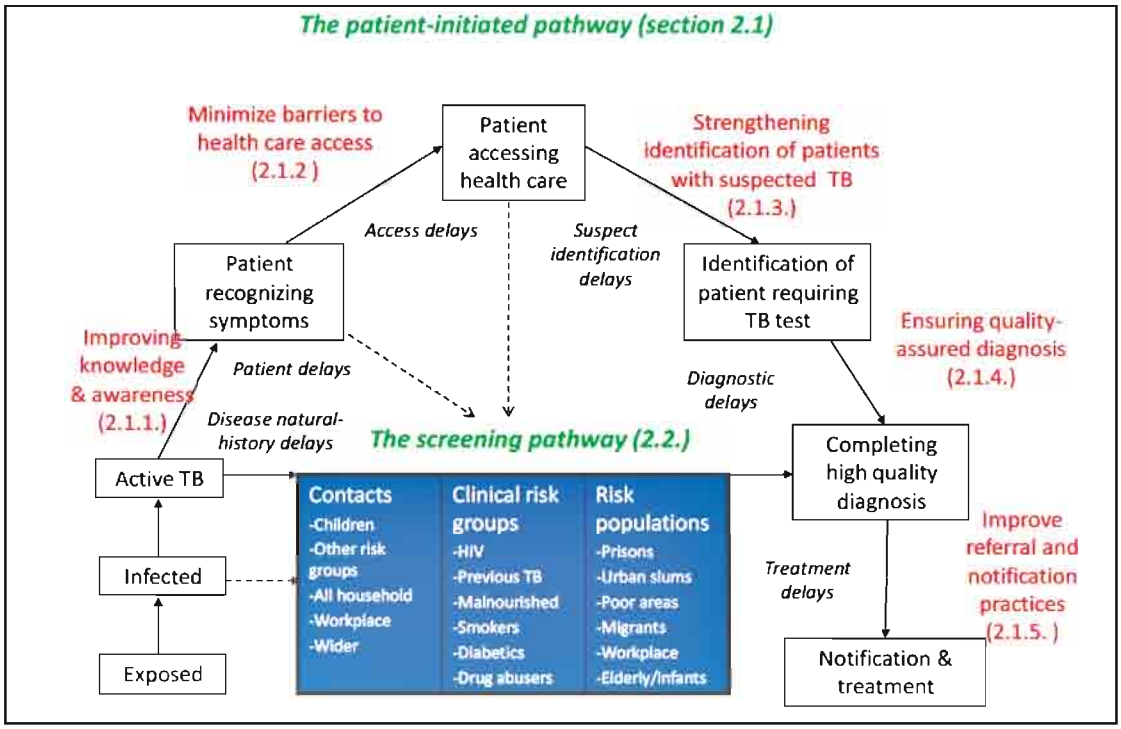
For full scale-up of current case detection, however, existing strategies will not be sufficient. Among people over the age of 15, the current TB-suspect definition and use of smear microscopy can only detect about one-third of all smear-positive cases, and only 13% of all bacteriologically verifiable cases. Complete geographical DOTS coverage and high performance of sputum smear laboratories has, thus, limited effectiveness to detect all people with bacteriologically verifiable disease, as well as to detect smear-positive cases early. The high positivity rate among people tested with smear microscopy suggests a combination of high underlying prevalence, late diagnosis, and high selectivity of "TB suspects" eligible for sputum smear microscopy. It is, therefore, a high priority to extend the indication for TB testing, expand active case-finding (ACF)/screening in risk groups and use more sensitive screening and diagnostic tools. Several ACF activities are ongoing, which are reviewed in detail below, in order to identify priority groups and suitable ACF/screening approaches.

An additional explanation for the lack of significant decline in TB burden could be that the expected positive impact of DOTS has been balanced out by the negative impact of other factors, such as poverty, undernutrition, poor living conditions (crowding, use of solid fuel for cooking, and poor ventilation), urban migration, and presence of TB risk factors such as HIV, smoking, diabetes and alcohol abuse. HIV prevalence increased in the 1990s, but seems to have been stable at least since 2005, based on data from the sentinel sites. Data on trends of the other risk factors and social determinants are scarce. It is obvious that TB control should be linked to the broader development and public health agenda in the country. Moreover, documenting and addressing risk factors for TB should be a part of the overall NTP strategy, as well as part of ACF/screening. Beyond screening for TB in risk groups, the underlying conditions that put these groups at risk should also be addressed. This may not be the responsibility of NTP but of other governmental departments or other agencies.

2.2. Two pathways to earlier TB case detection

Figure 5 depicts the two principal pathways to TB diagnosis and care – the patient-initiated pathway and the screening pathway – and related delays, barriers, and entry points for interventions.[3]

Figure 5. Pathways to TB diagnosis and treatment



The external review of NTP in 2011 focused on several aspects of case finding along the patient-initiated pathway, while this document deals primarily with ACF, including the screening pathway as well as intensified identification of people with suspected TB in health facilities and the application of more sensitive diagnostic tools for them (step three and four on the patient-initiated pathway). Therefore, while the first two entry points on the patient-initiated pathway (improving knowledge and awareness, and minimizing barriers to access) as well as the last entry point (improving referral and notification) are key for further improvement in early TB detection, they are not discussed in detail in this document, except when they are related to ACF/screening. Some key points, however, are raised here in brief, for the sake of completeness.

[3] *Early detection of Tuberculosis – an overview of approaches, guidelines and tools.* WHO/HTM/STB/PSI/2011.21. Geneva: WHO, 2011.

Several studies have shown that TB knowledge is suboptimal in Myanmar. Much attention has been paid to health information for the wider population, but no evaluation has been done to assess its impact. Intensified health information is a crucial aspect not only to promote appropriate health-seeking along the patient-initiated pathway, but also to enhance ACF/screening, which is discussed below in relation to such interventions.

Scaling up basic DOTS, and improving laboratory and other services in remote, underserved areas is a high priority of NTP. Access to health services is limited due to the high cost of health-seeking and severe financial constraints of disease-affected families.

Through public–private mix (PPM) initiatives, general practitioners (GPs)—who are commonly the first form of formal health care sought by people with TB in urban areas—have been actively and effectively involved. This has contributed to improving access also for the poorer segments of the population.[4,5] Interventions are planned to engage pharmacists/drug sellers and traditional healers as well. Further scale-up of PPM is crucial and should target appropriate providers as determined by local health service set-up and health-seeking behaviour. For example, further engagement of GPs is important in urban areas, while traditional healers and pharmacies should be a priority in rural and remote areas.

[4] Lönnroth K, Tin Aung, Win Maung, Kluge H, Uplekar M. Social franchising of TB care through private general practitioners in Myanmar - an assessment of access, quality of care, equity, and financial protection. *Health Policy and Planning* 2007; 22:156-66.

[5] M Sudhinaraset, T Lwin, D Montagu, M Theuss, I Onozaki, Z Win, T Aung. *Can Subsidized Private TB Care Serve the Poor? Evidence from Myanmar.* Poster presented at the Forty-Second Union World Conference on Lung Health (Lille, 2011).

3. Active case-finding interventions to improve earlier TB case detection

3.1. Improving suspect identification and diagnosis in health facilities

3.1.1. Observations

Hospital engagement is part of the PPM scale-up, with focus on improved referral/transfer of diagnosed cases. The number of formally engaged specialized hospitals increased from five to nine in 2011, and is planned to increase to 19 in 2013, which would include all major central and regional/state hospitals. In addition, it has been decided to include children's hospitals and private hospitals in the PPM scheme. All hospitals are engaged through "Option 3 or 4", which includes registration of all cases started on treatment and either referral to the township TB centre after discharge for people living far from hospitals (Option 3) or treatment in the "DOTS corner" of the hospital for patients living in the hospital's catchment area (Option 4). In 2010, about 2000 cases were registered for treatment in five hospitals, of whom three-quarters were treated under Option 4. Of 1385 patients referred under Option 3, 1232 (89%) were successfully transferred to township TB centres for continued treatment.

Diagnostic procedures for people with possible TB in health-care facilities have not been studied in detail in Myanmar. NTP has advocated for a "passive case-finding" approach based on identification of people with cough of more than two weeks, and use of smear microscopy as the first diagnostic test, both within public and private facilities.

According to NTP guidelines, chest X-ray (CXR) should be used as a follow-on test for people with suspected TB who have negative sputum smear microscopy. However, it is reported (as expected) that physicians in hospitals, particularly in chest disease departments, use CXR frequently as part of the routine diagnostic work-up of patients with respiratory symptoms.

Judging from very limited observations, it seems that there is no routine screening ofr TB symptoms among people attending health facilities (apart from TB-specific centres). Availability and use of other diagnostic tests has not been mapped. Xpert MTB/RIF was introduced in 2011 .

3.1.2. Action points

- More sensitive screening and diagnostic tools will be applied for people with increased risk of TB. Such actions will start in health-care facilities, where intensified case detection will be more feasible and cost-effective compared to outreach activities outside health facilities.

- All care providers will actively enquire about TB symptoms, starting with all respiratory patients, but ideally will enquire about symptoms among all patients, regardless of the reason for seeking care.

- TB testing will be applied on broad indications; it will include people with any duration of cough and/or other symptoms compatible with TB. A specific symptom screening algorithm will be developed.

- TB will be investigated rigorously in identified risk groups that may seek care for other reasons than symptoms compatible with TB. Regardless of the reason for seeking care, people with HIV, diabetes, malnutrition, smokers, and people with immunocompromising conditions or treatments should be asked about TB symptoms. Any sign or symptom of TB warrants testing for TB. In some risk groups with severely compromised immunity, TB testing may be done also in the absence of symptoms.

- Elderly people (all people above 55 years) will be targeted with CXR screening regardless of their reason for seeking care and symptoms. The rationale is that the prevalence survey found that the prevalence of TB was 0.9% among people aged 55-64 years and 1.4% among those older than 65. Among people seeking health care (for whatever reason) in these age groups, the average TB prevalence is likely to be higher.

3.2. ACF/Screening in risk groups

3.2.1. Introduction

ACF in communities and screening in risk groups is likely to improve early detection of TB, particularly to reach those people with TB who are unlikely to be reached by the current strategy. It should be seen as a complement to other actions outlined above.

Table 2 shows a preliminary analysis of the potential yield and cost of screening in different risk groups in Myanmar, modelling the possible yield and cost of six different screening algorithms. The considered algorithms are:

1. Screening for TB symptom (cough >2 weeks) – sputum smear microscopy
2. Screening for TB symptom (cough >2 weeks) – second screening with CXR – diagnosis with sputum smear microscopy (and CXR and clinical picture for diagnosis of smear-negative cases)
3. Screening with CXR – diagnosis with sputum smear microscopy (and CXR and clinical picture for diagnosis of smear-negative cases)
4. Screening for TB symptom (cough >2 weeks) – diagnosis with sputum smear microscopy – Xpert MTB/RIF if smear-negative
5. Screening with CXR – diagnosis with Xpert MTB/RIF
6. Screening for any TB symptom – diagnosis with Xpert MTB/RIF

The screening and diagnostic steps include:

- **Symptom screening:** Identifying those with cough >2 weeks (or any symptom for people with HIV) either through direct interview or through information campaigns instructing people to "self screen", and then approach a health facility, a community health worker, a sputum collection centre or a mobile team.
- **Smear microscopy:** for people with TB symptoms. This can be either through referral of the person with suspected TB, or by organizing sputum collection and transportation.
- **CXR** can be used as a second screening tool for those screening positive for symptoms; as a first screening tool in populations that can be reached (e.g. prisoners and elderly); and as part of the diagnostic assessment for smear-negative cases when Xpert MTB/RIF is not used.
- **Xpert MTB/RIF** can be used for the following people: people with HIV who have any TB symptom; people with suspected multidrug-resistant tuberculosis (MDR-TB); for those screened positive with CXR (any abnormality); or for those with negative sputum smear microscopy.

Table 2. Potential yield and cost of screening in different risk groups with different algorithms

Risk group	Population	Prevalence /100 000	Algorithm	% of pop. with CXR	Cost per case (US$)	Total cases detected	% false positives
Without Xpert MTB/RIF: CXR used both for screening and diagnosis of smear-negative TB							
Hard-to-reach areas, average prevalence, sputum collection centre, outreach workers	5m	434	Symptom smear	0%	1 347	2 223	0%
Hard-to-reach areas, mobile CXR team	5m	434	Symptom CXR smear	3%	1 001	3 151	8%
Urban general population (Yangon, Mandalay), mobile CXR team	12m	903	Symptom CXR smear	3%	483	15 736	8%
Urban poor, mobile CXR team (25% Yangon and Mandalay)	3m	1806	Symptom CXR smear	3%	244	7 868	8%
Contacts (five per notified case)	700 000	3500	Symptom CXR smear	4%	128	3 558	8%
Prisoners	50 000	4000	CXR smear	100%	142	1 282	14%
Diabetes (3% prevalence, 1% of those under care are reachable)	15 000	1085	CXR smear	100%	524	104	14%
With Xpert MTB/RIF to verify diagnosis among those screened positive with CXR and those with negative smear							
Hard-to-reach area, average prevalence, sputum collection centre	5m	434	Symptom smear Xpert MTB/RIF	0%	1 289	3 585	0%
Hard-to-reach area, average prevalence, mobile CXR team	5m	434	Symptom CXR Xpert MTB/RIF	3%	664	5 282	0%
Urban general	12m	903	Symptom	3%	322	26 368	0%

population, mobile CXR team			CXR Xpert MTB/RIF				
Urban poor, mobile CXR team	3m	1 806	Symptom CXR Xpert MTB/RIF	3%	164	13 189	0%
Contacts	700 000	3500	Symptom CXR Xpert MTB/RIF	4%	88	5 964	0%
Prisoners	50 000	4000	CXR Xpert MTB/RIF	100%	97	1 803	0%
HIV (0.3% prevalence, 20% under care)	30 000	8680	Xpert MTB/RIF	0%	44	2 396	0%
Diabetes	15 000	1085	CXR Xpert MTB/RIF	100%	357	147	0%

- Potential yield is based on modelling, see Annexes 1 and 2
- Symptoms: screening includes cough >2 weeks;
- Cost assumptions: symptom screening: 0.5 US$; CXR: US$ 3; smear microscopy: US$1; Xpert MTB/RIF: US$ 10

Conclusions

- Only using symptoms and smear microscopy (Algorithm 1) has limited effectiveness and therefore poor cost-effectiveness, despite low cost for each screening and test.
- Using CXR for second screening (Algorithm 2) increases sensitivity substantially. However, if CXR is also used as part of the final diagnostic evaluation, there will be a large proportion of overdiagnosed smear-negative TB cases.
- CXR as first screening (Algorithm 3) increases the yield even further, though with a significant amount of overdiagnosis.
- Xpert MTB/RIF as confirmatory test (Algorithms 4-6) improves cost-effectiveness, despite the increased cost, since it increases the detection of definite cases dramatically.

- The most cost-effective screening and diagnostic algorithm (except for people with HIV) seems to be screening first for symptoms, then with CXR, followed by Xpert MTB/RIF to verify the diagnosis.

- The risk groups that will be most cost-effective to screen are those with the highest TB prevalence, i.e. people with HIV, contacts and prisoners, where the cost per case may be less than US$ 100. Several thousand cases could be detected among people with HIV, prisoners and contacts. However, considering the total number of estimated prevalent cases in the country (over 200 000), it would still make up a small proportion of the total burden.

- There is a larger potential from screening in urban areas, which can be considered a risk group, since they have about double the prevalence of rural areas. Potentially, 25 000 cases could be detected in Yangon and Mandalay at a cost of about US$ 300 per case (approximately US$ 7.5 million in total). Targeting poor neighbourhoods would have much better cost-effectiveness (US$ 160 per case, assuming that the prevalence is about double among the poor), but the total number of cases would be about half compared to targeting the entire urban population.

- Screening among people with diabetes should be explored as part of intensified case detection in hospitals. Similar conclusions would emerge from analysis of other clinical risk groups, such as elderly people, malnourished patients or patients with smoking-related respiratory conditions, and people with alcohol use disorder.

- Except prisoners, other institutionalized populations are not considered, for lack of data. Occupational groups have also not been considered, since available data suggests that they have a similar prevalence as the general population, and screening among them may be done as part of broader population screening, e.g. when targeting urban areas.

- The following priority ranking of risk groups thus emerges (not including screening in health facilities discussed above, which should be the first priority):

1) People living with HIV

2) TB contacts

3) Prisoners

4) People living in urban areas, particularly poor urban neighbourhoods. This may include particular workplaces in urban areas.

5) People in rural areas with assumed under-detection and/or long delays, especially in states

6) Screening in workplaces (including health-care workers) and institutions should be further explored.

Different approaches will be used to conduct the screening and diagnosis, including:

- Health information campaigns to encourage people with TB symptoms to come for screening at fixed screening points or mobile teams
- Community/household symptom screening by outreach workers/ volunteers
- Mobile CXR and/or laboratory
- Decentralized sputum collection centres, and sputum transportation system
- Fixed laboratory and/or CXR in target institutions

3.2.2. HIV

Reference is made to the TB/HIV scale-up plan (Annex 3).

3.2.3. Contact investigation

Observations

The broad policy is to conduct contact investigation for all TB cases, as part of the initial household visit, within one week of treatment initiation. It may also be extended to neighbours and other possible contacts. No prioritization of index cases is currently undertaken.

All contacts with cough of more than two weeks should be investigated with sputum smear microscopy and with CXR in case the smear is negative.

In reality, contact investigation is done for a minority of index cases, only a small proportion of listed contacts are evaluated (i.e. interviewed about symptoms), and only about half of the "suspects" are investigated with smear microscopy (Figure 6 and Table 3). Index cases visited appear to be prioritized based on travel convenience rather than on smear positivity.

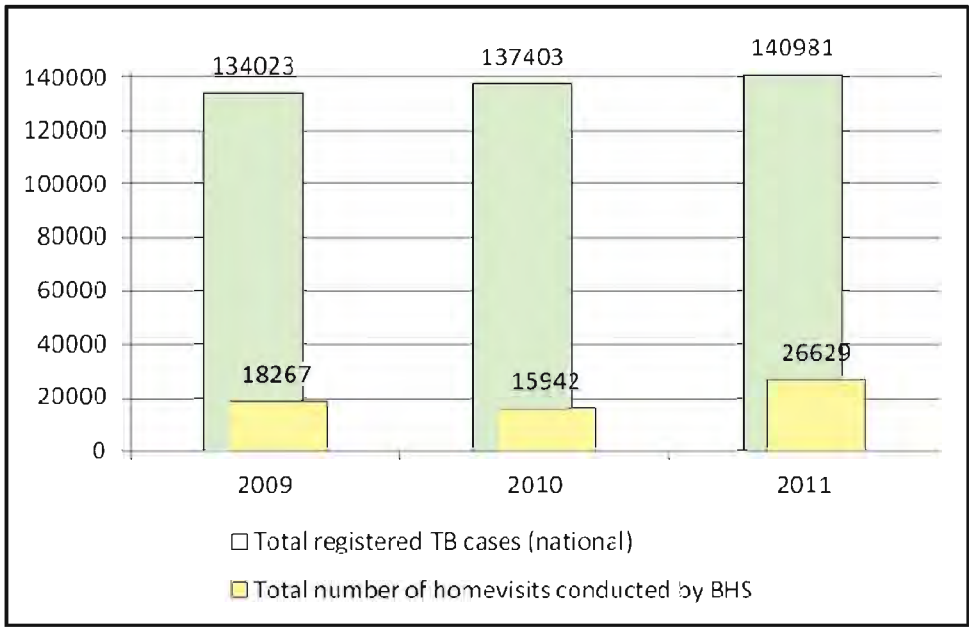
The proportion of listed contacts that were evaluated, as shown in lists from selected regions and townships, was less than 50%. The most common reason cited for this was that family members were not present at the time of the home visit. Furthermore, access barriers to attend the TB clinic for investigation remain an important obstacle. Finally, basic health staff (BHS), the cadre supposed to do contact investigation, do not have sufficient time to focus on TB contact investigation.

Contacts who are not present during household visits are supposed to report at the nearest TB centre for screening. No data exist on the frequency with which this happens. NTP has introduced a routine to note in laboratory register if the tested individual is a TB contact.

In 2011 a travel allowance of US$ 1 was introduced for BHS in selected areas to conduct contact investigation. The rate of investigation has since increased, but is still low. Smear-positive index cases are not necessarily prioritized.

PPM partners very rarely conduct contact investigation, apart from extending an "invitation" for family members to be screened at the clinic.

Figure 6. Proportion of index cases for whom contact investigation was done (2009-2011)



Source: NTP

Table 3. Initial home visits and contact tracing (2009-2011)

	2009	2010	2011
Proportion of TB patients with contact tracing done by BHS out of total registered patients by NTP	14%	12%	19%
Average number of townships giving reports for contact investigation	41/month	40/month	38/month

Source: NTP

Table 4. Identified contacts, suspects and cases during contact investigation (2009-2011)

	2009	2010	2011
Total number of contacts	80 915	65 205	98 871
Total suspects among contacts	05 317	05 466	05 986
Total suspects examined for acid-fast bacillus (AFB)	02 217	01 825	03 237
Proportion of TB suspects examined for AFB among total suspects examined	42%	33%	54%
Total AFB-positive patients found	249	143	258
Sputum positivity rate	11%	8%	8%
Proportion of smear-positive cases contributed by contact investigation to total smear-positive cases detected by NTP	0.52%	0.29%	0.52%

Source: NTP

Conclusions

- A very low proportion of index cases are investigated.
- A minority of identified contacts is evaluated and only half of the identified TB suspects are investigated with smear microscopy.
- The recorded contribution from contact investigation to overall case notification is minuscule, while the potential is large (Table 2).
- Contact investigation is thus incomplete, ad hoc, and lacking clear prioritization and operational guidelines. It is done in an environment of limited resources and barriers to access.
- The BHS cadre and partners involved in community outreach are resources that could perhaps be utilized better. The new allowance for household visits may further improve the situation, but additional resources will be required to scale up contact investigation.

Action points

- The NTP will develop a policy and operational guidelines on contact investigation. This will clearly define who should be considered as an index case and ensure that at least the recommended high-priority index cases are investigated (smear-positive cases; proven or suspected MDR-TB cases; people living with human immunodeficiency virus (HIV) or acquired immunodeficiency syndrome (AIDS); children under the age of five), while other index cases will be prioritized based on resource availability. The policy will also define who should be considered as a contact (e.g. household members or inmates) and ensure that all contacts are evaluated. The following types of contacts will be prioritized for further investigation: any symptom suggestive of TB; children <5 years; people living with HIV or AIDS and others with immunocompromising conditions (e.g. diabetes, undernourished, smokers); and contacts of index cases with proven or suspected MDR-TB. It will also specify how contact investigation should be carried out and clearly identify who will undertake them. At a minimum, the prioritized contacts should be investigated with sputum smear microscopy. If resources are available, screening can be done first with CXR. If resources are available, those with an abnormal CXR could be investigated with Xpert MTB/RIF.

- The NTP will develop a set of indicators, targets and a reporting system that can capture the full process of contact investigation and contribution of contact investigation to case notification. Proposed indicators are:

  - Number of index cases registered (disaggregated by the categories listed above)
  - Number of contact investigations carried out
  - Number of contacts identified
  - Ratio of the number of contact investigations to the number of index cases (should be less <1)
  - Number (and percentage) of identified contacts that have been evaluated (interviewed) for symptoms and other risk markers

- Number (and percentage) of evaluated contacts with risk marker (symptoms, children <5, HIV, other immunocompromising conditions, MDR-TB contact)

- Number (and percentage) of contacts with risk marker that have been investigated with different tests (smear, CXR, Xpert MTB/RIF), disaggregated by risk group

- Number (and percentage) of diagnosed cases, by risk group and type of TB

- Proportion of TB cases identified in contacts among registered TB patients (disaggregated by category of TB); this is the contribution of TB contact investigation to TB detection

- Number of TB contacts treated with isoniazid preventive therapy (IPT) by category of IPT indication as specified in the national operational guidelines

➢ The contact status will be recorded in the TB Laboratory Register and TB Register. The Sputum Request Form and TB Referral Form will be revised to include this information.

3.2.4. Screening in prisons

Observations

➢ There is no routine screening for TB in all prisons.

➢ Separate data from prisons are scarce. Among 5000 inmates in Mandalay prison, seven smear-positive cases (140/100 000) and 75 total cases (1500/100 000) were notified. The screening/diagnostic approach used was not clear.

Action points

- Regular meetings will be organized with prison authorities.
- Standard operation procedures will be established for screening and case management.
- Where available, prison CXR facilities will be used, while mobile CXR teams should be piloted in other prisons.
- Comprehensive CXR will be piloted for all inmates upon entry and repeated every six months with "passive case-finding" pursued in between.
- Smear microscopy will be performed for prisoners with a CXR compatible with TB; Xpert MTB/RIF will be piloted either as part of a mobile unit or through sputum collection and transportation.

3.2.5. Mobile CXR teams for TB screening in high-prevalence communities

Observations

- In 2011, mobile CXR teams were sent to selected villages in 40 townships (mostly one village per township for a maximum of two days), mainly in rural areas with poor access. One round of screening was done in each place. Health information was provided and people with any TB symptom (especially those over the age of 14) were invited for CXR screening.
- CXR was done for all attending the mobile CXR, regardless of symptoms. Sputum smear microscopy (in the mobile unit or sputum collection) was done in case of abnormal CXR or chronic cough.
- Only 7679 (<1%) individuals among some 1-2 million in the target villages were investigated with CXR, since they were asked to "self screen" and come forward only if they had TB symptoms. Yet, the screening identified some 15% of smear-positive cases in the target population, and a much higher proportion of notified smear-negative cases.

Table 5. Outcomes of mobile CXR teams (2011)

Number of townships	No. of TB suspects screened by CXR	No. of TB suspects examined by microscopy	No. of smear-positive patients	No. of patients put on treatment	Funding source
27	5 874	2 769	85	442	3DF
9	1 403	1 335	40	180	Global Fund
4	402	103	3	32	JICA
40	**7 679**	**4 207**	**128**	**654**	**Total**

- The contribution of smear-positive cases was 3% of the total smear-positive case notification in involved townships. This is very similar to the 3.5% positivity rate among people positive for both CXR and symptoms in the prevalence survey, but considerably higher than among those screening positive for CXR who did not have chronic cough (1%), suggesting that most people screened with CXR had significant TB symptoms. However, in each township the target population represented only about 20% of the township population. Reducing the denominator accordingly gives a contribution of about 15% to total smear-positive cases in the actual target population.

- Preliminary analysis of parts of the data suggests that women and the elderly are overrepresented among people screened, and sex distribution among detected cases is about 1:1.

- This data is based on screening in rural areas where townships seem to have been selected mostly based on low notification rates. This may mean large underdetection, but could also mean low prevalence. Using the same approach in poor urban areas would likely have better yield and cost-effectiveness.

Action points

- *Modality:* Four mobile units, including CXR and sputum smear microscopy (and Xpert MTB/RIF in two units) will be formed. Health information strategy, location of team, rotation schedule, and hours of operations will be tailored to the local context by arranging stakeholders meetings in selected townships. Combination with health promotion/screening activities for other health issues will be considered.

- *Algorithm:* All people with TB symptoms and/or TB contacts and/or previous TB patients and/or older than 55 will be invited for CXR screening. All

people attending, regardless of symptoms, will be screened with CXR. All people with either any radiological abnormality or chronic cough and all TB contacts will be investigated with sputum smear microscopy or Xpert MTB/RIF. All household contacts of identified cases will be invited for screening.

- *Frequency of screening rounds* and *activities between rounds:* The mobile team will stay for up to one week in each place. Re-screening will be undertaken every six months, for a minimum of two years. Standard "passive case-finding" will take place between screening rounds. Contact investigation will be undertaken as per national guidelines. Health information messages will be reinforced by BHS, local NGOs, GPs, other partners.
- *Target population:* High-prevalence townships will be targeted. Three to four urban townships with known high level of poverty, poor living conditions, and/or large internal migration (e.g. industrial areas) will be included. These may have relatively high case notification at baseline, but it is even better to focus on those with moderate case notification. One to two rural townships will also be targeted, either in states with available services of reasonable quality but poor access, or regions with good quality but very low case notification. All neighbourhoods/ villages in selected townships will be included, so that the entire township population becomes the target population and is covered. If possible, adjacent townships will be selected to optimize the impact on local transmission.
- *Monitoring and evaluation:* A Screening Register will be introduced which includes information about age, sex, address, symptoms, TB contact, TB history, CXR findings, sputum smear result with grading, Xpert MTB/RIF results (including rifampicin resistance). A list of indicators will be developed to capture the contributions of mobile teams.

3.2.6. Suspect identification by BHS in community and sputum collection centres

Observations

- Since 2009, sputum collection centres (SCCs) have been established at selected rural health centres (RHCs) (or subcentres). The process includes: health information in the community; identification of TB suspects (cough

>2 weeks) in communities by BHS, including household visits; collection of sputum samples by BHS in the community and transportation to SCC; transportation of sputum samples from SCC to the laboratory for testing, and feedback to BHS. On average, 14% of the population in targeted townships were covered by SCCs.

Table 6. Results of suspect identification by BHS in community and sputum collection centres

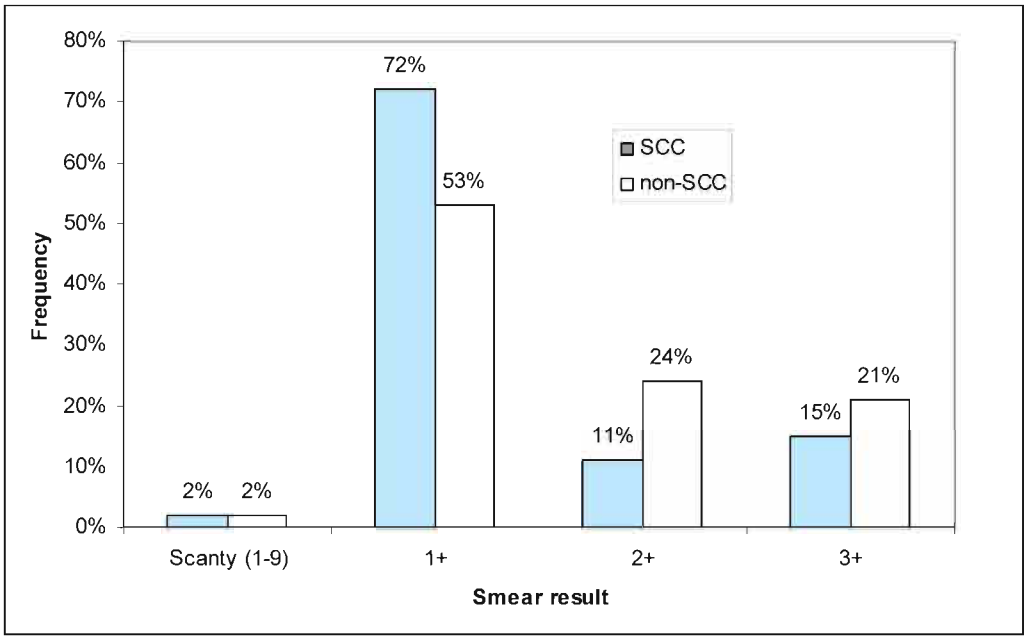
Indicator	2009	2010	2011
No. of SCCs functioning	8	21	35
No. of townships covered	7	19	34
No. of suspects examined for AFB	359	1474	6179
No. of smear-positive cases detected	35	107	235
Sputum positivity rate	10%	7%	4%
Proportion of smear-positive cases detected through SCC contributed to SCC-situated townships	4%	6%	7%
Proportion of smear-positive cases contributed to total registered smear-positive cases (national)	0.07%	0.22%	0.48%

- The age distribution was skewed towards older age groups. Among suspects investigated through SCCs, 53% were female, compared to 44% among non-SCCs. The suspect identification rate through SCCs ranged from over 600/100 000 to less than 100/100 000. The average proportion of all sputum smear examinations from SCCs in targeted townships was 12%.

- The proportion of smear-positive cases detected through SCCs was 7% across townships. Since only 14% of the population in those townships were actually covered, the potential contribution may be around 50% if each township is completely covered.

- The grading of smears among smear-positive cases shows that a larger proportion among SCC cases than non-SCC have 1+, suggesting earlier case detection from SCCs.

Figure 7. Grading of smear-positive cases detected through SCC cases vs non-SCC cases



- The approach seems to favour access to sputum smear investigation for women and the elderly, compared to the non-SCC approach.
- The limitation of the approach is that it will only detect smear-positive cases.

Action points

- SCCs will be further developed as planned.
- Trends will be monitored in the suspect investigation rate and smear-positive case notification rate in targeted townships, and in the targeted RHC catchment populations within townships, disaggregating SCC from non-SCC cases.
- Age and sex distribution among smear-positive cases will also be identified (age and sex distribution among patients detected through SCC should be compared to non-SCC detected patients).

3.2.7. Health talks and suspect identification by community outreach workers

Observations

- *Health talks* (health information meetings focusing on TB) and identification of TB suspects (cough >2 weeks) in the community, both during health talks and continuously have been done by outreach workers or "volunteers" (usually financially compensated), with referrals to diagnostic centre.
- In national NGO initiatives, 1873 health talks were conducted in communities in 53 townships, with a total of 28 252 reported attendees. In total, 2475 suspects were referred and 762 TB cases diagnosed among them (31% of these referred) (Table 7).

Table 7. Results of health talks by national NGOs

Apr-Sep 2011	MMCWA	MWAF	MRCS	MHAA	Total
No. of regions/states in which community-based TB care activities were conducted (funded by Global Fund Rd9)	2 Ayeyarwaddy Bago	2 Mon Shan (East)	3 NPT Mandalay Yangon	1 Mandalay	7
No. of townships that reported	18	25	7	3	53
No. of TB suspects referred from community	1147	1045	158	125	2475
No. of patients started on treatment from community	314	358	45	45	762
Proportion of TB patients put on treatment among suspects (community)	27%	28%	34%	36%	31%
No. of patients under DOT by community volunteer	328	248	9	35	620

- On average, 1.3 TB suspect and 0.4 TB case were identified per health talk by national NGOs. However, since suspects were identified not only among attendees at the health talk but also continuously between talks, it is not possible to relate the suspect identification to the talks per se.
- 762 TB cases (all forms) were identified in two quarters, so the annualized figure is about 1500 cases in 53 townships. Using a conservative estimate of average 100 000 population per township, this represents a notification rate of about 30/100 000. This seems low. However, similar to SCC and mobile teams, these activities do not cover the entire township population.

Action points

- Further analysis of ongoing and planned activities will be undertaken before judging the value of health talks. Suspects identified during health talks vs suspects identified through continuous outreach work in the community will be reported.
- Health talks will be combined with SCCs, mobile CXR or laboratory.

3.2.8. Workplace screening

Observations

- Most workplaces screened have a TB prevalence close to that of the average urban population, which had about 0.9% in the prevalence survey, and can therefore not be considered as higher risk.
- Health workers working with TB patients are normally screened annually.

Action point

- Main employers, especially those in workplaces with a likelihood of very high prevalence of TB, such as health-care workers, mining industry, cement factories, and large congested workplaces with a large number of floating population (e.g. garment factories) will be mapped out. Targeted screening will be conducted in presumed very high-risk workplaces to establish better prevalence estimates.

4. Key activities and expansion (2012-2015)

4.1. Contact investigation

2012

- Development of policy and operational guidelines on contact investigation.
- Start implementation and evaluation of guidelines in 10 townships.

2013

- Expansion to 100 additional townships (25 per quarter).

2014

- Expansion to 100 additional townships.

2015

- Expansion to rest of country.

4.2. Prisons

2012

- Develop coordination mechanism for TB in prisons between Ministry of Health (MoH) and Ministry of Home Affairs (MoHA).
- Development of policy and operational guidelines on investigation of prisoners.
- Development of referral/transfer mechanism for continuation of treatment upon release.
- Start implementation and evaluation of guidelines in 3 prisons.

2013

- Expansion to 20 prisons.

2014

- Expansion to 20 prisons.

2015

- Expansion to 10 prisons.

4.3. Screening in urban poor neighbourhoods

2012

- Development of a protocol for mobile CXR in selected townships, with Xpert MTB/RIF if appropriate.
- Develop teams who can run the mobile clinics (up to 16 teams in six months for one week each).
- Pilot and evaluate in four to five townships/sites (one site could cover approximately 50 000 people).

2013 Jan-Jun

- Conduct mobile clinics in 2 multiplied with 4 selected townships/sites (1-8) at one site per week.

2013 Jul-Dec

- Conduct mobile clinics in the same townships/sites (1-8).
- Conduct mobile clinics in 2 multiplied with 4 new selected townships/sites (9-16).

2014 Jan-Jun

- Conduct mobile clinics in the same 16 townships/sites (1-16).
- Conduct mobile clinics in 2 multiplied with 4 new selected townships/sites (17-24).

2014 Jul-Dec

- Conduct mobile clinics in the same 24 townships/sites (1-24).
- Conduct mobile clinics in 2 multiplied with 4 new selected townships/sites (25-32).

2015 Jan-June

- Conduct mobile clinics in townships/sites 9-32.
- Conduct mobile clinics in 2 multiplied with 4 new selected townships/sites (33-40).

2015 Jul-Dec

- Conduct mobile clinics in townships/sites 17-40.
- Conduct mobile clinics in 2 multiplied with 4 new selected townships/sites (41-48).

4.4. Screening in hospitals

2012

- Meeting with hospitals and hospital authorities.
- Assess TB screening and diagnostic routines in hospitals through operational research.
- Development of guidelines for screening in hospitals focusing on broadening the suspicion criteria for TB and identifying higher-risk groups (including any respiratory symptomatic, HIV, elderly people, diabetes, smokers).
- Pilot and evaluate in 2-3 hospitals.
- Incorporate new guidelines in guideline for PPM in hospitals.

2013

- Train all TB teams on new guidelines.
- Apply new guidelines in all townships where TB teams are present.

2014

- Train all township medical officers on new guidelines.
- Apply new guidelines in half of remaining townships.

2015

- Apply new guidelines in remaining townships.

5.Budget

All figures are in US$.

5.1. Contact investigation

Stakeholders meeting to develop protocol and guidelines	1 000
Training of pilot centre staff	1 000
Evaluation of pilot	3 000
Meeting to revise guidelines after pilot	1 000
Printing of guidelines	3 000

Training of relevant staff (25 townships per quarter)

– nil (can be done during coordination meeting)

Conducting contact investigation – US$1 per index case

Index cases: 90 per township per quarter (average)

Number of new (and cumulative) townships	2012	Fraction (top) and number (below) of index cases investigated											
		2013				2014				2015			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
10 (10)	.2 180	.45 405	.45 405	.45 405	.45 405	.60 540	.60 540	.60 540	.60 540	.70 630	.70 630	.70 630	.70 630
25 (35)		.2 450	.2 450	.2 450	.2 450	.45 1012	.45 1012	.45 1012	.45 1012	.60 1350	.60 1350	.60 1350	.60 1350
25 (60)			.2 450	.2 450	.2 450	.2 450	.45 1012	.45 1012	.45 1012	.45 1012	.6 1350	.6 1350	.6 1350
25 (85)				.2 450	.2 450	.2 450	.2 450	.45 1012	.45 1012	.45 1012	.45 1012	.6 1350	.6 1350
25 (110)					.2 450	.2 450	.2 450	.2 450	.45 1012	.45 1012	.45 1012	.45 1012	.6 1350
25 (135)						.2 450	.2 450	.2 450	.2 450	.45 1012	.45 1012	.45 1012	.45 1012
25 (160)							.2 450	.2 450	.2 450	.2 450	.45 1012	.45 1012	.45 1012

25 (185)								.2 450	.2 450	.2 450	.2 450	.45 1012	.45 1012
25 (210)									.2 450	.2 450	.2 450	.2 450	.45 1012
25 (235)										.2 450	.2 450	.2 450	.2 450
25 (260)											.2 450	.2 450	.2 450
25 (285)												.2 450	.2 450
45 (330)													.2 810
Total index cases with contact investigation	180				6 120				19 481				39 637
Total contacts	900				30 600				97 405				198 185
Est. cases	31				1 071				3 409				6 936
Total symptom screening	900				30 600				67 405				198 195
Total X-ray screening	36				1 224				2 697				7 928
Total sputum screening	18				612				1 349				3 964
Yield (.15 of est.)	**5**				**161**				**511**				**1 040**
Investigation cost	180				6 120				19 481				39 637
Symptom screening	450				15 300				33 703				99 098
X-ray screening	54				1 998				4 047				11 892
Sputum screening	18				612				1 349				3 964
Total cost	**702**				**24 030**				**58 580**				**154 591**

Total for contact investigation (2012-2015): 246 903

5.2. Prisons

Meeting between NTP/MoH and MoHA	1 000
Development of operational guidelines for screening of prisoners	2 000
Meetings with prison authorities (three)	6 000
Training of relevant prison health staff (three batches)	6 000

Prison to be linked	Number of cases investigated											
	2012	2013				2014				2015			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Prison A	1000		1000		1000		1000		1000		1000		1000
Prison B	1000		1000		1000		1000		1000		1000		1000
Prison C	1000		1000		1000		1000		1000		1000		1000
Prison D		1000		1000		1000		1000		1000		1000	
Prison E		1000		1000		1000		1000		1000		1000	
Prison F		1000		1000		1000		1000		1000		1000	
Prison G		1000		1000		1000		1000		1000		1000	
Prison H		1000		1000		1000		1000		1000		1000	
Prison I			1000		1000		1000		1000		1000		1000
Prison J			1000		1000		1000		1000		1000		1000
Prison K			1000		1000		1000		1000		1000		1000
Prison L			1000		1000		1000		1000		1000		1000
Prison M			1000		1000		1000		1000		1000		1000
Prison N				1000		1000		1000		1000		1000	
Prison O				1000		1000		1000		1000		1000	
Prison P				1000		1000		1000		1000		1000	
Prison Q				1000		1000		1000		1000		1000	
Prison R				1000		1000		1000		1000		1000	
Prison S					1000		1000		1000		1000		1000
Prison T					1000		1000		1000		1000		1000
Prison U					1000		1000		1000		1000		1000
Prison V					1000		1000		1000		1000		1000
Prison W					1000		1000		1000		1000		1000
Prison X						1000		1000		1000		1000	
Prison Y						1000		1000		1000		1000	
Prison Z						1000		1000		1000		1000	
Prison AA						1000		1000		1000		1000	
Prison AB						1000		1000		1000		1000	
Prison AC							1000		1000		1000		1000
Prison AD							1000		1000		1000		1000
Prison AE							1000		1000		1000		1000
Prison AF							1000		1000		1000		1000
Prison AG							1000		1000		1000		1000
Prison AH								1000		1000		1000	
Prison AI								1000		1000		1000	

Prison AJ						1000		1000		1000
Prison AK						1000		1000		1000
Prison AL						1000		1000		1000
Prison AM							1000		1000	1000
Prison AN							1000		1000	1000
Prison AO							1000		1000	1000
Prison AP							1000		1000	1000
Prison AQ							1000		1000	1000
Prison AR								1000		1000
Prison AS								1000		1000
Prison AT								1000		1000
Prison AU								1000		1000
Prison AV								1000		1000
Prison AW									1000	1000
Prison AX									1000	1000
Total cases investigated	**3 000**			**36 000**			**76 000**			**100 000**
X-ray and Xpert	0			10 000			20 000			30 000
X-ray and sputum	3 000			26 000			56 000			70 000
Total est. cases (.04)	**120**			**1 440**			**3 040**			**4 000**
Total X-ray screening	3 000			36 000			76 000			100 000
Total Xpert screening	0			2 000			4 000			6 000
Total sputum screening	600			5 200			11 200			14 000
Yield with Xpert (.9)	0			360			720			1 080
Yield with sputum (.6)	72			624			1 344			1 680
Total yield	**72**			**984**			**2 064**			**2 760**
X-ray screening cost	9 000			90 000			210 000			300 000
Xpert screening cost	0			20 000			40 000			60 000
Sputum screening cost	600			5 200			11 200			14 000
Total cost	**9 600**			**115 200**			**261 200**			**374 000**

Total cost for prisons: 775 000

5.3. Screening in poor urban neighbourhoods (mobile teams)

Stakeholders' meeting for development of protocol for mobile CXR in selected townships/sites	2 000
Truck (two additional)	80 000
Mobile X-ray (two additional)	40 000
Xpert MTB/RIF machine	20 000
Pilot mobile CXR in 5 sites	
Meeting to evaluate pilot	1 000
Printing of protocol	2 000
Formation and training of teams	10 000

Urban area	2012	Number of cases investigated											
		2013				2014				2015			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Site 1	50000	50000		50000		50000							
Site 2	50000	50000		50000		50000							
Site 3	50000		50000		50000		50000						
Site 4	50000		50000		50000		50000						
Site 5		50000		50000		50000		50000					
Site 6		50000		50000		50000		50000					
Site 7		50000		50000		50000		50000					
Site 8		50000		50000		50000		50000					
Site 9			50000		50000		50000		50000				
Site 10			50000		50000		50000		50000				
Site 11			50000		50000		50000		50000				
Site 12			50000		50000		50000		50000				
Site 13				50000		50000		50000		50000			
Site 14				50000		50000		50000		50000			
Site 15				50000		50000		50000		50000			
Site 16				50000		50000		50000		50000			
Site 17					50000		50000		50000		50000		
Site 18					50000		50000		50000		50000		
Site 19					50000		50000		50000		50000		
Site 20					50000		50000		50000		50000		
Site 21						50000		50000		50000		50000	
Site 22						50000		50000		50000		50000	
Site 23						50000		50000		50000		50000	
Site 24						50000		50000		50000		50000	
Site 25							50000		50000		50000		50000
Site 26							50000		50000		50000		50000
Site 27							50000		50000		50000		50000
Site 28							50000		50000		50000		50000
Site 29								50000		50000		50000	
Site 30								50000		50000		50000	
Site 31								50000		50000		50000	
Site 32								50000		50000		50000	
Site 33									50000		50000		50000
Site 34									50000		50000		50000
Site 35									50000		50000		50000
Site 36									50000		50000		50000
Site 37										50000		50000	
Site 38										50000		50000	
Site 39										50000		50000	
Site 40										50000		50000	
Total cases investigated	200 000	300 000	300 000	500 000	500 000 **1 600 000**	700 000	700 000	800 000	800 000 **3 000 000**	800 000	600 000	600 000	400 000 **2 400 000**
Symptoms	200 000				1 600 000				3 000 000				2 400 000
X-ray (.03)	6 000				48 000				90 000				74 700
Xpert (.55*.25)	825				6 600				12 375				10 271
Sputum (.55*.75)	2 475				19 800				37 125				30 813
Est. yield in Xpert group (.22)	181				1 452				2 723				2 260

Est. yield in sputum group (.14)	347			8 712			5 198			4 314
Total yield	**528**			**10 164**			**7 921**			**6 574**
Symp-tom screen-ing cost	100 000			800 000			1 500 000			1 200 000
X-ray screen-ing cost	18 000			144 000			270 000			224 100
Xpert screen-ing cost	8 250			66 000			123 750			102 710
Sputum screen-ing cost	2 475			19 800			37 125			30 813
Total cost	**128 725**			**1 029 800**			**1 930 875**			**1 557 623**

Total cost for screening in urban neighbourhoods: 4 787 023

5.4. Screening in hospitals

Stakeholders' meeting to develop protocol and guidelines	2 000
Assessment of screening practices (operational research)	7 000
Development of operational guidelines for screening in hospitals	2 000
Training of staff in pilot settings	1 000
Evaluation of pilot	3 000
Revision of guidelines	1 000
Dissemination meeting of guidelines	3 000
Scale-up (covered under ongoing training programmes)	-
Total cost for screening in hospitals:	19 000

5.5. Budget summary

Assumptions made: Only additional cost has been included here. Remuneration for staff/volunteers covered under routine programme. Similarly, costs for mobile clinics (except procurement of two vans, two mobile X-ray and one Xpert MTB/RIF) covered from ongoing activities.

Unit cost for activities:

- Symptom screening: US$ 0.50 per person. This should cover all costs related to advocacy meetings with local community, awareness programme in community, cost related to placement of van, utilities for mobile clinics etc.
- Sputum microscopy: US$ 1 per person tested
- Xpert: US$ 10 per person tested

Contact investigation	246 903
Prisons	775 000
Urban poor	4 787 023
Hospitals	19 000
Total	**5 827 926**

EXPANSION PLAN

FOR THE PROGRAMMATIC MANAGEMENT OF DRUG-RESISTANT TUBERCULOSIS

2011-2015

ANNEX 2
TO
FIVE YEAR NATIONAL STRATEGIC PLAN
FOR
TUBERCULOSIS CONTROL

2011-2015

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List of tables and figures

Abbreviations

3DF	Three Diseases Fund
ACSM	advocacy, communication and social mobilization
AIDS	acquired immunodeficiency syndrome
BHS	basic health staff
CPC	cetylpyridinium chloride
DOT	directly observed treatment
DOTS	the basic package that underpins the Stop TB Strategy
DRS	drug resistance survey
DR-TB	drug-resistant tuberculosis
DST	drug susceptibility testing
EXPAND-TB	Expanding Access to New Diagnostics for TB (Project funded by UNITAID and implemented by GLI, FIND, WHO and GDF)
FIND	Foundation for Innovative New Diagnostics
GDF	Global Drug Facility
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
HIV	human immunodeficiency virus
INGO	international nongovernmental organization
MDG	Millennium Development Goal
MDR-TB	multidrug-resistant tuberculosis
MMA	Myanmar Medical Association
MOH	Ministry of Health
MSF	Médecins Sans Frontières
NGO	nongovernmental organization
NRL	National Reference Laboratory
NTP	National Tuberculosis Programme
PPM	public-private mix / public-public mix
SLD	second-line anti-tuberculosis drug
SRL	supranational tuberculosis reference laboratory
TB	tuberculosis
Union	International Union Against Tuberculosis and Lung Disease
UNITAID	international facility for the purchase of drugs and laboratory commodities for HIV/AIDS, malaria and tuberculosis
USAID	United States Agency for International Development
WHO	World Health Organization
XDR-TB	extensively drug-resistant tuberculosis

Executive summary

Tuberculosis (TB) is a major public health concern in Myanmar. The country is listed among the 22 high TB burden countries, among the 41 high TB/human immunodeficiency virus (HIV) burden countries and among the 27 high multidrug-resistant (MDR)/extensively drug-resistant (XDR) TB burden countries. The World Health Organization (WHO) estimated in 2010 that there are 8900 (6300-12 000 confidence interval) new and relapse MDR-TB cases nationwide each year.[1]

The activities described in this *Expansion Plan for the programmatic management of drug-resistant tuberculosis, 2011-2015: A supplement to the National Strategic Plan for Tuberculosis Control, 2011-2015* (referred to as the "Expansion Plan for MDR-TB" or the "Expansion Plan") will enable scale-up of the successful pilot programme for MDR-TB with the following long-term goals:

1. Diagnosis of MDR-TB in all groups of patients at risk for MDR-TB;
2. Diagnosis of MDR-TB in all HIV infected patients with TB;
3. MDR-TB treatment for all patients diagnosed with MDR-TB under WHO-endorsed treatment protocols.

A pilot project for the diagnosis and treatment of MDR-TB began only recently, in July 2009, embedded within the existing National Tuberculosis Programme (NTP). The programme has experienced great success but it has become clear that the burden of MDR-TB is tremendous and that the pilot programme addresses only a fraction of the cases. A rapid programme expansion is immediately necessary.

The Expansion Plan builds on an excellent existing TB control programme and the National Strategic Plan for TB 2011-2015;[2] furthermore, it sets specific goals for expansion, recommends changes to the existing standard operational procedures for MDR-TB and addresses financing the expansion. This *Expansion Plan for MDR-TB* was developed by the Myanmar NTP, the Drug-resistant Tuberculosis (DR-TB) Expert Committee and the WHO Country Office for Myanmar.

When implemented in conjunction with the National Strategic Plan for TB, the Expansion Plan aims to ensure that all patients with a high risk of MDR-TB have access to drug susceptibility testing (DST) and that any patient with documented MDR-TB will be treated under the NTP protocols. Over the next five years, a total of 9295 MDR-TB patients will initiate treatment under this Expansion Plan (500, 1200, 1800, 2400 and 3395 patients each year, respectively).

[1] World Health Organization. *Multidrug and extensively drug-resistant TB: 2010 global report on surveillance and response.* WHO/HTM/TB/2010.3.
[2] Myanmar National TB Programme. *Draft Five Year National Strategic Plan for TB Control 2011-2015.* National TB Programme, Ministry of Health Department of Health. 12 August 2010

The National Strategic Plan estimates that nationwide MDR-TB diagnosis and treatment (including the cost for second-line anti-TB drugs) will cost US$ 31 million over a five-year period, which is 18.9% of the national budget for TB (US$ 160 million). A more aggressive expansion plan, as outlined here, will cost an estimated US$ 52.8 million over a five-year period. The MDR-TB programme will rely heavily on funding from the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund) for MDR-TB expansion. Of the US$ 65 million already approved for Global Fund Round 9 (2011-2015), approximately US$ 11 million is for MDR-TB. There are plans to apply for additional funding in Round 11 or 12. The funding gap for the total cost of implementing an MDR-TB programme expansion over the next five years is approximately US$ 35 million.

While Global Fund Round 9 support is already approved, it is crucial to continue to seek additional support from other donor agencies, nongovernmental organizations (NGOs) and international nongovernmental organizations (INGOs) for successful programme scale-up. The current funding sources available apart from second-line anti-TB drug (SLD) supply through the Global Fund are minimal; social and nutritional support to patients is provided through December 2011 (presently funded by the Three Diseases Fund or 3DF) and will need to be continued at a higher amount given the expected increase in patient load. The purchase of rapid diagnostic tools in 2011 will also be essential. The Expansion Plan describes resource mobilization efforts and possible external resources for MDR-TB management in Myanmar.

1. Background

1.1. Geographical reach

Myanmar is administratively divided into 14 regions and states consisting of 67 districts, 330 townships, 64 sub townships, 2891 wards, 13 698 village tracts and 64 910 villages. The population of Myanmar is estimated at 58.38 million (2008-2009).

Figure 1. Map of Myanmar and regions/states

The existing MDR-TB programme is in 10 townships in Yangon and Mandalay Regions, based at Aung San TB Hospital and Patheingyi TB Hospital, respectively.

Table 1. Existing townships in MDR-TB programme

Region	Existing townships	Population of Catchment area
Yangon Aung San TB Hospital	Hlaingtharyar Insein Mayangone Shwepyithar Hlaing AZG Clinic	1 085 828
Mandalay Patheingyi TB Hospital	Aungmyaetharzan Chanmyatharzi Chanayetharzan Mahaaungmyae Pyigyitagon	1 067 784
Total population covered currently		**2 153 612**

The programme at present covers only 3% of townships and 3.9% of the population nationwide. In the National Strategic Plan, there are plans to expand to an additional six townships in each region over the next five years, for a total of 22 townships nationwide. Expanding to an additional 12 townships in the next five years would cover 6.7% of townships and 9.3% of the population. This rate of expansion has been determined to be inadequate and is revised in the plan below.

1.2. MDR-TB epidemiology

The first nationwide drug resistance survey (DRS) was carried out in 2002, showing 4% MDR-TB among new cases and 15.5% MDR-TB among re-treatment cases.[3] The second nationwide drug resistant TB survey was conducted in 2007 and showed 4.2% MDR-TB among new cases and 10.0% MDR-TB among re-treatment cases.[4] These preliminary data indicate that MDR-TB transmission is ongoing but not increasing, which is probably a result of Myanmar's successful DOTS programme. However, even in an ongoing excellent DOTS programme, when MDR-TB is left largely untreated the percentage of new MDR-TB cases can increase. A third nationwide DRS is already planned and funded for 2012.

Table 2. Prevalence of anti-TB drug resistance, Myanmar, 2002-2008

	New cases					Previously treated cases				
	Cases with DST results (H+R)	Multidrug-resistant		Any izoniazid resistance		Cases with DST results (H+R)	Multidrug-resistant		Any izoniazid resistance	
		No.	%	No.	%		No.	%	No.	%
2002-2003			4%					15.5%		
2007-2008	1 071	45	4.2% (3.1-5.6)	56	5.2% (4.0-6.7)	299	30	10.0% (6.9-14.0)	35	11.7% (8.3-15.9)

During 2007 and 2008, the Supranational TB Reference Laboratory (SRL) in Antwerp, Belgium, conducted second-line anti-TB drug susceptibility testing on isolates from 86 Category II treatment failures. Among the Category II failures, 99% had MDR-TB (85 out of 86 cases). One case of XDR-TB was found. Among the 86 cases, the resistance pattern to second-line anti-TB drugs were as follows: ofloxacin: 14%, PAS: 1%, kanamycin: 2%, capreomycin 1% and ethionamide: 0%.

[3] World Health Organization. *Multidrug and extensively drug-resistant TB: 2010 global report on surveillance and response.* WHO/HTM/TB/2010.3.
[4] World Health Organization. *Anti-tuberculosis drug resistance in the world: 4th global report.* WHO/HTM/TB/2008.394.

Table 3. DST results of Category II failure cases (2007-2008)

Total Isolates N= 86		Resistant									Not tested	Contam -inated
		MDR (H,R)	Ofx	PAS	Km	S	Cm	Eto	E	All sen	Neg		
Yangon	47	41	4	1	0	41	0	0	37	0	1	3	2
Manda-lay	40	31	5	0	1	26	0	0	24	1	0	5	3
Aung San Hospital	13	9	3	0	1	10	1	0	7	0	1	3	0
PSI*	4	4	0	0	0	4	0	0	2	0	0	0	0
Total	104	85	12	1	2	81	1	0	70	1	2	11	5
% Total		98.8 %	14 %	1.1 %	2.3 %	94.2 %	1%	0	81.4 %				

**PSI: Population Services International*

The WHO *Multidrug and Extensively Drug-resistant TB: 2010 Global Report on Surveillance and Response*[3] bases new estimates for the number of cases of MDR-TB on 2007-2008 drug resistance testing data. There are an estimated 8900 new cases of MDR-TB every year in Myanmar and 450 cases among previously treated patients, for a total of 9300 MDR-TB cases.

Table 4. Estimates of MDR-TB in Myanmar, 2010

	% MDR among new cases	% MDR among previously treated cases	No. MDR among incident new & relapse cases	No. of incident acquired MDR cases	No. of MDR among incident total TB cases
2010	4.2(3.2-5.6 CI)	10.0 (7.1-14.0)	8 900 (6 300-12 000)	450 (180-770)	9 300 (6 400-12 000)

**95% confidence interval (CI) for all percentages shown*

1.3. Existing MDR-TB programme

After initial WHO Green Light Committee approval in November 2007, the enrollment of MDR-TB cases began in July 2009 in Yangon and Mandalay Regions in a total of 10 townships (out of 330 nationwide), with plans of enrolling 275 patients on treatment. As of February 2011, there were a total of 227 patients enrolled in the pilot programme: 195 in Yangon Region and 32 in Mandalay Region. At present, only Category II failures are enrolled, with the following standardized treatment regimen:

6(Am Lfx Eto Cs PAS Z)/18 (Lfx Eto Cs PAS Z)*

*Am: amikacin, Lfx: levofloxacin, Eto: Ethionamide, Cs: cycloserine, Z: pyrazinamide.

While it is too early to report on treatment outcomes for these patients, 177 patients are still on treatment, 5 died before treatment started, 28 died, 15 defaulted, 1 failed and 1 refused treatment. Sputum and culture conversion is 100% by month 6 for all patients

who remain on treatment. The treatment model includes at least one month of hospitalization, and the remainder of the ambulatory treatment occurs at the patient's home with DOTS provided by a Basic Health Staff (BHS) and a volunteer supporter. The patients receive both nutritional support (20 000 Myanmar kyat/month) and a transportation stipend (5000 kyat/month). The BHS receive an incentive on top of their monthly salary for each MDR-TB patient they have: 40 000 kyat/month during the injectible phase and 30 000 kyat/month during the continuation phase. This incentive is crucial in motivating BHS to take on MDR-TB patients as there is still significant stigma around MDR-TB and because of the tremendous amount of time that goes into daily home visits to MDR-TB patients.

A manual of national standard operating procedures was developed in 2007 and finalized in 2009 with clear diagnosis and treatment protocols for the pilot project sites. There are plans to revise some of the existing guidelines and protocols for scale-up implementation; specific details are discussed in Section 4.

National Reference Laboratories (NRLs) in both Yangon and Mandalay completed renovations in 2010 and are now state-of-the-art facilities with well-trained and dedicated staff. Both laboratories can perform DST to first-line drugs with three methods: solid egg-based culture, liquid culture-MGIT, and genetic-HAIN (isoniazid and rifampicin only). At present there is no use of the Xpert MTB/RIF system. The Xpert MTB/RIF system is strongly recommended by WHO for initial diagnostic tests in all MDR-TB suspects and HIV-associated TB patients and will be a large part of the planned laboratory capacity scale-up.

It is expected that the enrollment of the 275 pilot project patients will be completed by June 2011. Thereafter, patients enrolled in the national MDR-TB treatment programme will follow the revised treatment model and operating procedures outlined in Section 4.

1.4. Financial situation and collaboration with donor agencies

Existing sources of funding for MDR-TB are limited to UNITAID for purchase of SLDs for 200 patients, Médecins Sans Frontières (MSF)-Holland for SLDs for an additional 75 patients, and 3DF for social and economic support for patients and BHS incentives. The United States Agency for International Development (USAID) provides an additional US$ 0.5 million for human resource development, infection control and laboratory needs. The Global Fund Round 9 grant started in 2011 with a maximum US$ 65 million for TB and US$ 11 million for MDR-TB.

With an expected gap of US$ 35 million for the MDR-TB programme alone, additional funding and support needs to be pursued as part of this Expansion Plan. The Global Fund Round 11 or Round 12 applications, due December 2011 and June 2012

respectively, are potential options for securing funds for the purchase of additional SLDs. Steps towards mobilizing these resources as well as others are described in Section 5. The Expansion Plan for MDR-TB will be largely dependent on external resources for funding.

1.5. Collaboration with technical agencies

The Ministry of Health established the National DR-TB Expert Committee in 2006 to develop a national framework for the management of MDR-TB. Since 2006, the National DR-TB Expert Committee has been meeting regularly to conduct workshops and trainings, develop operational procedures for diagnosis and treatment and monitor programme progress. This Committee collaborates with a number of technical agencies as well as the Technical Strategy Group for TB to coordinate strategies and activities for MDR-TB control. While there are numerous agencies involved in TB control activities (see the National Strategic Plan for TB Control 2011-2015), at present there are a limited number of agencies collaborating with MDR-TB control activities, as listed in Table 5. The Expansion Plan requires the involvement of more organizations at both local and national levels.

Table 5. Health and development agencies collaborating with MDR-TB programme

Organization	Type of organization	MDR-TB control activities	Location of TB control activities as of 2009
Expand-TB (FIND,* UNITAID, GDF, GLI)	INGO	• Laboratory strengthening (rapid diagnostic tests) • Technical assistance	National level
Global Drug Facility	Stop TB Partnership	• Anti-TB drugs • Technical assistance in drug management	Countrywide
JATA/JICA**	Development cooperation	• DOTS • Operational research • Public–private mix (PPM) • Laboratory strengthening • Training	Yangon & Mandalay Region 4 townships, absorbed by MMA (2009)
Médecins Sans Frontières – Holland	INGO	• MDR-TB • ACSM*** • TB/HIV	Kachin, Rakhine, Shan (North) States and Yangon Region
Médecins Sans	INGO	• MDR-TB	2 townships,

Frontières – Switzerland		• TB / HIV	Taninthayi Region
Myanmar Medical Association (MMA)	NGO	• PPM • ISTC • DOTS • ACSM • Training	70 townships
Population Services International	INGO	• PPM • ACSM • TB/HIV	166 townships
Union****	INGO	• TB/HIV • Technical assistance, training	14 townships
UNITAID	INGO	• Second-line anti-TB drugs • Paediatric TB drugs • Diagnostic tests	Countrywide
World Health Organization	INGO	• All elements of the Stop TB Strategy	Countrywide
World Vision Myanmar	INGO	• DOTS • Childhood TB • ACSM • Social support	5 townships

*FIND: Foundation for Innovative New Diagnostics
**JATA/JICA: Japan Anti-Tuberculosis Association/Japan International Cooperation Agency
**ACSM: advocacy, communication and social mobilization
****Union: International Union Against Tuberculosis and Lung Disease

1.6. Major challenges in the scale-up

The expansion of MDR-TB diagnosis and treatment activities faces three major challenges: human resources, laboratory capacity and funding. These three challenges are described briefly in this section.

1.6.1. Human resource development and capacity-building

Human resource development is an area of great concern, specifically at the field level. BHS spend a significant percentage of their time (20%-50%) on MDR-TB patients with daily directly observed treatment (DOT). National expansion of the programme needs to propose a sustainable model of care that is both economical and fair while maintaining treatment standards. Increased case-finding, diagnosis and treatment will require additional staff at all levels, as well as training for those staff. Strong infection control measures will also need to be maintained.

1.6.2. Laboratory capacity

While there are two excellent reference laboratories for DST in Myanmar, with increased demand for DST the laboratories will soon reach capacity. Therefore, additional testing strategies are introduced in Section 3.2.1 below. With a larger patient load, there will be an increase not only in diagnostic testing but also regular treatment monitoring, which requires monthly cultures.

Furthermore, there are ancillary laboratory demands for monitoring treatment such as testing serum for potassium, creatinine, thyroid stimulating hormone, and liver function tests.

1.6.3. Funding

As previously mentioned, funding for the Expansion Plan will be largely dependent on external resources and donor agencies. While this is of some concern, it is widely agreed that the scaling-up of MDR-TB control in Myanmar is of global interest and consequence and the NTP is confident that adequate funding will be secured with technical assistance from WHO and other partners.

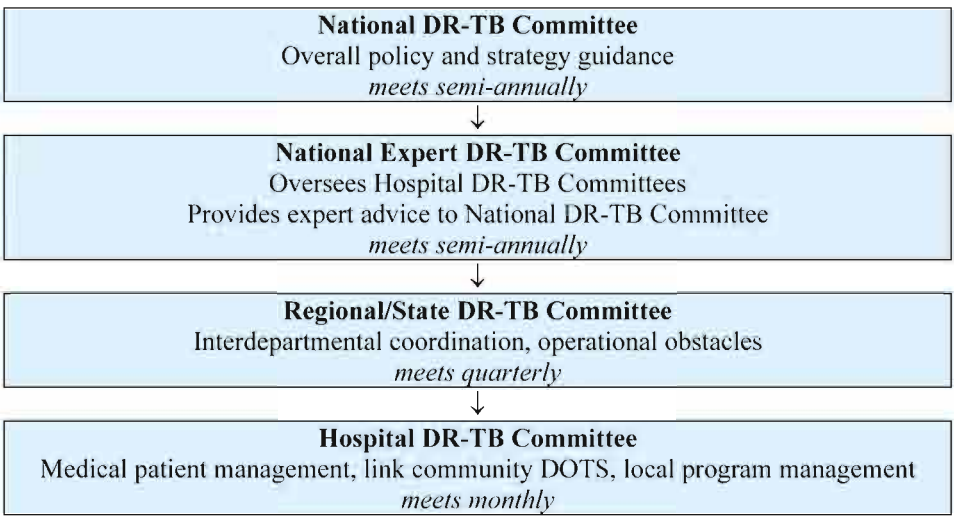
2. Organizational structure and model of care

2.1. Organizational structure of the MDR-TB programme

The existing MDR-TB programme is very well organized at a national and local grassroots level and will serve as an excellent foundation for the Expansion Plan. The National DR-TB Committee was formed in September 2006 and developed the National Framework on the Management of DR-TB, and then produced the National Operational Procedures for the DOTS-Plus Pilot Sites in 2009. Since 2009, the National Expert DR-TB Committee, Regional DR-TB Committee and Hospital DR-TB Committees have been formed, each with designated members, specific goals and terms of reference to ensure timely and effective management of MDR-TB patients at all pilot project sites.

The Expansion Plan will maintain these committees but will need to form additional regional/state and hospital committees beginning in 2012 with plans to expand to an additional four regions/states, and again in 2013 with plans to expand to an additional three regions/states. By 2015, there will be a total of 13 Regional/State DR-TB Committees and up to 13 Hospital DR-TB Committees, depending on how many hospitals become TB hospitals/treatment centres.

Figure 2. Organizational structure for MDR-TB programme and clinical management



In the existing MDR-TB programme, only Category II failures, defined as still sputum smear-positive at the fifth month and/or end of the re-treatment regimen, are enrolled in the programme for treatment. The Expansion Plan adds a number of additional selection criteria for programme enrollment, which are further discussed in Section 4.1.

Full algorithms for case-finding, referral and diagnosis can be found in the Operational Procedures for the DOTS-Plus Project Sites Manual, and Section 4 describes the modifications necessary to the manual for the Expansion Plan.

In summary, the organizational structure and model of care of the pilot project are maintained in the Expansion Plan, and specific revisions to the current model of care are discussed in Section 4.

3. Expansion goals, objectives and targets for MDR-TB

3.1. Stop TB Partnership goals for DR-TB

Global targets for reductions in the burden of disease caused by TB have been set within the context of the Millennium Development Goals (MDGs) and the Stop TB Partnership.[5] Table 6 outlines global indicators and targets for DR-TB and laboratory strengthening which will serve as a guide for the development of this Expansion Plan.

Table 6. Stop TB Partnership indicators, baselines and targets for drug-resistant TB and laboratory strengthening, as applied to Myanmar

Indicator	Baseline (2010)	Target (2015)
Percentage of previously treated TB patients tested for MDR-TB	Less than 10% (only Cat II failures from two regions)	100%
Percentage of new TB patients tested for MDR-TB	Less than 1% (not part of protocols)	20%
Ratio of culture laboratories per population (Goal of ≥1 culture laboratory per 5 million population)	1 per 25 million	1 per 5 million
Percentage confirmed cases of MDR-TB enrolled in treatment according to international guidelines	Not known (low)	100%
Number of confirmed cases of MDR-TB enrolled in treatment according to international guidelines	~ 200 cases	~4000
Treatment success rate among confirmed cases of MDR-TB	Not yet determined	≥75%

3.2. Nationwide expansion plan goals

This Expansion Plan uses Stop TB Partnership targets and MDGs as a guide for scale-up but also draws on data from the national TB prevalence survey and the WHO Global Tuberculosis Control 2010 report. Specific goals are discussed in detail in the following section, but the overarching goals of the Expansion Plan are as follows:

- Diagnosis of MDR-TB in all groups of patients at risk for MDR-TB;

[5] World Health Organization. *Global Plan to Stop TB 2011-2015: Transforming the Fight to Elimination of Tuberculosis.* 2010.

- Diagnosis of MDR-TB in all HIV infected patients with TB;
- MDR-TB treatment for all patients diagnosed with MDR-TB under WHO-endorsed treatment protocols.

The goal is to treat almost half of the WHO-estimated number of MDR-TB cases (8900 annually) by the end of the Expansion Plan period.

3.2.1. Case-finding

The ultimate goal of expanding case-finding strategies is to find patients earlier and get them on treatment sooner. Revisions to current operational procedures and protocols in case-finding will be made in Section 4.1. These methods include:

1. Screening in patient groups beyond failures of Category II
2. Geographical expansion
3. Modifying the strict inclusion criteria for programme enrollment

Table 7 estimates the number needed to be screened among different groups of patients if all patients from the group were screened. It is provided to give an estimate of the amount of screening needed to capture all the MDR-TB in a certain group and an estimate of the number of cases of MDR-TB that will be identified with the screening and will require treatment.

Table 7. Estimated number of expected MDR-TB cases with increased case-finding

Patient Group	Number needed to be screened	Percentage estimated to be Rif resistance positive	Number of expected cases of MDR-TB
Failures from CAT I * (Case notifications - retreatment - extrapulmonary x 3% failure rate)	2 613	35.0%**	915
Failures from CAT II *** (total retreatment cases x 5% failure rate)	431	95.0%	410
Retreatment Cases ***	8 631	10.0%	863
Contacts of MDR-TB (Rough estimate: 1 close contact developing MDR-TB for every 4 known cases)	1 000	80.0%	800
HIV/TB patients (Total case notification new and relapse - extrapulmonary x 10% HIV prevalence in TB cases)	9 683	4.2%	407
TOTAL TESTS	**22 359**		**3 395**

*World Health Organization. *Global Tuberculosis Control 2010 WHO Report*. Table A2.3 2009.

** Percentage of Rif resistance (a surrogate for MDR-TB) for failures of category I has not yet been determined. The 35% is an estimate based on knowledge from other countries. This number should be adjusted when the rate becomes available.
***World Health Organization. *Global Tuberculosis Control 2010 WHO Report*. Table A2.5 2009.

3.2.2. Number of MDR-TB cases treated

As determined by Table 7, it is unlikely that more than 40% of MDR-TB cases (3395 out of a predicted 8900 cases = 38%) will be identified unless DST is done at the start of treatment in all patients. At present it is not practical or feasible to do DST in all patients at the start of treatment, and it is unlikely under the present financial, technical and human resource restraints that the NTP can scale-up to testing all within the next five years. It should be noted that through modelling techniques it has been determined both cost-effective and more medically efficient (i.e. more lives will be saved) to test all cases.[6]

Most patients with MDR-TB started on Category I will not cure, although some will. In HIV patients, the percentage of death in new MDR-TB cases is too high and one cannot safely wait to see the response to treatment. The strategy of case-finding used in the Expansion Plan will detect all cases of failure of Category I in addition to identifying cases of MDR-TB at the start of MDR-TB treatment. Table 8 describes the approximate number of MDR-TB cases to be treated per year in the plan.

Table 8. Predicted number of MDR-TB cases treated by year

Year	MDR-TB cases initiating treatment	Percentage of estimated cases in Myanmar (%)
2011	500	7%
2012	1 200	13%
2013	1 800	20%
2014	2 400	27%
2015	3 395	38%

3.2.3. Geographical expansion

The geographic expansion aims to have 30% of the townships with the capacity to treat MDR-TB by the year 2015. There will be a focus on expanding diagnosis and treatment in urban areas, as the most recent nationwide TB prevalence survey report indicated that the prevalence of smear-positive TB is 65% higher in urban area versus rural (331/100 000 vs 216/100 000). With this strategy it is expected that more than 50% of the population will live in a township with MDR-TB care activities. People who live in townships without MDR-TB activities will have to move temporarily to townships that offer treatment and care.

[6] World Health Organization. *Guidelines for the programmatic management of drug-resistant tuberculosis, 2011 Update.*

The NTP is already planning on expanding to an additional six townships in each of Yangon and Mandalay regions in 2011, for a total of 22 townships with MDR-TB treatment centres. A possible expansion scenario beyond 2011 is outlined in Table 9.

Geographical expansion will come automatically as diagnostic capacity and MDR-TB treatment centres are established in new regions and states; the targets outlined here are for setting goals for the percentage of the population covered. The numbers of townships, regions and states are provided in Table 9. The specific townships, regions and states that are chosen to be part of the Expansion Plan are outlined in Table 10.

Table 9. Geographical expansion scenario: townships, states and regions

Year	Reference diagnostic labs with culture/ With DST	Number of centres with Xpert MTB/RIF	Number of regions or states with TB/MDR-TB treatment centre	Number of townships with MDR-TB treatment centre	Percentage of townships covered	Percentage of population covered
2010	2/2	0	2	10	3.0%	3.9%
2011	2/2	2	2	22	6.7%	9.3%
2012	3/2	6	6	37	11.2%	14.6%
2013	4/3	12	9	62	18.8%	26.3%
2014	5/4	17	11	72	21.8%	31.6%
2015	5/5	23	13	100	30.3%	41.5%

Table 10. Specific townships, regions/states by year for MDR-TB treatment activities

Region or State/ MDR-TB Treatment Centre	Townships	Catchment area population
Yangon/ Aung San TB Hospital	**11 Townships:** Hlaingtharyar, Insein, Mayangone, Shwepyithar, Hlaing, AZG Clinic, New Dagon North, New Dagon South, North Okkalapa, South Okkalapa, Tharkata, Mingaladon	2.38 million
Mandalay/ Patheingyi TB Hospital	**11 Townships:** Aungmyaetharzan, Chanmyatharzi, Chanayetharzan, Mahaaungmyae, Pyigyitagon, Patheingyi, Amarapura, Kyaukse, Pyinmana, Pyin Oo Lwin, Meiktila	2.26 million
	2012 (6 regions/states, 37 townships)	
Yangon/ Aung San TB Hospital	**14 Townships**: Same as 2011 + Bahan, Yankin, Tarmwe	2.69 million

Mandalay/ Patheingyi TB Hospital	**11 Townships**: Same as 2011	2.26 million
Shan State/Taunggyi MDR-TB Treatment Centre	**5 Townships:** Taunggyi, Kalaw, Nyaungshwe, Yatsauk, Hopone	0.89 million
Kachin State/Myitkyina MDR-TB Treatment Centre	**1 Township:** Myitkyina	0.22 million
Magway Region/Magway MDR-TB Treatment Centre	**5 Townships:** Magway, Yenanchaung, Chauk, Thayet, Aunglan	1.01 million
Tanintharyi Region/Dawei MDR-TB Treatment Centre	**1 Township:** Dawei	0.22 million
2013 (9 regions/states, 62 townships)		
Yangon/ Aung San TB Hospital	**19 Townships**: Same as 2012 + Thanlyin, Kyauktan, Thongwa, Twintay, Dala	3.62 million
Mandalay/ Patheingyi TB Hospital	**11 Townships**: Same as 2012	2.26 million
Shan State/Taunggyi MDR-TB Treatment Centre	**5 Townships:** Same as 2012	0.89 million
Kachin State/Myitkyina MDR-TB Treatment Centre	**1 Township:** Same as 2012	0.22 million
Magway Region/Magway MDR-TB Treatment Centre	**6 Townships:** Same as 2012 + Pakokku	1.3 million
Tanintharyi Region/Dawei MDR-TB Treatment Centre	**1 Township:** Same as 2012	0.22 million
Sagaing Region/Monywa MDR-TB Treatment Centre	**8 Townships:** Sagaing, Shwebo, Wetlet, Monywa, Ayadaw, Budalin, Kalay, Tamu	1.79 million
Bago Region/Bago MDR-TB Treatment Centre	**5 Townships:** Bago, Taungnu, Pyi, DaikU, Phyu	1.39 million
Mon/Kayin State Mawlamyaing MDR-TB Treatment Centre	**6 Townships:** Mawlamyaing, Phaan, Ye, Belin, Mudon, Myawady	1.43 million
2014 (11 regions/states, 72 townships)		
Yangon/ Aung San TB Hospital	**19 Townships**: Same as 2013	3.62 million
Mandalay/ Patheingyi TB Hospital	**11 Townships**: Same as 2013	2.26 million
Shan State/Taunggyi MDR-TB Treatment Centre	**5 Townships:** Same as 2013	0.89 million
Kachin State/Myitkyina MDR-TB Treatment Centre	**1 Township:** Same as 2013	0.22 million

Magway Region/Magway MDR-TB Treatment Centre	**6 Townships:** Same as 2013	1.3 million
Tanintharyi Region/Dawei MDR-TB Treatment Centre	**1 Township:** Same as 2013	0.22 million
Sagaing Region/Monywa MDR-TB Treatment Centre	**8 Townships:** Same as 2013	1.79 million
Bago Region/Bago MDR-TB Treatment Centre	**5 Townships:** Same as 2013	1.39 million
Mon/Kayin State Mawlamyaing MDR-TB Treatment Centre	**6 Townships:** Same as 2013	1.43 million
Ayeyarwady Region/ Pathein MDR-TB Treatment Centre	**5 Townships**: Pathein, Myaungmya, Hinthada, MaUbin, Pyarpon	1.77 million
Yakhine State/ Sittwe MDR-TB Treatment Centre	**5 Townships**: Sittwe, Rathedaung, Kyauktaw, Buthidaung, Maungdaw	1.51 million
2015 (13 regions/states, 100 townships)		
Yangon/ Aung San TB Hospital	**24 Townships**: Same as 2014 + Dawbon, Thingangyun, Kyinmyindaing, Taikkyi, Hmawbi	4.4 million
Mandalay/ Patheingyi TB Hospital	**11 Townships**: Same as 2014	2.26 million
Shan State/Taunggyi MDR-TB Treatment Centre	**7 Townships:** Same as 2014 + Loikaw, Dimawhso	1.09 million
Kachin State/Myitkyina MDR-TB Treatment Centre	**4 Townships:** Same as 2014+ Mohynin, Mogaung, Waingmaw	0.68 million
Magway Region/Magway MDR-TB Treatment Centre	**6 Townships:** Same as 2014	1.3 million
Tanintharyi Region/Dawei MDR-TB Treatment Centre	**4 Townships:** Same as 2014 + Launglon, Thayetchaung, Yebyu	0.69 million
Sagaing Region/Monywa MDR-TB Treatment Centre	**8 Townships:** Same as 2014	1.79 million
Bago Region/Bago MDR-TB Treatment Centre	**5 Townships:** Same as 2014	1.39 million
Mon/Kayin State Mawlamyaing MDR-TB Treatment Centre	**6 Townships:** Same as 2014	1.43 million

Ayeyarwady Region/ Pathein MDR-TB Treatment Centre	**10 Townships**: same as 2014 + Ngaputaw, Laputta, Bogalay, Kangyidaung, Kyaunggon	3.1 million
Yakhine State/ Sittwe MDR-TB Treatment Centre	**5 Townships**: Same as 2014	1.51 million
Shan State/ Lashio MDR-TB Treatment Centre	**7 Townships:** Lashio, Kyaukme, Hsipaw, Naungcho, Namtu, Muse, Koikki	1.37 million
Shan State/ Kyaingtong MDR-TB Treatment Centre	**3 Townships:** Kyaingtong, Mongphyuk, Tachileik	0.34 million

3.2.4. Human resource development

The goals for human resource development are based on the successful MDR-TB pilot project. Each region or division that begins MDR-TB treatment during the expansion phase will choose a designated MDR-TB treatment centre with inpatient capabilities as well as an outpatient centre for monthly follow-up visits. The treatment centres will not always be a strictly TB hospital as developed in the pilot project areas of Yangon and Mandalay, but can be a single wing of a hospital or other health-care facility. With the revised treatment protocols implemented, initial hospitalization will be optional and the need for designated MDR-TB hospital beds per treatment centre will be less than required in the pilot phase.

The home-based care component of treatment delivery will also be based on the pilot project with the BHS performing DOT, supervised by the Township Medical Officer from the Township Health Department.

By 2015, there may be as many as 3500 patients enrolled each year across 13 regions/states and 100 townships. This translates to a steady rate of approximately 7000 patients on MDR-TB treatment each year (as treatment is two years long), with an average of 70 patients per township on treatment.

Human resource needs should be considered in three specific areas:

1. Centrally at the NTP
2. Regionally and at the township level
3. In the laboratory

Table 11. Human resource needs at central, regional and laboratory levels

Central at the NTP *Given the size of the scale-up, a department at the NTP will be created and dedicated to MDR-TB.*	• 1 MDR-TB Deputy Manager • 2 Physicians (assist with supervision and training) • 1 Training manager • 1 Administrative assistant • 1 Accountant
Regionally and at the township level *Staff and training for a region/state to follow on average 700 patients/year.*	**MDR-TB Treatment Centre:** • 1 TB specialist (focal point) • 2-3 Physicians • 6-7 Nurses • 1 Data assistant
	Township Medical Centre: • 1 Medical officer (focal point) • 1 MDR-TB coordinator • 30-40 BHS trained in MDR-TB • 30-40 volunteer treatment supporters
Laboratory *Laboratory staff will need to be added at all levels to accommodate the increased diagnostic and follow-up tests.*	**Reference Laboratory (Yangon & Mandalay):** • 1 Senior consultant • 2 Microbiologists • 3 Med tech • 3 Lab technicians • 1 Data assistant
	MDR-TB Diagnostic Centres with C&DST facility • 1 Microbiologist • 1 Med tech • 2 Lab technicians • 1 Data assistant
	MDR-TB Diagnostic Centres with Xpert MTB/RIF: • 2 Xpert MTB/RIF technicians

It is imperative that ongoing trainings reiterate the importance of treatment of MDR-TB as well as proper infection control measures. In addition, campaigns to reduce the stigma of MDR-TB and the fear of health-care workers to treat MDR-TB should be implemented.

The BHS already dedicate 20%-50% of their time to MDR-TB patient care on a daily basis; therefore, the overall number of BHS per Township Health Department will likely need to increase at some point during the expansion phase. Funding to maintain this increase in the number of trained staff as well as their additional monthly financial incentive will need to be identified. While this Expansion Plan does set certain goals for increased staff at the township level, the number of additional BHS appointed to the Township Health Department will ultimately be decided by the Ministry of Health. However, because it will take time for the townships to scale up treatment to 70 patients, this Expansion Plan assumes that townships will have a caseload of only 15-25 patients for the first few years of the expansion. The Expansion Plan assumes no new hires of BHS for the first three years(2011-2013) and that already-established BHS at the township

level will be motivated to take one to two patients under the monthly incentive scheme described in this plan. In 2012, the programme should be assessed and if needed, a plan for increasing the overall number of BHS at the township level should be proposed.

This Expansion Plan recommends performing a formal Human Resources Assessment to address both the overall national TB strategic plan and to specifically address the human needs resources for MDR-TB activities.

3.2.5. Reference laboratory and MDR-TB diagnostic centres with Xpert MTB/RIF

The Expansion Plan will use the two NRLs in Yangon and Mandalay to perform culture and DST to first-line drugs with three methods: solid egg-based culture, liquid culture-MGIT, and genetic-HAIN (H and R only). Diagnostic testing and monitoring with cultures will be the responsibility of the NRLs for Years 1-3. Because these reference laboratories may be far from MDR-TB treatment centres and a number of days may pass between sample collection and processing in the culture laboratory, a proposed system of transportation is as follows:

- **For specimens in transit for less than 4 days:** Refrigerate at +4 °C until transport or immediately transport to the laboratory for processing.
- **For specimens in transit more than 4 days:** Sputum for culture and DST should be transported in tubes pre-filled with 1% cetylpyridinium chloride (CPC). CPC is a substance known to kill pathogenic fungi and shown to increase the culture positivity and reduce the contamination rate. The tube is filled with an equal amount of sputum to the volume of the CPC in the tube. **CPC is strictly not permitted for liquid media;** therefore, specimens decontaminated with CPC cannot be used with MGIT liquid techniques. Specimens with CPC in them should not be refrigerated as the CPC will crystallize and be ineffective. Before inoculation of solid culture the specimen with CPC should be centrifuged (without refrigeration) and after centrifugation the CPC in specimen should be discarded.

A courier system will be set up that will transfer specimens once a week between distant MDR-TB treatment centres and the NRLs. Only solid culture and HAIN testing can be used for specimens with CPC. Specimens for liquid culture and DST should be sent in less than four days and refrigerated.

In Year 2 (2012), three culture centres will be added, one to each new region or state with an MDR-TB treatment centre in Taunggyi, Mawlamyaing, Pathein. In Year 4 (2014), the three culture centres will add DST capabilities.

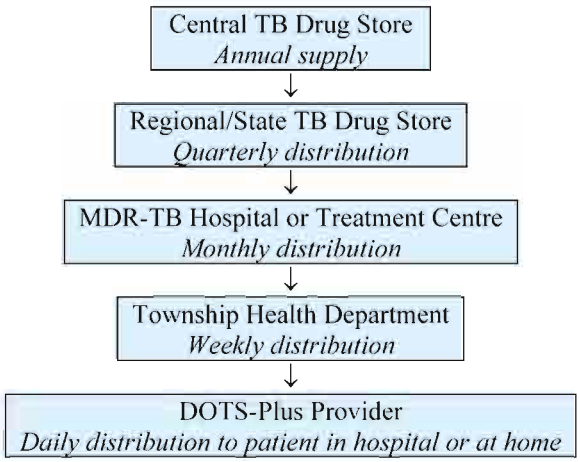
Xpert MTB/RIF will be added in Year 1 (2011) to both NRLs, and to four of the MDR-TB treatment centres in Taunggyi, Myitkyina, Magway and Dawei in 2012. Once available and established in Myanmar, Xpert MTB/RIF will be the diagnostic test of choice to rule out MDR-TB.

Table 9 in Section 3.2.3 as well as the workplan in Section 6 address these added laboratory facilities and diagnostic tools as well.

3.2.6. Second-line anti-TB drug supply

SLDs are obtained from the Global Drug Facility (GDF); the WHO Country Office for Myanmar will provide ongoing technical assistance with ordering. Funding for SLDs is described in the section below. Depending on the success of the MDR-TB Expansion Plan, drug orders should be placed every six months instead of annually. The supply chain for SLD will remain the same as described in the *Operational Procedures for the DOTS-Plus Pilot Sites* and as shown in the figure below.

Figure 3. Second-line drug supply chain



3.2.7. Monitoring and evaluation

The forms laid out in the *Operational Procedures for the DOTS-Plus Pilot Sites* will continue to be used and applied to any new state or region adding MDR-TB activities.

A system for registering all documented MDR-TB cases in Myanmar will be put in place. Cases documented from any private laboratory will not be entered in the national register unless the private laboratory is evaluated for quality assurance. Any DST results from an outside non-quality-assured laboratory should be repeated at one of the reference laboratories and then entered in the National Register if MDR-TB is documented.

A data manager will be placed in each region or state.

4. Revisions to the current operational procedures for MDR-TB management

The current *Operational Procedures for the DOTS-Plus Pilot Sites for MDR-TB Management in the Yangon and Mandalay Divisions, Myanmar, 2009* will serve as the procedure guidelines for areas that expand MDR-TB activities. The changes to the *Operational Procedures* will be summarized in a short supplemental expansion plan guide and will be placed inside the manual. This section describes the changes to the *Operational Procedures,* which should be revised as a whole in 2012.

4.1. Case-finding strategies

During the pilot project, only Category II failures (defined as sputum smear-positive at the fifth or eighth month of treatment) were enrolled for treatment. For the Expansion Plan, the patient categories included for DST and screening will be expanded to follow WHO-recommended guidelines. Patient categories to be tested for DST and enrolled in treatment when MDR-TB is found include:

1. Failures of Category I and II
2. All retreatment cases
3. Close contacts of MDR-TB patients with active TB
4. All HIV infected patients at the start of TB therapy

Until Xpert MTB/RIF is available, diagnostic DST for patients will be done at the reference laboratories. When Xpert MTB/RIF is available, a diagnostic test for a patient to rule out MDR-TB can be done with Xpert MTB/RIF and if positive for TB and negative for rifampicin resistance no further DST needs to be done. If clinical suspicion of MDR-TB remains despite a negative Xpert MTB/RIF test, the test can be repeated and a specimen sent to one of the reference laboratories. All Xpert MTB/RIF specimens positive for TB and positive for rifampicin resistance should be sent to one of the reference laboratories for confirmation with DST of MDR-TB.

4.2. Exclusion criteria

The selection criteria set for the pilot project were fairly exclusive; however the criteria will be revised for the expansion period to follow WHO-recommended treatment guidelines. The table below describes existing exclusion criteria and the ways in which they will change to be more inclusive.

Table 12 . Selection criteria revisions for expansion period

Selection criteria	Excluded from pilot project		Revisions for expansion period
Alcohol use	Daily alcohol user or alcoholic	→	Only excluded if alcohol use impedes patient's taking of medications.
Resident	Absence of Form 10 or guest form		Eliminate or shorten the 6-month waiting period.
Family/community support	Absence of family/community support	→	The NTP will assist in identifying a treatment supporter for those who do not have one.
Pregnancy	1st trimester (eligible pregnant women are kept on standby until 2nd trimester for treatment)	→	Include any 1st-trimester patients when a life-threatening TB condition exists.
Side-effects due to TB treatment	Side-effects to SLD that do not allow for construction of MDR regimen	→	Criteria to remain the same.
Continuously migrant	Excluded without exceptions	→	Criteria to remain the same.
Severe co-morbidities (liver, renal, epilepsy, psychosis)	Excluded without exceptions	→	Only excluded if at the very end stage of disease (individual case basis).
Drug abuse	Excluded without exceptions	→	Only excluded if drug use impedes patient's taking of medications.
History of SLD use for more than one month	Excluded without exceptions	→	Consider keeping PAS for patients who have previous SLD use.

The Regional/State TB Officer will still be responsible to include the proven MDR-TB patients using the revised selection criteria and will report back to the Hospital DR-TB Committee on all MDR-TB suspects who underwent DST.

4.3. Drug regimen

The MDR-TB patients enrolled during the pilot project were put on a standardized treatment regimen based on drug sensitivity patterns of Category II failures whose sputa were tested at the SRL at the Tropical Institute of Medicine in Antwerp, Belgium.

Previous treatment regimen:	6(Amk Lfx Eto Cs PAS Z)/18(Lfx Eto Cs PAS Z)

*Am: amikacin, Lfx: levofloxacin, Eto: Ethionamide, Cs: cycloserine, Z: pyrazinamide.

It has been agreed upon and decided that PAS does not need to be included in the standard regimen for patients enrolled during the expansion period. Given the prevalence of SLD resistance, the standard regimen with PAS exceeds the minimum requirements. Removing PAS would result in fewer side-effects, possibly less default

and be less costly; furthermore, evidence suggests it would result in the same efficacy. In addition, it is easier to give the drugs once a day at home without the PAS, ultimately saving both time spent on home visits and resources. The new standardized MDR-TB regimen will be:

Revised treatment regimen:	6(Amk Z Lfx Eto Cs)/18(Lfx Eto Cs Z)

The new standard MDR-TB treatment regimen can be modified under the following circumstances:

PAS can be added to the regimen when one of the following indications is present:

1. The patient's strain tests resistant to ofloxacin (i.e. determined in a survey for DST to SLDs or because of an indication for second-line DST): use the above regimen plus PAS.

2. The patient has a history of SLD use: use the above regimen plus PAS.

3. The patient is a contact of a patient who died on SLD regimen or a contact with a known history of resistance to SLD: use the above regimen plus PAS.

4. The patient cannot tolerate cycloserine (one of the drugs in the regimen): PAS can be substituted.

5. The patient is pregnant: with consultation from a DR-TB expert, include PAS in the regimen.

For patients with strain testing resistant to kanamycin (or amikacin) or who cannot tolerate amikacin: substitute capreomycin for amikacin.

The length of treatment will remain at 24 months.

4.4. Model of care protocols

At present, the MDR-TB patient is managed by the Hospital DR-TB Committee after referral by the Township Medical Officer/TB Coordinator and the Medical Officer at the regional TB centre. From there, the patient is admitted to one of the TB hospitals and hospitalized for one to three months and is given education about their disease, medications and length of treatment. Ambulatory treatment after discharge is done at the patient's home; DOT is provided twice daily by a BHS and a volunteer community supporter. The BHS comes to the patient's home for the morning dose of medicines and

the volunteer community supporter (usually a family member, neighbour or friend) provides DOT for the evening dose.

While this model has been effective for patients enrolled during the pilot project, it is agreed that it should be revised for the Expansion Plan. The current model relies heavily on the BHS providing daily DOT in a way that is not sustainable for scale-up; therefore this Expansion Plan suggests the formal addition of a volunteer treatment supporter for Sunday DOT and any necessary evening doses. Table 13 describes this change as well as others that are necessary for nationwide scale-up of the programme.

Table 13. Revisions to the model of care

Component	Pilot project SOP		Expansion Plan SOP
Hospitalization	Minimum of one month, maximum of three months.	→	Decrease to one to four weeks and encourage an initial hospitalization for all patients at start of treatment. If a hospital waiting list develops or if the patient strongly prefers home-based care, allow for home-based from the start.
Ambulatory care	Daily patient home visits by BHS and volunteer treatment supporter.	→	Patient will continue home-based care and should come to the TB hospital every two weeks for the first two months of treatment and then monthly thereafter for follow-up.
Drug dosage	All drugs are given under DOT seven days a week; one morning dose with injectible agent and one evening dose of just oral medications.	→	Give the injectible agent under DOT six days/week and all oral medications seven days/week. Administer all drugs in one daily dose in the morning. If the medicines are not tolerated, they can be given twice a day.
BHS responsibility	DOT seven days/week for morning dose.	→	DOT six days/week for daily dose.
Volunteer treatment supporter responsibility	DOT seven days/week for evening dose.	→	DOT on Sundays for daily dose. DOT for evening doses when necessary.
BHS support	Financial incentive of US$ 40/ patient/month during injectible phase and US$ 30/patient/month during continuation phase. US$ 5/month for transportation. Continued training, education and supervision.	→	Financial incentive of US$ 40/ patient/month during injectible phase and US$ 30/patient/month during continuation phase. US$ 5/ month for transportation. Continued training, education and supervision. *These amounts may be revised depending on financial resources.*
Volunteer treatment supporter support	No incentive or support.	→	Financial incentive of US$ 15/month.
Patient support	Social support of US$ 20/month. Transportation stipend of US$ 5/month.	→	Social support of US$ 20/month. Transportation stipend of US$ 5/month.

4.5. Infection control

Infection control measures described in the *Operational Procedures Manual* will continue to be implemented during the expansion phase. All health-care staff and BHS will be provided personal protection in the form of N-95 masks.

4.6. Side-effect management and monitoring response to therapy

Extensive guidelines and protocols for managing side-effects and monitoring response to therapy are outlined in the *Operational Procedures Manual*. Additional guidelines to manage adverse effects are provided below:

1. Ondansetron (a 5-HT3 receptor antagonist) is added as an additional drug to treat nausea and vomiting.
2. Check thyroid-stimulating hormone every three months at minimum for signs of hypothyroidism in patients taking both PAS and ethionamide. Patients receiving only ethionamide can have their TSH checked every six months.
3. Give magnesium orally to all patients with hypokalaemia at 1000 to 1200 mg, twice a day. Avoid using magnesium as its bioavailability is less. Use any of the following preparations: magnesium aspartate, magnesium chloride, magnesium lactate, magnesium citrate or magnesium glycinate (each have bioavailability four times greater than the oxide form and are equivalent to each other per amount of magnesium in the tablet).

4.7. Addressing failures of the MDR-TB regimen and rescue regimens

Addressing failures of MDR-TB treatment is addressed in the *Operational Procedures Manual.* The Expansion Plan will add the use of a rescue regimen under the supervision of an MDR-TB specialist. The regimen will be individualized and designed to treat XDR-TB.

5. Financing

5.1. Total costs

The total cost per patient has previously been estimated at US$ 3571 per patient per year, including the cost of a SLD regimen that includes PAS. Table 14 has a slightly higher estimated cost per patient and takes into account all of the financial support provided to BHS and patients. Table 15 is meant to serve as a guide for estimating overall programme costs, which are in addition to direct patient costs (Table 14). Tables 14 and 15 show estimated costs and are not intended to serve as a final budget for the MDR-TB Expansion Plan. The quantities and amounts used in the estimated programme costs budget correlate directly with the planned geographical expansion as detailed in Tables 8 and 9 in Sections 3.2.2 and 3.2.3. Some of these quantities and amounts are taken directly from the WHO budget tool, while others are educated estimates. Refer to Excel versions of Tables 14-18 for more detailed information and exact budget line amounts.

Table 14. Estimated total direct costs per patient per two-year treatment. Figures are in US$.

Component	Cost per month	Cost per year
SLDs (not including PAS)		2 500
Ancillary drugs	10	240
Hospitalization (based on avg stay = 30d)		70
BHS incentive injectible phase	40	240
BHS incentive continuation phase	30	540
Transportation for BHS	5	120
Transportation for patient	5	120
Treatment supporter incentive	10	240
Nutritional support for patient	20	480
Sputum smears, cultures, DST and X-rays	10	240
Training		In programme budget
Programme and data management		In programme budget
Other	10	240
Total cost per patient for two-year treatment		**5 030**
Total cost per patient without drugs		**2 530**

Table 15. Estimated programme costs over five-year period, 2011-2015. Figures are in US$.

Component	2011	2012	2013	2014	2015	Estimated cost over five-year period
Monitoring & evaluation and coordination	22 200	25 650	55 000	27 400	39 600	169 850
Infrastructure	38 000	845 000	1 405 000	115 000	125 000	2 528 000
Human Resources	150 000	250 000	350 000	400 000	400 000	1 550 000
Training	234 433	264 751	286 180	297 096	356 757	1 439 217
Laboratory	246 500	1 067 000	394 000	413 000	750 000	2 870 500
Total	**691 133**	**2 452 401**	**2 490 180**	**1 252 496**	**1 671 357**	**8 557 567**

Table 16. Estimated total MDR-TB Expansion Plan cost over five-year period, 2011-2015 Figures are in US$.

Year	No. patients enrolled	Direct patient costs*	Estimated programme costs	Total
2011	500	2 515 000	691 133	3 206 133
2012	1 200	6 036 000	2 452 401	8 488 401
2013	1 800	9 054 000	2 490 180	11 544 180
2014	2 400	12 072 000	1 252 496	13 324 496
2015	3 395	17 076 850	1 671 357	18 748 207
Total		**46 753 850**	**8 557 567**	**55 311 417**

** Based on US$ 5030 for full two-year treatment (see Table 14).*

Therefore, the total estimated cost of implementing this MDR-TB Expansion Plan over the next five years is 55.3 million USD. The direct patient costs and programme costs shown are estimates only; the actual cost of the Expansion Plan may differ considerably.

5.2. Funding availability and gaps

The tables below detail the known availability of external funding at the time this Expansion Plan was first drafted (April 2011) and the expected funding gap based on those resources. It is highly likely that the available funding will increase before parts of this Expansion Plan are implemented; therefore the final Expansion Plan budget should be revisited on a regular basis to ensure that funding is pursued for all components of the programme.

A preliminary estimate of the funding gap for the five-year Expansion Plan is US$ 37 million.

Table 17. Expected funding sources for MDR-TB management over five-year period, 2011-2015. Figures are in US$.

		2011	2012	2013	2014	2015	Total
Global Fund	SLDs, ancillary drugs, training, infection control, supervision and meetings	1 331 540	2 611 880	2 611 880	2 611 880	2 611 880	11 779 060
USAID	HR development, laboratory, social and economic support for patients, training, supervision	500 000	500 000	500 000	500 000	500 000	2 500 000
FIND	Laboratory support	900 000	900 000				1 800 000
3DF	Social and economic patient support and incentives	314 651					314 651
MSF-Holland	SLDs	414 677	350 000	300 000	200 000	200 000	1 464 677
Total		**3 460 868**	**4 361 880**	**3 411 880**	**3 311 880**	**3 311 880**	**17 858 388**

Table 18. Funding gap for MDR-TB Expansion Plan, 2011-2015. Figures are in US$.

Estimated Expansion Plan cost over five-year period	55 311 417
Expected funding over five-year period	17 858 388
Funding gap	**37 453 029**

5.3. Resource mobilization

Because the MDR-TB pilot project in Myanmar has already been so successful, convincing donor agencies and partners that the country is capable of a massive scale-up should not be a problem. Once funding has been secured, the real challenge will be the actual expansion of trained and dedicated MDR-TB staff and diagnosis and treatment infrastructure. The MOH, the NTP and collaborating partners have all expressed their full support of this Expansion Plan and their commitment to pursue all possible resources.

The WHO Country Office for Myanmar will continue to play an important role as a technical assistance partner in helping the NTP identify and pursue available funds for the MDR-TB Expansion Plan. There are immediate plans to pursue additional Global Fund funding by applying to either Round 11 or 12 in the next year. USAID is already supporting MDR-TB activities with US$ 0.5 million per year and it seems likely that they will approve the purchase of two Xpert MTB/RIF machines in 2011. While 3DF funding is scheduled to stop in December 2011, there are plans to request continued funding for social and economic support for patients. UNITAID and TB Reach are both being approached to request funding for the purchase of additional Xpert MTB/RIF machines; furthermore, UNITAID be able to continue funding for SLDs. Lastly, NGOs and INGOs will be approached to help support community-based care.

Continued support from the government and annual meetings involving donors and stakeholders will ensure coordination at all levels so that efforts are not duplicated or fragmented. There is tremendous political will to move forward with this Expansion Plan.

6. Workplan and timeline for expansion

The timeline in Table 19 lays out the major activities of the Expansion Plan. A more detailed workplan will be the responsibility of the NTP and the actual timeline may depend on secured funding.

Table 19. Proposed workplan and timeline for expansion activities, 2011-2015

MDR-TB Expansion Timeline and General Workplan 2011-2015 – Myanmar	2011	2012	2013	2014	2015	Responsible party
Activity 1: Write and implement MDR-TB Expansion Plan						
First draft of Expansion Plan						WHO, NTP
Determine the 3 States/Regions for 2012 and 2013 expansion						NTP
Determine the 3 States/Regions for 2014 and 2015 expansion						NTP
Final version of Expansion Plan adopted and approved						NTP
Secure funding for the Expansion Plan						NTP
Implement the Expansion Plan						NTP
Activity 2: Revise National MDR-TB Standard Operating Procedures						
Draft memo to be added to existing SOP						
Full revision of SOP						
Activity 3: Establish a department at the NTP to focus on MDR-TB						
Write job descriptions and approval for department						NTP
Hire MDR-TB Deputy Director						NTP
Hire MDR-TB Team						NTP
NTP MDR-TB Team in place implementing Expansion Plan and supervision						NTP
Activity 4: Procure SLDs, ancillary drugs for adverse effects, and equipment						
Order SLD from GDF (every 6 months)						
Order ancillary drugs (once a year)						
N-95 Masks						
Order lab reagents (every 6 months)						
Order Xpert MTB/RIF machines & generators						

MDR-TB Expansion Timeline and General Workplan 2011-2015 – Myanmar																				Responsible party
	2011				2012				2013				2014				2015				
Order Xpert MTB/RIF cartridges (every 6 months)																				
Oxygen concentrators (4 per DOTS-Plus Centre)																				
Other inpatient equipment																				
Activity 5: Establish and maintain MDR-TB Treatment Centres (includes hiring staff																				
Maintain and small upgrades for TB hosp. Yangon & Mandalay																				
Construct & Maintain MDR-TB Tx Ctr in Expansion State/Reg 3																				
Construct & Maintain MDR-TB Tx Ctr in Expansion State/Reg 4																				
Construct & Maintain MDR-TB Tx Ctr in Expansion State/Reg 5																				
Construct & Maintain MDR-TB Tx Ctr in Expansion State/Reg 6																				
Construct & Maintain MDR-TB Tx Ctr in Expansion State/Reg 7																				
Construct & Maintain MDR-TB Tx Ctr in Expansion State/Reg 8																				
Construct & Maintain MDR-TB Tx Ctr in Expansion State/Reg 9																				
Construct & Maintain MDR-TB Tx Ctr in Expansion State/Reg 10																				
Activity 6: Maintain and expand laboratory capacity																				
Continue Yangon and Mandalay reference laboratories																				
Establish culture laboratories in Expansion Region 3, 4, and 5																				
Establish DST in laboratories in Expansion Region 3, 4, and 5																				
Xpert MTB/RIF in Yangon and Mandalay reference laboratories																				
Xpert MTB/RIF in Expansion Region 3, 4, and 5																				
Xpert MTB/RIF in 2 additional locations (Total 7)																				

MDR-TB Expansion Timeline and General Workplan 2011-2015 – Myanmar																			Responsible party
	2011				2012				2013				2014				2015				
Xpert MTB/RIF in 5 additional locations (Total 12)																					
Xpert MTB/RIF in 7 additional locations (Total 19)																					
Activity 7: Train staff in expansion areas																					
NTP MDR-TB Team																					
Refine and update training materials																					
Staff in 12 new townships in Yangon & Mandalay																					
Staff in Expansion Region 3, 4 & 5																					
Staff in Expansion Regions 6 & 7																					
Staff in Expansion Regions 8, 9 & 10																					
BHS in Expansion Regions 3, 4 & 5																					
BHS in Expansion Regions 6 & 7																					
BHS in Expansion Regions 8, 9 & 10																					
Vol. Tx Supporter in Expansion Regions 3, 4 & 5																					
Vol. Tx Supporter in Expansion Regions 6 & 7																					
Vol. Tx Supporter in Expansion Regions 8, 9 & 10																					
Refresher courses (once a year for all areas)																					

7. Expected impact of implementation and conclusions

It is estimated that 9295 MDR-TB cases will be treated according to WHO guidelines from 2011 to 2015 and at least 6971 (75%) will be treated successfully. Without treatment, the majority of these patients would die after having transmitted MDR-TB to their families and communities.

The absence of an MDR-TB control programme would stimulate treatment by general practitioners that might not conform to NTP MDR-TB treatment protocols, or self-treatment through the purchase of inadequate quantities and combinations of medicines due to financial constraints. The purchase of anti-TB drugs from pharmacies and drug shops could also lead to the use of counterfeit and poor-quality drugs. Such practices lead to the development, amplification, and spread of drug resistance. More severe drugs resistance patterns, including XDR-TB, would mean that the standardized MDR-TB treatment regimen would no longer be useful. Instead individualized/tailor-made SLD regimens would be required, resulting in escalating human and financial resource needs, and worse treatment outcomes.

By 2015, it is expected that 38% of MDR-TB cases will be managed according to WHO guidelines. This percentage is based on the estimated number of MDR-TB cases among all estimated TB cases in the country. If based on the percentage of MDR-TB cases among notified pulmonary TB cases this percentage would increase to about 60%.

Evidence from other countries shows that the MDR-TB incidence can fall as a result of effective TB and MDR-TB control programmes. With the implementation of a solid basic TB control programme (as outlined in the National Strategic Plan, 2011-2015), and stepwise expansion of diagnosis, treatment and care of MDR-TB, it is expected that the development, circulation and amplification of resistant strains will be reduced. Nationwide DRSs are planned for 2012 and 2015. These surveys will provide useful information on the impact of the TB and MDR-TB control programmes.

NATIONWIDE SCALE-UP PLAN

FOR TB/HIV COLLABORATIVE ACTIVITIES

2012-2015

ANNEX 3
TO
FIVE YEAR NATIONAL STRATEGIC PLAN
FOR
TUBERCULOSIS CONTROL

2011-2015

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Abbreviations

3DF	Three Diseases Fund
3MDG	Three Millennium Development Goals Fund
AFB	acid-fast bacilli
AHRN	Asian Harm Reduction Network
AIDS	acquired immunodeficiency syndrome
ART	antiretroviral therapy
CBO	community-based organization
CPT	cotrimoxazole preventive therapy
CSO	civil society organization
CXR	chest X-ray
HIV	human immunodeficiency virus
IEC	information, education and communication
IHC	integrated HIV care
INGO	International nongovernmental organization
IPT	isoniazid preventive therapy
MDG	Millennium Development Goal
MSF	Médecins Sans Frontières
MMA	Myanmar Medical Association
NAP	National AIDS Programme
NGO	nongovernmental organization
NTP	national TB programme
PMTCT	prevention of mother-to-child transmission
PSI	Population Services International
PWID	people who inject drugs
STD	sexually transmitted disease
TB	tuberculosis
TSG	technical strategy group
UNAIDS	Joint United Nations Programme on HIV/AIDS
Union	International Union against Tuberculosis and Lung Disease
VCCT	voluntary confidential HIV counselling and testing
WHO	World Health Organization

1. Background

Tuberculosis (TB) is a major cause of mortality and morbidity among people living with the human immunodeficiency virus (HIV). In 2010, there were an estimated 1.1 million new HIV positive TB cases worldwide.[1] An estimated 350 000 people died of HIV-associated TB, and almost one in four deaths among people with HIV infection is due to TB. At least one-third of the 34 million people living with HIV worldwide are infected with *Mycobacterium tuberculosis*. People living with HIV and infected with *M. tuberculosis* are 21-34 times more likely to develop active TB disease than people without HIV.

To reduce the dual burden of TB and HIV among populations at risk and affected by both diseases, the World Health Organization (WHO) has recommended 12 collaborative TB/HIV activities as part of core HIV and TB prevention, care and treatment services.[2]

Table 1. WHO-recommended collaborative TB/HIV activities

A. Establish and strengthen the mechanisms for delivering integrated TB and HIV services
A.1. Set up and strengthen a coordinating body for collaborative TB/HIV activities functional at all levels
A.2. Determine HIV prevalence among TB patients and TB prevalence among people living with HIV
A.3. Carry out joint TB/HIV planning to integrate the delivery of TB and HIV services
A.4. Monitor and evaluate collaborative TB/HIV activities
B. Reduce the burden of TB in people living with HIV and initiate early antiretroviral therapy (ART) (*the Three I's for HIV/TB*)
B.1. Intensify TB case-finding and ensure high-quality antituberculosis treatment
B.2. Initiate TB prevention with isoniazid preventive therapy and early ART
B.3. Ensure control of TB Infection in health-care facilities and congregate settings
C. Reduce the burden of HIV in patients with presumptive and diagnosed TB
C.1. Provide HIV testing and counselling to patients with presumptive and diagnosed TB
C.2. Introduce HIV prevention interventions for patients with presumptive and diagnosed TB
C.3. Provide cotrimoxazole preventive therapy for TB patients living with HIV
C.4. Ensure HIV prevention interventions, treatment and care for TB patients living with HIV
C.5. Provide ART for TB patients living with HIV

[1] World Health Organization. *Global Tuberculosis Control Report 2011*.
[2] World Health Organization. *WHO policy on collaborative TB/HIV activities – Guidelines for national programmes and other stakeholders*, 2012.

1.1. Epidemiology

HIV prevalence among adults and adolescents more than 15 years old in Myanmar was estimated to be 0.53% in 2011. The HIV epidemic in Myanmar is largely concentrated among population subgroups with high-risk behaviours, notably people who inject drugs (PWID), female sex workers and men who have sex with men. The prevalence of HIV in these groups in 2011 was 21.9%, 9.4% and 7.8%, respectively while HIV prevalence among women attending antenatal clinics was 0.9%.[3] The majority of HIV cases are reported from large urban areas and from the northern and north-eastern parts of the country. The number of people living with HIV in need of ART according to 2010 WHO guidelines (i.e. with CD4 count of ≤350 cells/mm^3 or in WHO clinical stage 3 or 4 regardless of CD4) is estimated at 120 000 (low to high estimate: 110 000 to 140 000).[4] Coverage of ART is largely insufficient, with 40 128 patients on ART by the end of 2011. Over 50% of the patients receive ART from Médecins Sans Frontières (MSF). The states and regions with the highest coverage are Shan, Rakhine and Kachin states as well as Yangon and Thanintharyi regions (more than 30 000 patients on ART by the end of 2011). The number of PWID in 2010 was estimated at 75 000 (range 60 000-90 000).[5] Harm reduction programmes, including methadone maintenance therapy, needle and syringe exchange, HIV counselling and testing and ART, are in place but reach less than 20% of the estimated number of PWID (13 358 clients reached in drop-in centres in 2010 in fewer than 10 cities).

The nationwide TB prevalence survey conducted in 2009-2010 revealed that the prevalence of TB in Myanmar is 2.5 times higher than previously estimated.[6] The prevalence of smear-positive TB was 171 (131-223) per 100 000 population and that of bacteriologically positive TB 434 (355-529) per 100 000 population. When TB in children, extrapulmonary TB and bacteriologically negative TB are taken into consideration, the TB prevalence (all cases) could be 600 per 100000 population or more. States, which are mostly populated by ethnic minority groups, showed a significantly higher prevalence than regions. This may be related to weaker access to health and TB services. The TB prevalence was also higher in urban areas (especially Yangon) than rural ones, although more patients were notified and treated from urban areas. The prevalence among males was more than twice that in females.

[3] Government of Myanmar, National AIDS Programme, Ministry of Health. *Results of HIV Sentinel Sero-surveillance 2010*, 2011.
[4] World Health Organization. *Global HIV/AIDS response – Epidemic update and health sector progress towards Universal Access – Progress Report 2011*, 2011.
[5] Government of Myanmar, National AIDS Programme, Ministry of Health. *Myanmar National Strategic and Operational Plan on HIV and AIDS 2011-2015*, 2011.
[6] Government of Myanmar, Ministry of Health Myanmar. *Report on National TB Prevalence Survey 2009-2010*, 2011.

HIV prevalence among TB patients was first assessed in the mid-1990s and found to be 4.5% on average. Since 2005, the prevalence of HIV among TB patients has been informed by sentinel surveillance conducted serially, starting in four sites in 2005, growing to 20 sites by 2010. Available data shows an average HIV prevalence among newly diagnosed TB patients of 10%. Trends at sentinel surveillance sites do not suggest any meaningful increase or decrease in HIV prevalence. Routine data showed HIV prevalence rates ranging from 11% in 10 TB clinics offering HIV counselling and testing in 2010, to 21% in the 13 townships offering integrated HIV care to TB patients in the first three quarters of 2011. The TB prevalence among people living with HIV is believed to be over 30%. In the MSF cohort, 62% of about 6000 patients on ART have had active TB disease.[7] TB death rates among people with HIV infection were 24% in 2009 compared to 5.5% among TB patients with unknown HIV status.[8]

1.2. Existing TB/HIV control strategies

Where collaborative TB/HIV activities are implemented, people living with HIV are screened for TB at each visit to health facilities. TB screening is performed using a clinical (symptom-based) algorithm that includes cough of three weeks' or more duration, blood in sputum, fever or drenching night sweats in the past three days, weight loss over the past month and lymph node enlargement in the neck or the axillae. Patients presenting with one of these symptoms are referred to the National TB Programme (NTP) for TB investigations that include sputum acid-fast bacilli (AFB) smear and chest X-ray (CXR), and culture where available. Xpert MTB/RIF machines are currently being purchased and set up by implementing partners. Algorithms for the use of Xpert MTB/RIF have been developed by the NTP. Xpert MTB/RIF will be used as a first diagnostic test for suspicion of HIV-associated TB together with sputum AFB smear and CXR. Isoniazid preventive therapy (IPT) was provided in 12 pilot sites by the end of 2011. Criteria for IPT eligibility include no clinical suspicion of active TB disease based on the symptoms described above, no prior or current course of IPT or antituberculosis treatment, and the absence of chronic liver disease or heavy alcohol use. When eligible, patients are counselled for IPT and offered a 9-month course. Completion rate averages 64%. Infection control measures such as provision of surgical masks, natural or mechanical ventilation and/or ultraviolet lights are in place in ART clinics supported by partners. The TB screening clinical algorithm has been recently revised to include cough, fever, weight loss, night sweats of any duration as well as lymph node enlargement, but this revised algorithm has not yet been implemented.

[7] Sabapathy et al, *Journal of Acquired Immune Deficiency Syndrome*, 2012 (in press).
[8] Government of Myanmar, Ministry of Health. *National Tuberculosis Programme Annual Report 2010*, 2010.

HIV counselling and testing is provided to TB patients and family members of those found to have HIV infection through voluntary confidential counselling and testing (VCCT). In practice, much of HIV counselling and testing for TB patients is provider-initiated with the option for the patient to opt out. The HIV testing strategy involves serial testing with the use of rapid tests. TB patients living with HIV are referred to the National AIDS Programme (NAP) for ART, which is provided regardless of CD4 count and initiated between two weeks and two months after initiation of TB treatment. Timing depends on completion of the three ART adherence counselling sessions and review of ART eligibility criteria and availability of the drugs by an ART selection committee.

1.3. Technical and financial collaboration

Both the NAP and the NTP collaborate with a number of national and international health and development agencies to implement their respective national strategic plans. Table 2 shows the nongovernmental organizations (NGOs) and institutions implementing collaborative TB/HIV activities in Myanmar. To ensure best use of comparative advantages and to avoid fragmentation and duplication of efforts, regular coordination meetings are held under the Technical Strategy Groups for HIV and for TB (HIV-TSG and TB-TSG), which are coordinated by the Department of Health with the Joint United Nations Programme on HIV/AIDS (UNAIDS) and WHO serving as respective secretariats. The TB-TSG includes a specific sub-group on TB/HIV. Both TSGs report to the Myanmar Country Coordinating Mechanism for AIDS, Tuberculosis and Malaria which oversees and coordinates the national response relevant to HIV/AIDS, TB and malaria but also to maternal, newborn and child health and other related health issues.

Table 2. International and national NGOs and institutions implementing collaborative TB/HIV activities in Myanmar

Organization	Location of collaborative TB/HIV activities as of 2011
Asian Harm Reduction Network (AHRN)	Kachin State Shan State (North)
Malteser International	Rakhine State
Médecins du Monde	Kachin State Yangon Region
Médecins Sans Frontières (MSF)–Holland	Kachin State Rakhine State Shan State (North) Yangon Region
Médecins Sans Frontières (MSF)–Switzerland	Tanintharyi Region
Myanmar Health Assistant Association	Mandalay Region
Pact Myanmar	Magway Region Sagaing Region
Populations Services International (PSI)	TB activities in 190 townships including a few with VCCT services
International Union against Tuberculosis and Lung Disease (Union)	Magway Region Mandalay Region Sagaing Region Shan State (North and South) Yangon Region

In addition to the TSG, there is a Central TB/HIV Coordinating Committee that was created in 2005. Its membership and terms of reference were revised in December 2011. Its membership includes the Directors of Disease Control, of Medical Care and of Laboratory, the NAP and NTP managers, consultant physicians, United Nations organizations, representatives of main implementing and funding partners, and representatives of the affected community. Both WHO and UNAIDS serve as secretariat. The Committee is responsible for the governance, planning, coordination, implementation and scale-up of collaborative TB/HIV activities as well as mobilization of financial resources. It meets at least every six months and on an ad hoc basis as needed.

Until recently, the major source of funding for HIV, TB, malaria and integrated projects in Myanmar was the Three Diseases Fund (3DF) which is a donor consortium by the European Commission and Governments of Australia, Denmark, the Netherlands, Norway, Sweden and the United Kingdom. From 2006 to 2011, 3DF contributed a total

of US$ 113 million, of which nearly US$ 60 million was for HIV and US$ 17 million for TB. In the next phase, 3DF will change its scope of work and will become the Three Millennium Development Goals Fund (3MDG). It has been informed that US$ 300 million is available for the next five years. Although the bulk of funds will support mother and child health activities, about 15% of the funds will support TB, HIV and malaria.

With the cancellation of Global Fund Round 11, available sources of funding for collaborative TB/HIV activities are scarce. They currently include Global Fund Round 9 (US$ 7 530 451 over five years for all recipients), and Total/Yadana Consortium (US$ 800 000 per year) plus TB REACH (US$ 744 754 for one year) supporting activities implemented by the Union. Under Global Fund Round 9, it is planned to scale up collaborative TB/HIV activities to 26 townships by 2015. The Global Fund Round 9 TB proposal covers annual meetings of the Central TB/HIV Coordinating Committee, quarterly meetings of the TB/HIV coordinating committee at township level, advocacy meetings, annual TB/HIV monitoring and evaluation workshop, HIV sentinel surveillance activities among TB patients, printing of forms and registers, IPT for people living with HIV, infection control upgrade/renovation for a limited number of facilities, CXR for the diagnosis of HIV-associated TB, and production of treatment literacy materials, for a total of US$ 417 905 over five years. The Global Fund Round 9 HIV proposal covers HIV rapid test kits for TB patients and their families; opportunistic infection and antiretroviral drugs for a total of 5410 HIV positive TB patients by 2015; training on collaborative TB/HIV activities and on infection control; upgrade/renovation of facilities providing care to people living with HIV; procurement of N95 masks; and joint supervision of sites implementing collaborative TB/HIV activities, for a five-year total budget of US$ 7 112 546.

Other sources of funding include international NGOs. Five of them, MSF– Holland, MSF–Switzerland, Médecins du Monde, Aide Médicale Internationale and Malteser International, will contribute to the Hospital Initiative Programme. The aim will be to improve health care in public hospitals in collaboration with the Department of Health, with a special focus on HIV care and treatment. Collaborative TB/HIV activities will be encompassed in the initiative.

1.4. Major challenges to scale-up

The major challenges to scaling up collaborative TB/HIV activities in Myanmar include:

- Limited availability of commodities such as rapid HIV test kits, drugs for opportunistic infections including cotrimoxazole, and antiretroviral drugs
- Centralization of HIV diagnosis, care and treatment services including ART mainly at state/region and district level
- Inadequate human resources

Global Fund Round 9 is expected to increase ART coverage to about 45 000 people living with HIV by the end of 2015. HIV rapid test kits and cotrimoxazole will also be available through Global Fund Round 9, but quantities remain limited. However, the NAP intends to scale up HIV counselling and testing throughout the country to double the number of HIV tests conducted annually by 2015. Decentralization of HIV diagnosis, care and treatment services will therefore be necessary. Decentralized TB teams and clinics provide an opportunity to the NAP to expand HIV testing and counselling and to strengthen health systems at the township level. Waiting for the increased availability of life-saving ART, HIV case-finding among TB patients will allow the provision of cotrimoxazole preventive therapy (CPT), which reduces mortality by 30% and morbidity and hospital admission by 46% among TB patients with HIV regardless of CD4 count. The wider availability of ART will be crucial to ensure maximum reduction of death among HIV positive TB patients. Scaling-up services also entails adequate availability of trained human resources. Both programmes suffer many vacant posts. Integration of TB and HIV services at the same time and location is particularly effective where availability of human resources is an issue.

2. Organizational structure and model of care

The Department of Health is responsible for providing health-care service to the entire country's population and is divided into 10 divisions: Administration; Planning; Public Health; Medical Care; Disease Control; Health Education; Food and Drug Administration; Laboratory; Occupational Health and Nursing. The NAP and the NTP fall under the Division of Disease Control and are both led by a Programme Manager with the rank of Deputy-Director. They report to the Director of Disease Control. The State/Region Health Department is responsible for state/region-level planning, coordination, training, technical support, supervision, monitoring and evaluation of health services. The Township Health Department, headed by the Township Medical Officer, forms the backbone for primary and secondary health care. Each township covers, on average, a population of 173 000 people. Each township has a 16-, 25- or 50-bedded hospital, one or two station hospitals and four to seven rural health centres as well as urban health centres.

There are a total of 101 TB teams and 47 AIDS/sexually transmitted disease (STD) teams throughout the country. Among these, 47 TB teams and 37 AIDS/STD teams are located at district level (with 30 districts having both teams operating). NTP activities are widely decentralized up to township level. ART is currently provided in 38 locations, usually at the state/region level and in districts with a 100-bedded hospital. The services for the prevention of mother-to-child transmission (PMTCT) are decentralized to 246 townships. The Integrated HIV Care (IHC) programme supported by the Union is also decentralized to the township level in Mandalay region.

Implementation of collaborative TB/HIV activities by the NAP and the NTP started in 2005 in seven townships and reached 17 districts/townships by 2011: Amapura, Aung Myay Thazan, Chan Aye Thazan, Chan Mya Tharzi, Lashio, Magway, Maha Aungmye, Mawlamyine, Meikhtila, Monywa, Myingyan, Myitkyna, Pakkoku, Pathein, Patheingyi, Pyay, Pyigyi Tagon, Tachileik, Taunggyi. Collaborative TB/HIV activities are also provided in Mandalay General Hospital. In 13 townships, TB and HIV services are delivered through the IHC programme supported by the Union, with the goal to scale up comprehensive HIV care and treatment, including ART, within existing health facilities. The model of TB and HIV service delivery is based on partial integration and cross-referral. All adult TB patients are tested for HIV within the TB clinic at the initiative of the health-care provider. HIV counselling is provided by the TB team leader, a nurse or a social worker who either performs HIV testing or refers to the TB laboratory technician to do so. HIV testing and counselling are also offered to family members of the HIV

positive TB patients. TB patients found to be HIV positive are referred to the IHC clinic for HIV care and treatment including ART. The two clinics are closely located within the same compound. In the IHC clinic, people living with HIV, either on pre-ART or ART care, are screened for TB at each visit, based on symptoms, and if needed are referred to the TB clinic for sputum smear, CXR, and culture if available. CPT and IPT are provided for people living with HIV within the IHC clinic if they receive ART, or within the AIDS/STD clinic if they are not yet on ART. Cross-referral seems to function well, with few patients lost to follow-up between the clinics.

In the four townships operating without the support of the Union, a similar model of care is in place. TB patients found to be HIV positive are referred to the AIDS/STD team leader, or the consultant physician in general hospitals, for CPT and ART where available. Due to the limited availability of antiretroviral drugs, most of the ART sites carry a waiting list but TB patients usually jump to the front of the queue (although not systematically), as do pregnant women and in-patients with WHO clinical stage III and IV disease. In all townships, TB/HIV quarterly meetings between township health staff and implementing partners have been set up to discuss implementation.

Collaborative TB/HIV activities are also provided by MSF through a fully integrated or "one-stop service" approach. People living with HIV are screened for TB using the clinical algorithm with symptoms of any duration and investigated for TB by sputum AFB smear and chest x-ray if needed. Antituberculosis treatment is provided in the same location. IPT is not in place. Drop-in centres for PWID run by AHRN offer HIV counselling and testing and TB screening on-site. When HIV infection is confirmed or TB disease suspected, clients are referred respectively to the NAP and NTP for further assessment. Clients are also referred to drug treatment services for methadone maintenance therapy. Needles and syringes are distributed by AHRN. Other partners also provide collaborative TB/HIV activities (see table 2).

3. Goal, objectives and targets

In accordance to the NAP and NTP National Strategic Plans for 2011-2015, the nationwide scale-up plan for collaborative TB/HIV activities in Myanmar will contribute to the overall efforts to achieve the MDGs by 2015.

In scaling-up collaborative TB/HIV activities, the NAP and NTP will aim to decentralize and integrate TB and HIV services, preferably at the same time and location through a "one-stop service". Due to the concentrated nature of the HIV epidemic, the efforts to scale up collaborative TB/HIV activities will also cover people who inject drugs and other drug users.

3.1. Goal

To substantially reduce the burden of HIV-related TB to achieve the 2015 MDGs, the Stop TB Partnership, Universal Access and UNAIDS targets.

3.2. Objectives

- To establish and strengthen the mechanisms for delivering integrated TB and HIV services, preferably at the same time and location, to populations at risk of and affected by both diseases.
- To reduce the burden of TB in people living with HIV, their families and communities by ensuring the delivery of the *Three I's for HIV/TB* and the early initiation of ART in line with WHO guidelines.
- To reduce the burden of HIV in patients with active TB disease and in those with signs and symptoms of TB (TB suspects), their families and communities by providing HIV prevention, diagnosis and treatment including ART.

3.3. Targets by 2015

Impact target: the number of TB deaths among people living with HIV is reduced by 50% compared to a baseline of 2004.[9]

Coverage targets:

- 100% of TB patients have an HIV test result recorded in the TB register
- 100% of HIV positive TB patients are started on or continue previously initiated CPT during TB treatment
- 100% of HIV positive TB patients receive life-saving ART
- 100% of people living with HIV enrolled in HIV care, including pregnant women and PWID, have their TB status assessed and recorded during their last visit
- 100% of eligible people living with HIV newly enrolled in HIV care, including pregnant women and PWID, are started on IPT
- 100% of health-care facilities providing services to people living with HIV have demonstrable TB infection control practices consistent with international guidelines.

[9] TB treatment outcomes by HIV status are only available from 2005.

4. Strategies and interventions (including geographical scale-up)

Collaborative TB/HIV activities will be gradually scaled up to all townships including public hospitals by 2015. The geographical scale-up will take place according to the following criteria (see Appendix 1 for details):

In 2012:

- All townships with both AIDS/STD and TB teams, n=19 (ART is already available in 17 of them)
- All townships/general hospitals with just an AIDS/STD team and where ART is already available, n=8
- Public hospitals in Yangon[10] where ART is already available, n=2 (these two hospitals will also be part of the Hospital Initiative Programme)
- Public hospitals in Yangon where a public–public partnership is in place with the NTP (n=7)

In 2013:

- All townships with an AIDS/STD team and where ART is not yet available in 2011 (n=6)
- Townships with just a TB team and where TB notification exceeds 300 cases in 2009-2010 (n=33)
- Public hospitals outside Yangon where a public–public partnership is in place with the NTP (n=5)
- Public hospitals outside Yangon that will be part of the Hospital Initiative Programme (n=11)

In 2014:

- All other townships with just a TB team and townships of Yangon Region where there is currently no AIDS/STD nor TB team (n=70)

[10] Given the high TB and HIV prevalence in Yangon, efforts will be made to scale-up collaborative TB/HIV activities as early as possible.

In 2015:

- All remaining townships where there is currently no AIDS/STD nor TB team (n=182).

To achieve nationwide scale-up and the goal and objectives set out above, the plan includes 10 sub-objectives with related indicators and yearly targets and major activities (see Appendix 2 for details):

Sub-objective 1: Strengthen collaboration between the NAP, NTP, Divisions of Medical Care and of Laboratory, and all relevant partners for the delivery of integrated TB and HIV services

Regular meetings of the Central TB/HIV Coordinating Committee (on a six-monthly basis) and of the TB/HIV Technical sub-Group (on a quarterly basis) will need to take place. At state/region, district and township level, TB/HIV coordinating committees will be created where collaborative activities will be implemented, and will meet on a quarterly basis. At all levels, membership needs to be inclusive and comprise the NAP, NTP, Division of Medical Care and of Laboratory, PMTCT and harm reduction services, international and national partners as well as representatives of people at risk and affected by both diseases. At each level, the committee will oversee the coordination, implementation and scale-up of collaborative TB/HIV activities.

Sub-objective 2: Provide training on collaborative TB/HIV activities and management of HIV-associated TB

Training will cover programmatic and clinical aspects of collaborative TB/HIV activities and the management of HIV-associated TB (i.e. provision of CPT and ART, TB screening, provision of IPT, infection control practices and monitoring and evaluation). Before training takes place, national policies and clinical guidelines will be revised to introduce latest recommendations on IPT (see sub-objective 6), Xpert MTB/RIF (see sub-objective 5), and ART (see sub-objective 10). At least 5 staff from the NAP, NTP, consultant physicians, PMTCT and harm reduction services from each township and public hospital implementing collaborative TB/HIV activities will be trained. A total of at least 1715 staff from the public sector will be trained by 2015. Partnership will be formed with the Myanmar Medical Association (MMA) and PSI to train general practitioners (through training of trainers). Medical school curricula for doctors, nurses and health assistants will be revised to include latest recommendations on collaborative TB/HIV activities and management of HIV-associated TB.

Sub-objective 3: Strengthen monitoring and evaluation

See section 5.

Sub-objective 4: Involve non-governmental and other civil society organizations, communities and the private-for-profit sector

In addition to the nine international and national NGOs and institutions already implementing collaborative TB/HIV activities, other civil society organizations (CSOs) and community-based organizations (CBOs) working on advocacy, treatment literacy and community mobilization, such as the Myanmar Positive Group or other associations of people living with HIV and patients self-help groups, will be involved in the planning, implementation and monitoring of collaborative activities. In collaboration with the CBOs and CSOs, information, education and communication (IEC) materials on HIV-associated TB will be developed, printed and disseminated. Advocacy meetings will take place at township level where collaborative TB/HIV activities are going to be implemented. The MMA and PSI will be engaged to include collaborative TB/HIV activities in the public–private mix activities for TB and HIV.

Sub-objective 5: Scale-up TB screening among people living with HIV based on international guidelines

National guidelines and registers for TB screening among people living with HIV have already been revised to include cough, fever, weight loss and night sweats of any duration in addition to lymph node enlargement, but they are not implemented. Health-care workers from townships already implementing collaborative TB/HIV activities will be trained on the revised TB screening clinical algorithm and updated registers will be distributed. TB screening among HIV positive pregnant women and PWID will be systematically introduced in PMTCT and harm reduction services, and registers distributed accordingly. TB screening will also be introduced into NAP mobile team activities for HIV case-finding in order to improve early detection of TB. By 2015, 100% of people living with HIV enrolled in care, including pregnant women and PWID, will be screened for TB using the revised symptom-based clinical algorithm.

Xpert MTB/RIF will be gradually introduced as the first diagnostic test for HIV-associated TB. The diagnosis algorithm including the use of Xpert MTB/RIF will be revised to perform CXR only after negative result with Xpert MTB/RIF and suspicion of extra-pulmonary TB.[11]

[11] World Health Organization. *Rapid Implementation of the Xpert MTB/RIF diagnostic test – Technical and Operational "How-to" – Practical considerations*, 2011.

Sub-objective 6: Scale-up access to isoniazid preventive therapy among people living with HIV without active TB, based on international guidelines

National guidelines will be revised to include six-month duration of IPT for eligible people living with HIV, irrespective of the degree of immunosuppression, and also to those on ART, those who have previously been treated for TB and pregnant women.[12] The revision of the national guidelines will also include secondary prophylaxis with IPT immediately after successful completion of TB treatment. Being a core component of HIV prevention care, IPT should be provided in pre-ART and ART clinics and should be under the responsibility of the NAP. Therefore, the NTP will facilitate the provision of isoniazid and pyridoxine drugs to HIV service providers. By 2015, all people living with HIV newly enrolled in care, including pregnant women and PWID, and who are eligible for IPT (i.e. without active TB) will be started on IPT.

Sub-objective 7: Scale up the implementation of infection control measures in health-care facilities providing collaborative TB/HIV activities

While scaling up collaborative TB/HIV activities in townships and public hospitals, infection control practices will be assessed to ensure the prevention of TB transmission. Health-care facilities will be rehabilitated according to assessment. The scale and efficacy of TB infection control measures will be assessed according to the ratio of TB notification rate among health-care workers to the TB notification rate in the general population, which should be around 1. Annual surveillance of TB disease among health-care workers will be conducted. By 2015, all facilities will have demonstrable infection control practices in place, which will include a written infection control plan, a person responsible for implementing TB infection control, a well-ventilated waiting area, identification and separation of TB suspects upon arrival and monitoring of TB cases among health-care workers.

Sub-objective 8: Scale up access to HIV testing among TB patients, patients with signs and symptoms of TB and their families

Provider-initiated HIV counselling and testing will be scaled up in TB clinics. At least two NTP staff per township and public hospital (TB team leader, nurse or social worker) will be trained to provide HIV counselling and perform HIV rapid tests, and referral to the laboratory technician will be dropped. Laboratory technicians will instead ensure supervision and quality assurance, including quality control for testing and bio-safety. HIV counselling and testing will also be offered to patients with signs and symptoms of

[12] World Health Organization. *Guidelines for intensified tuberculosis case-finding and isoniazid preventive therapy for people living with HIV in resource-constrained settings*, 2010.

TB and to family members of TB patients and TB suspects found to be HIV positive. In addition, HIV counselling and testing will be introduced in NTP mobile team activities for TB-intensified case-finding to improve diagnosis of co-infection. By 2015, 100% of notified TB patients will be tested for HIV and will have an HIV test result recorded in the TB register.

Sub-objective 9: Scale up access to cotrimoxazole preventive therapy for TB patients living with HIV, based on international guidelines

Routine CPT will be administered to all TB patients living with HIV regardless of CD4 count. CPT will be offered in the TB clinic, for the duration of antituberculosis treatment, in an effort to integrate TB and HIV services at the same time and location and avoid unnecessary referral. The NAP will therefore facilitate the provision of cotrimoxazole to TB service providers. By 2015, 100% of TB patients living with HIV will receive CPT.

Sub-objective 10: Scale up access to antiretroviral therapy for TB patients living with HIV, based on international guidelines

National guidelines will be revised to include timely initiation of ART as soon as possible within the first eight weeks of antituberculosis treatment. HIV positive TB patients with profound immunosuppression (e.g. CD4 counts less than 50 cells/mm^3) should receive ART immediately within the first two weeks of initiating antituberculosis treatment.[13] To ensure rapid start of ART, which significantly improves survival among TB patients living with HIV, the ART selection committee will be dropped for TB patients, who in any case meet the clinical criteria. The three adherence counselling sessions will be maintained but speeded up in patients with profound immunosuppression. The NAP and NTP will guarantee access of ART to TB patients living with HIV in as integrated manner as possible, through cross-referral between the TB and ART clinics or through provision of ART in the TB clinic in a "one-stop service". By 2015, 100% of TB patients living with HIV will receive ART.

[13] World Health Organization. *WHO policy on collaborative TB/HIV activities – Guidelines for national programmes and other stakeholders*, 2012.

5. Monitoring and evaluation

Monitoring and evaluation provides the means to assess the delivery, coverage, quality and effectiveness of collaborative TB/HIV activities. It involves collaboration between the NAP and the NTP and the Divisions of Medical Care and of Laboratory, the development of referral linkages between the different services and organizations, and joint supervision. The use of internationally agreed and harmonized indicators as well as standard recording and reporting formats that should be captured by each programme and partners will facilitate cross-checking and reconciliation of data at local and national levels.[14] There is an urgent need to revise the current monitoring and evaluation system for collaborative TB/HIV activities, since it involves too many different indicators, registers and reports, which will not be sustainable with scale-up.

5.1. Indicators

Indicators for monitoring and evaluation of collaborative TB/HIV activities in Myanmar will include at least the following ones:

To be reported by the NAP (and to the NAP by partners):

- Number of people living with HIV who received ART and who were started on TB treatment within the reporting period. *This is the numerator of UNGASS core indicator 6 that evaluates the percentage of estimated HIV positive incident TB cases that received treatment for TB and HIV.*
- Number of adults and children enrolled in HIV care whose TB status was assessed and recorded during their last visit during the reporting period, expressed as a proportion of all adults and children enrolled in HIV care in the reporting period.
- Number of adults and children newly enrolled in HIV care who were started on IPT, expressed as a proportion of the total number of adults and children newly enrolled in HIV care during the reporting period.
- Number of facilities providing ART services for people living with HIV with demonstrable infection control practices that include TB control, expressed as a proportion of the total number of facilities providing ART services. *Demonstrable*

[14] World Health Organization. *A Guide to Monitoring and Evaluation for Collaborative TB/HIV Activities*, 2009.

infection control measures include a written infection control plan, a person responsible for implementing TB infection control, a well-ventilated waiting area, identification and separation of TB suspects on arrival and monitoring of TB cases among health-care workers.

To be reported by the NTP (and to the NTP by partners):

- Number of TB patients registered during the reporting period who had an HIV test result recorded in the TB register, expressed as a proportion of the total number of TB patients registered during the reporting period. *It includes TB patients who were known to be HIV positive before being diagnosed with TB as well as TB patients with a negative HIV result from previous testing that was acceptable to the clinician (e.g. done in the last 3-6 months in a reliable laboratory).*
- Number of registered TB patients with a documented HIV status on TB register who were HIV positive, expressed as a proportion of all registered TB patients with documented HIV status over the reporting period.
- Number of HIV positive TB patients who were started on or continued previously initiated CPT, during TB treatment, expressed as a proportion of all HIV positive TB patients registered over the reporting period.
- Number of HIV positive TB patients who were started on or continued previously initiated ART during their TB treatment, expressed as a proportion of all HIV positive TB patients registered over the reporting period. *This figure should be equivalent to the one reported by the NAP and entails reconciliation of data between the two programmes.*

Organizations implementing collaborative activities will report to the two programmes on these harmonized indicators and will ensure that their data are captured by the national monitoring and evaluation system.

5.2. Routine recording and reporting formats

Routine recording and reporting formats will be revised based on the WHO recommended "Three interlinked patient monitoring system for HIVcare/ART, MCH/PMTCT and TB/HIV" (Figure 1).[15] The NAP will revise current HIV/ART cards, pre-ART and ART registers to include key TB-related variables of TB status, antituberculosis co-treatment, and IPT. Revision of TB cards and registers has already

[15] World Health Organization. *Three Interlinked Patient Monitoring Systems for HIV Care/ART, MCH/PMTCT, and TB/HIV: Standardized Minimum Data Set and Illustrative Tools*, 2010.

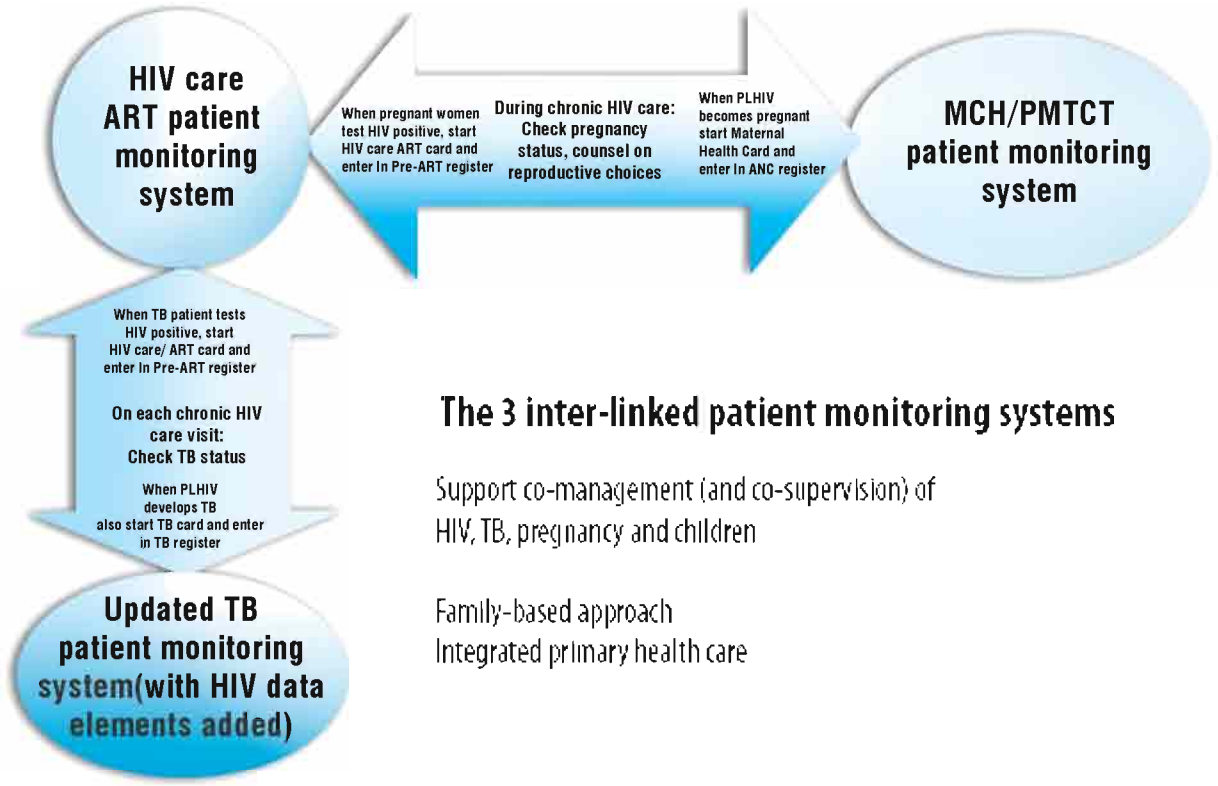
taken place and these now include the key HIV-related variables of HIV status, CPT and ART. There is a stand-alone quarterly report for collaborative TB/HIV activities that will be simplified and that could be integrated with the NAP and NTP quarterly reports in the future.

Adoption of the three interlinked patient monitoring system will avoid multiplication of registers in the TB, pre-ART and ART clinics. Revised recording and reporting formats will replace existing ones including the current TB screening register that monitor activities on the number of TB screenings performed and not on the number of people living with HIV screened for TB. Both programmes will continue to disaggregate data per sex and age and the NTP will continue to report TB treatment outcomes by HIV status.

5.3. Supportive supervision

Routine supportive supervision by the two programmes from the state/region and district level to the township level will include supervision of the collaborative TB/HIV activities, in particular quality checks of reporting and recording and identification and discussion of difficulties or misunderstandings in data management. In addition, a joint review of the routine monitoring systems will be conducted by the NAP and the NTP at least once a year. Activities will include validating cohort report and analysis; validating the quarterly reports; additional register tallies; and systematic sampling of patient cards to measure the quality of care and to validate core TB/HIV indicators. NAP and NTP supervisors will reconcile HIV and TB register data to cross-check registration of TB patients into HIV or ART care and of HIV patients into TB treatment. The Central TB/HIV Coordinating Committee will coordinate and conduct, with all relevant partners, an annual TB/HIV evaluation workshop to monitor progress towards impact and coverage targets; discuss national-level data dissemination plan and inform programme improvement at all levels.

Figure 1 . The 3 interlinked patient monitoring system



5.4. Surveillance and surveys

Routine data on HIV testing of TB patients will progressively replace the annual HIV sentinel surveillance activities, which will not be extended beyond 2015. Similarly, the collection of routine data on active TB disease among people living with HIV will allow the monitoring of TB rates among patients enrolled in HIV care and among patients initiating ART. In addition, HIV testing will be incorporated in the next TB prevalence survey.

6. Funding needs, availability and gaps

Total cost for the nationwide scale-up plan for collaborative TB/HIV activities over the four-year period is estimated at US$ 12 214 027, ranging from US$ 1 126 077 in 2012 to US$ 5 295 022 in 2015. Antiretroviral drugs (Tenofovir-based regimen) encompass most of the costs, representing 49% of the budget in 2012 and 61% in 2015 (budget excluding operational research and technical assistance). Training and TB infection control-related upgrade/renovation of health facilities also share an important part of the budget. The costs per activity and per year are described in detail in Appendix 3.

The costs include:

- Meetings of the Central TB/HIV Coordinating Committee, TB/HIV technical strategy subgroup, and TB/HIV coordinating committees at township and public hospital levels
- Development/updating, printing and dissemination of clinical guidelines and training materials
- Training of health-care staff, including training of trainers among general practioners
- Revision of medical and nursing schools curricula
- Revision, printing and dissemination of recording and reporting forms
- Annual monitoring and evaluation workshop and supervision
- HIV sentinel surveillance
- Collaboration with CSOs and CBOs
- Advocacy and IEC materials
- TB screening based on clinical algorithm
- Isoniazid preventive therapy and pyridoxine for six months preventive therapy
- Infection control measures at health facilities
- HIV rapid test kits for TB patients
- Cotrimoxazole and antiretroviral drugs for HIV positive TB patients for one year's duration
- Operational research (10% of the budget)
- Technical assistance (3% of the budget)

The costs do not include:

- Cotrimoxazole and antiretroviral drugs beyond one year's treatment (the cumulative cost of antiretroviral drugs to treat cumulative patients is estimated at US$ 3 764 070 until the end of 2015)
- Anti-tuberculosis drugs
- HIV preventive measures such as condoms
- Investigations for diagnosis of TB (smear microscopy, culture, Xpert MTB/RIF machines and cartridges, CXR)
- Additional staff
- Incentives and enablers to health-care workers or patients

Global Fund Round 9 already covers some of the activities of the nationwide scale-up plan. With the reprogramming of the Phase 2, 10% of the initial Round 9 budget for 2013-2015 will be lost and some activities may be adjusted to fit this plan. Funding gaps over the four-year period will be US$ 4 491 783. Table 3 summarizes the estimated cost, available funding and gaps per year.

Table 3. Total estimated costs, available funding through GF R9 and gaps per year
Figures are in US$.

		2012	2013	2014	2015
Estimated cost	Objective 1	167 466	265 895	408 844	837 572
	Objective 2	59 546	115 856	189 299	359 319
	Objective 3	769 517	1 623 858	2 522 735	3 488 969
	Operational research	99 653	200 561	312 088	468 586
	Technical assistance	29 896	60 168	93 626	140 576
	Total	**1 126 077**	**2 266 338**	**3 526 591**	**5 295 022**
GFR9	HIV proposal	1 000 018	1 414 335	1 822 641	2 203 778
	TB proposal	82 492	79 923	87 354	102 875
	Total	1 082 510	1494 258	1 909 995	2 306 653
	10% phase 2 efficiency saving		149 426	191 000	230 665
	after phase 2 reprogramming	**1 082 510**	**1 344 832**	**1 718 996**	**2 075 988**
GAP		**43 567**	**921 505**	**1 807 595**	**3 219 034**

Total budget 2012-2015	12 214 027
Total GF R9 2012-2015	6 222 325
Total gap 2012-2015	5 991 702

Resource mobilization will therefore be needed and the following funding options may be explored:

- 3MDG Fund: submit the nationwide TB/HIV scale-up plan and funding gaps
- Global Fund Transitional Funding Mechanism and future rounds
- Bilateral donors: UK Department for International Development, USAID, Australian Agency for International Development, Japan International Cooperation Agency
- TB REACH wave 3 (expected to be launched in June 2012)
- Private sector

Appendix-1: Geographical scale-up by year

TB/HIV NATIONAL SCALE-UP PLAN - GEOGRAPHICAL SCALE-UP

2011 Baseline	CRITERIA	STATE/REGION	TOWNSHIP
		MANDALAY	AMARAPURA
		MANDALAY	AUNG MYAY THAZAN
		MANDALAY	CHAN AYE THAZAN
		MANDALAY	CHAN MYA THARZI
		SHAN NORTH	LASHIO
		MAGWAY	MAGWAY
		MANDALAY	MAHA AUNGMYE
		MANDALAY	MEIKHTILA
		SAGAING	MONYWA
		MANDALAY	MYINGYAN
		KACHIN	MYITKYINA
		MAGWAY	PAKOKKU
		AYEYARWADY	PATHEIN (district)
		MANDALAY	PATHEINGYI
		MANDALAY	PYIGYI TAGON
		SHAN EAST	TACHILEIK
		SHAN SOUTH	TAUNGGYI
	Public hospital		
		Mandalay	General Hospital
			TOTAL TOWNSHIPS/PUBLIC HOSPITALS: 18

2012	AIDS/STD present and ART programme already in place in general hospitals; AIDS/STD team and TB teams are present		
	AYEYARWADY	MA U BIN (district)	AIDS/STD and TB teams and ART
	AYEYARWADY	MYAUNGMYA	AIDS/STD and TB teams and ART
	BAGO EAST	BAGO	AIDS/STD and TB teams and ART
	BAGO EAST	TAUNGOO	AIDS/STD and TB teams and ART
	BAGO WEST	PYAY	AIDS/STD and TB teams and ART
	KACHIN	BHAMAW (district)	AIDS/STD and TB teams and ART
	KAYAH	LOIKAW	AIDS/STD and TB teams and ART
	KAYIN	HPA-AN	AIDS/STD and TB teams and ART
	MANDALAY	NYAUNG U (district)	AIDS/STD and TB teams and ART
	MANDALAY	PYINMANA	AIDS/STD and TB teams and ART
	MON	MAWLAMYINE	AIDS/STD and TB teams and ART
	RAKHINE	SITTWAY	AIDS/STD and TB teams and ART
	SHAN EAST	KENGTUNG	AIDS/STD and TB teams and ART
	TANINTHARYI	KAWTHAUNG	AIDS/STD and TB teams and ART
	TANINTHARYI	MYEIK	AIDS/STD and TB teams and ART
	TANINTHARYI	DAWEI	AIDS/STD and TB teams and ART
	YANGON	THANLYIN	AIDS/STD and TB teams and ART
	AYEYARWADY	HINTAHDA (district)	AIDS/STD team and ART
	KAYIN	MYAWADDY	AIDS/STD team and ART
	MANDALAY	PYIN OO LWIN(MYAYMO)	AIDS/STD team and ART
	SAGAING	KALAY	AIDS/STD team and ART
	SAGAING	SHWEBO	AIDS/STD team and ART
	SHAN NORTH	MUSE	AIDS/STD team and ART
	YANGON	NORTH OKKALAPA	AIDS/STD team and ART
	YANGON	THAKETA	AIDS/STD team and ART

Yangon	Mingalardon Specialist Hospital	ART
Yangon	Tharketa Specialist Hospital	ART
CHIN	HAKA	AIDS/STD and TB teams
MAGWAY	TAUNGDWINGYI	AIDS/STD and TB teams

Public hospitals in Yangon with TB PPM	
Yangon	Sanpya GH
Yangon	New YGH
Yangon	Insein GH
Yangon	West YGH
Yangon	East YGH
Yangon	North Okkalapa GH
Yangon	Aung San Tuberculosis Hospital
	TOTAL TOWNSHIPS/PUBLIC HOSPITALS: 36

2013 TB team is present and total notified TB patients in 2009/2010 >300 OR AIDS/STD team is present		
RAKHINE	BUTHIDAUNG	TB team
KAYIN	HLAING BWE	TB team
BAGO EAST	NYAUNGLEBIN	TB team
AYEYARWADY	PYAPON (ditrict)	TB team
MON	MUDON	TB team
AYEYARWADY	INGAPU	TB team
YANGON	HLEGU	TB team
AYEYARWADY	MYAN AUNG	TB team
MON	BILIN	TB team
AYEYARWADY	LABUTTA	TB team
MON	THANBYUZAYAT	TB team
RAKHINE	KYAUKTAW	TB team
AYEYARWADY	BOGALE	TB team
MON	THATON	TB team
AYEYARWADY	YE KYI	TB team
AYEYARWADY	WAKEMA	TB team
KAYIN	KAWKAREIK	TB team
MANDALAY	MOGOKE	TB team
KACHIN	MOHNYIN	TB team
RAKHINE	MYAUK OO	TB team
MANDALAY	MADAYA	TB team
MAGWAY	CHAUK	TB team
AYEYARWADY	MAWKYUN	TB team
BAGO EAST	PYU	TB team
AYEYARWADY	KYAUNGGON	TB team
BAGO WEST	THARAWADY (district)	TB team
RAKHINE	MINBYA	TB team
RAKHINE	KYAUKPYU	TB team
SHAN NORTH	TANGYAN	TB team
AYEYARWADY	EINME	TB team
MON	CHAUNGZON	TB team
RAKHINE	MAN AUNG	TB team
MANDALAY	YAMETHIN (district)	TB team
YANGON	HLAINGTHAYAR	AIDS/STD team no ART in 2011
YANGON	INSEIN	AIDS/STD team no ART in 2011
YANGON	KYIMYINDINE	AIDS/STD team no ART in 2011
YANGON	LATHA	AIDS/STD team no ART in 2011
YANGON	MINGALA TAUNG NYUNT	AIDS/STD team no ART in 2011
YANGON	S OKKALAPA	AIDS/STD team no ART in 2011

Other public hospitals with TB PPM		
Kayin State	Hpa-an General Hospital	
Ayeyarwaddy	Pathein GH	
Mandalay	Nay Pyi Taw 1000 bedded Hospital	
Mandalay	Patheingyi Tuberculosis Hospital	
Mon State	Mawlamyaing General Hospital	

Other public hospitals under the Hospital Initiative Programme		
Kachin	Myitkyina General Hospital	MSF-Holland
Kachin	Bhamo District Hospital	MSF-Holland
Kachin	Moe Gaung Township Hospital	MDM
Kachin	Moenyin District Hospital	MDM
Shan	Lashio General Hospital	MSF-Holland
Shan	Muse District Hospital	MSF-Holland
Shan	Kengtung General Hospital	Malteser
Shan	Tachileik General Hospital	Malteser
Sittway	Sittway General Hospital	MSF-Holland
Tanintharyi	Dawei General Hospital	MSF-CH
Yangon	Dala Township Hospital	AMI
	TOTAL TOWNSHIPS/PUBLIC HOSPITALS: 55	

2014	Other townships with TB team and townships in Yangon with no AIDS/STD team nor TB team in 2011	
SHAN NORTH	KYAUKME	TB team
RAKHINE	THANDWE (district)	TB team
AYEYARWADY	KYANGIN	TB team
AYEYARWADY	KYAIKLAT	TB team
SHAN NORTH	HSIPAW	TB team
AYEYARWADY	THABAUNG	TB team
MAGWAY	YESAGYO	TB team
YANGON	KUNGYANGONE	TB team
MON	KYAIKHTO	TB team
BAGO EAST	YEDASHAY	TB team
BAGO WEST	PAUNGDE	TB team
SAGAING	SAGAING	TB team
KACHIN	PUTAO	TB team
RAKHINE	GWA	TB team
BAGO EAST	WAW	TB team
SHAN SOUTH	KALAW	TB team
SAGAING	KATHA	TB team
MAGWAY	PAUK	TB team
SHAN NORTH	NAUNGKHIO	TB team
AYEYARWADY	DADEYE	TB team
SAGAING	KAWLIN	TB team
CHIN	PALETWA	TB team
CHIN	MINDAT	TB team
CHIN	FALAM	TB team
SHAN NORTH	MOMEIK	TB team
SHAN SOUTH	NYAUNGSHWE	TB team
SHAN SOUTH	LEIKHA	TB team
KACHIN	SHWEGU	TB team
SHAN SOUTH	LOILEM	TB team
KAYAH	DEEMAWSOE	TB team
SHAN NORTH	NAMSAN - NORTH	TB team
SHAN SOUTH	YWANGAN	TB team
SHAN SOUTH	MOENAI	TB team
AYEYARWADY	HENZADA	TB team

RAKHINE	RAMREE	TB team
SHAN NORTH	HSENNI	TB team
YANGON	AHLONE	
YANGON	BAHAN	
YANGON	BOTATAUNG	
YANGON	CO CO KYUN	
YANGON	DAGON	
YANGON	NEW DAGON - EAST	
YANGON	NEWDAGON - NORTH	
YANGON	NEW DAGON - SEIKKAN	
YANGON	NEWDAGON - SOUTH	
YANGON	DALLAH	
YANGON	DAWBON	
YANGON	HLAING	
YANGON	HMAWBI	
YANGON	HTANTABIN - YANGON	
YANGON	KAMAYUT	
YANGON	KAWHMU	
YANGON	KAYAN	
YANGON	KYAUKTADA	
YANGON	KYAUKTAN	
YANGON	LANMADAW	
YANGON	MAYANGONE	
YANGON	MINGALADON	
YANGON	PABEDAN	
YANGON	PAZUNDAUNG	
YANGON	SANCHAUNG	
YANGON	SEIKKAN	
YANGON	SEIK KYI KANAUNGTO	
YANGON	SHWEPYITHAR	
YANGON	TAIKKYI	
YANGON	TARMWAY	
YANGON	THINGYANGYUN	
YANGON	THONGWA	
YANGON	TWANTE	
YANGON	YANKIN	
	TOTAL TOWNSHIPS: 70	

2015 Remaining

AYEYARWADY	DANUBYU
AYEYARWADY	KANGYIDAUNT
AYEYARWADY	KYONEPYAW
AYEYARWADY	LAYMYETHNA
AYEYARWADY	MAWLAMYAING
AYEYARWADY	NGAPUTAW
AYEYARWADY	NYAUNGDON
AYEYARWADY	PANTANAW
AYEYARWADY	ZALUN
BAGO EAST	DAIK U
BAGO EAST	HTANTABIN - BAGO
BAGO EAST	KAWA
BAGO EAST	KYAUKTAGA
BAGO EAST	KYAUKKYI
BAGO EAST	OKTWIN
BAGO EAST	SHWEGYIN
BAGO EAST	THANATPIN

BAGO WEST	GYOBINGAUK
BAGO WEST	LETPADAN
BAGO WEST	MINHLA - BAGO
BAGO WEST	MONYO
BAGO WEST	NATTALIN
BAGO WEST	OKPO
BAGO WEST	PADAUNG
BAGO WEST	PAUKKHAUNG
BAGO WEST	SHWEDAUNG
BAGO WEST	THEGON
BAGO WEST	ZIGONE
CHIN	THLANT LANG
CHIN	KANPETLET
CHIN	MATUPI
CHIN	TIDDIM
CHIN	TONZANG
KACHIN	KHAWBUDAI
KACHIN	CHIPWE
KACHIN	KAMAING
KACHIN	KHAWBUDAI
KACHIN	MACHANBAW
KACHIN	MANSI
KACHIN	MOGAUNG
KACHIN	MOMAUK
KACHIN	NOGMONG
KACHIN	L' JANGYAN
KACHIN	PHARKANT
KACHIN	SUMPRABUM
KACHIN	TANAI
KACHIN	TSAWLAW
KACHIN	WAINGMAW
KAYAH	BAWLAKE
KAYAH	PRUSOE
KAYAH	MESE
KAYAH	HPASAUNG
KAYAH	SHADAW
KAYAH	HPASAUNG
KAYIN	KYAINSEIKKYI
KAYIN	PAPUN
KAYIN	THAN DAUNG
MAGWAY	AUNGLAN
MAGWAY	GANGAW
MAGWAY	HTILIN
MAGWAY	KAMA
MAGWAY	MINBU (Minbu)
MAGWAY	MINDON
MAGWAY	MINHLA - MAGWAY
MAGWAY	MYAING
MAGWAY	MYOTHIT
MAGWAY	NATMAUK
MAGWAY	NGAPE
MAGWAY	PWINTBYU
MAGWAY	SALIN
MAGWAY	SAW
MAGWAY	SAYDOKTAYA
MAGWAY	SEIKPYU
MAGWAY	SINBAUNGWE
MAGWAY	THAYET (district)

MAGWAY	YENANGYAUNG
MANDALAY	KYAUKPADAUNG
MANDALAY	KYAUKSE
MANDALAY	LEWAY
MANDALAY	MAHLAING
MANDALAY	MYITTHA
MANDALAY	NATOEGYI
MANDALAY	NGAZUN
MANDALAY	PYAWBWE
MANDALAY	SINGAING
MANDALAY	SINGU
MANDALAY	THABEIKKYIN
MANDALAY	TADA U
MANDALAY	TAT KON
MANDALAY	TAUNGTHA
MANDALAY	THARZI
MANDALAY	WUNDWIN
MON	KYAIKMARAW
MON	PAUNG
MON	YE
RAKHINE	ANN
RAKHINE	MAUNGDAW
RAKHINE	MYEBON
RAKHINE	PAUKTAW
RAKHINE	PONNAGYUN
RAKHINE	TAUNGUP
RAKHINE	RATHEDAUNG
SAGAING	AYARDAW
SAGAING	BANMAUK
SAGAING	BUDALIN
SAGAING	CHAUNG U
SAGAING	DEBAYIN
SAGAING	HOMALIN
SAGAING	HTEEGYAINT
SAGAING	INDAW
SAGAING	KALEMYO
SAGAING	KALEWA
SAGAING	KANI
SAGAING	KANBALU
SAGAING	KHAMTI
SAGAING	KHIN U
SAGAING	KYUNHLA
SAGAING	LAHE
SAGAING	LAYSHI
SAGAING	MAWLAIK
SAGAING	MINGIN
SAGAING	MYAUNG
SAGAING	MYINMU
SAGAING	NAM YUM
SAGAING	PALE
SAGAING	PHAUNGBYIN
SAGAING	PINLEBU
SAGAING	SALINGYI
SAGAING	TAMU
SAGAING	TAZE
SAGAING	WETLET
SAGAING	WUNTHO
SAGAING	YE U

SAGAING	YINMABIN
SHAN EAST	MONGKHAT
SHAN EAST	MONGPHYAT
SHAN EAST	MONGPING
SHAN EAST	MONGHSAT
SHAN EAST	MONGTONG
SHAN EAST	MANGYAN
SHAN EAST	MONGYAUNG
SHAN EAST	METMAN
SHAN NORTH	CHINSWEHAW
SHAN NORTH	HOPAN
SHAN NORTH	KYONEGYAN
SHAN NORTH	KUNGLONG
SHAN NORTH	KUTKAI
SHAN NORTH	LAUKKAING
SHAN NORTH	MABEIN
SHAN NORTH	MONGMAW
SHAN NORTH	MONGYAI
SHAN NORTH	MANPHANT
SHAN NORTH	MANTONG
SHAN NORTH	NAMKHAM
SHAN NORTH	NAMTU
SHAN NORTH	NAHPANT
SHAN NORTH	PANGYANG
SHAN NORTH	PANWAING
SHAN NORTH	THEINNI
SHAN NORTH	THIBAW
SHAN SOUTH	HOPONE
SHAN SOUTH	HSISENG
SHAN SOUTH	KUNGHEIN
SHAN SOUTH	KHESIMANSAN
SHAN SOUTH	LINKHE
SHAN SOUTH	MONGKUNG
SHAN SOUTH	MONGPAN
SHAN SOUTH	MONGSHU
SHAN SOUTH	MAUKMAI
SHAN SOUTH	NAMSAN - SOUTH
SHAN SOUTH	PEKON
SHAN SOUTH	PINDAYA
SHAN SOUTH	PINLAUNG
SHAN SOUTH	LAUKSAUK
SHAN SOUTH	YATSOUT
TANINTHARYI	BOKEPYIN
TANINTHARYI	KYUNSU (MYEIK EAST)
TANINTHARYI	LAUNGLON
TANINTHARYI	PALAW
TANINTHARYI	TANINTHARYI
TANINTHARYI	THAYETCHAUNG
TANINTHARYI	YEBYU
	TOTAL TOWNSHIPS: 182
	GRAND TOTAL: 361 TOWNSHIPS/PUBLIC HOSPITALS

Appendix-2: Detailed nationwide scale-up plan per sub-objective and per year

PLAN COMPONENT	DEFINITION	SUB-OBJECTIVE	INDICATOR	MAJOR ACTIVITIES	DATA SOURCE	BASELINE 2011	TARGETS 2012	2013	2014	2015	Remarks
Goal	To substantially reduce the burden of HIV-related TB to achieve 2015 MDG, Stop TB Partnership, Universal Access and UNAIDS targets		Pourcentage reduction in TB deaths in people living with HIV		HIV care (pre-ART and ART), TB registers and vital registers	6% increase (from 731 deaths out of 3925 new and retreatment cases in 2005 to 1478 deaths out of 6222 new and retreatment cases in 2009)				50% compared to 2004 baseline	Data on TB treatment outcomes per HIV status in Myanmar only available
			Number of townships/hospitals implementing collaborative TB/HIV activities			18	54	109	179	361	
Objective 1	To establish and strengthen the mechanisms for delivering integrated TB and HIV services, preferably at the same time and location, to populations at risk of and affected by both diseases	Strenghten collaboration between the NAP, NTP, Divisions of Medical Care and Laboratory, and partners for the delivery of integrated TB and HIV services	Number of six-monthly meetings of the Central TB/HIV Coordinating Committee	Conduct six-monthly Central TB/HIV Coordinating meetings	Notes for the record (NFR)	1	at least 2	at least 2	at least 2	at least 2	
			Number of quarterly meetings of the TB/HIV Technical Strategy sub-Group	Conduct quarterly TB/HIV Technical Strategy sub-Group meetings	NFR	?	4	4	4	4	
			Number of quarterly meetings of the TB/HIV coordinating committee at township/hospital lelve	Create TB/HIV coordinating committee at state/region, district and township level and conduct quarterly meetings	NFR	?	4 per township/hospital	4 per township/hospital	4 per township/hospital	4 per township/hospital	
		Provide training on collaborative TB/HIV activities and management of HIV-associated TB (CPT, ART, TB screening, IPT, Infection control and M&E)	Number of health care workers including NAP and NTP staff, consultant physicians, providers of PMTCT and harm reduction services, and general practioners trained		Training records	?	140	265	350	910	
				Revise TB/HIV recommendations on IPT, ART and Xpert MTB/RIF, clinical guidelines and training material; print and distribute revised clinical guidelines							
				Train at least 5 staff (from NAP, NTP consultant physician, PMTCT and harm reduction services) per location (township and public hospital)							
				Partner with MMA and PSI to train general practioners (training of trainors)							
				Revise medical (doctors, health assistants) and nursing schools curricula to include latest recommendations on collaborative TB/HIV activities and management of HIV-associated TB							

	Strenghten monitoring and evaluation	Number of townships and public hospitals reporting data on collaborative TB/HIV activities to NAP and NTP	Revise, print and distribute HIV recording and reporting formats (patient card, register and cohort report) based on WHO recommended Three interlinked patient monitoring system Perform annual jointly NAP/NTP supervision of routine monitoring systems to townships and public hospitals providing collaborative TB/HIV activities (in addition to routine supportive supervison by each programme) Conduct annual TB/HIV evaluation workshop to monitor progress of implementation with relevant partners Conduct HIV surveillance among TB patients and TB surveillance among PLHIV using routine data (which will progressively replace HIV sentinelle survey among new TB patients)	HIV and TB annual reports	57	109	179	361	
	Involve non governmental and other civil society organizations, national NGO and CSO providing communities and the private-for-profit sector	Number of international and collaborative TB/HIV activities	Partner with civil society and community-based organizations that work on advocacy, treatment literacy and community mobilization to raise awareness among people at risk of or affected by both diseases through advocacy meetings at township level Partner with MMA and PSI to include collaborative TB/HIV activities in their PPM-TB activities	NFR of TB/HIV coordinating committee at township and hospital level	9	TBD	TBD	TBD	TBD	To be decided in country

Objective 2	**To reduce the burden of TB in people living with HIV, their families and communities by ensuring the delivery of the Three I's for HIV/TB and the early initiation of ART in line with WHO guidelines**	Scale-up TB screening among PLHIV based on international guidelines	Number of adults and children enrolled in HIV care, including HIV positive pregnant women and PWID, whose TB status was assessed and recorded during their last visit, expressed as a proportion of all PLHIV enrolled in HIV care		HIV care registers: pre-ART, ART registers, PMTCT and harm reduction registers	100%	60%	75%	90%	100% of PLHIV enrolled in HIV care
				Distribute recently revised registers for TB screening among PLHIV up to township level; gradually replace by revised HIV and TB recording and reporting formats based on WHO recommended Threeinterlinked patient monitoring system						
				Train at least 2 health care workers working in townships already providing collaborative TB/HIV activities on revised clinical algorithm for TB screening						
				Introduce TB screening of HIV positive pregnant women in PMTCT services						
				Introduce TB screening of HIV positive IDUs in harm reduction services						
				Include HIV-related TB into HIV awareness campaigns performed by NAP mobile teams						
		Scale-up access to isoniazid preventive therapy (IPT) among PLHIV without active TB based on international guidelines	Number of PLHIV newly enrolled in HIV care, including HIV positive pregnant women and PWID, who are started on IPT expressed as a proportion of the total number of PLHIV newly enrolled in care		HIV care registers: either pre-ART or ART register according to country M&E system	9%	20%	50%	75%	100% of eligible PLHIV newly enrolled in care
				Provide isoniazid and pyridoxine drugs up to township level, in PMTCT and in harm reduction services						
		Scale-up implementation of TB infection control measures in health care facilities providing services to PLHIV	Number of health care facilities providing services to PLHIV with demonstrable infection control practices that include TB control, expressed as a proportion of the total number of health care facilities evaluated			no BL	36	83	153	335

			Number of HCW employed in facilities providing services PLHIV who develop TB in one year		Annual survey	no BL	ratio TB notification rate in health care workers over TB rate notification among general population =1	ratio TB notification rate in health care workers over TB rate notification among general population =1	ratio TB notification rate in health care workers over TB rate notification among general population =1	ratio TB notification rate in health care workers over TB rate notification among general population =1
				Assess infection control practices in health care facilites providing collaborative TB/HIV activities and upgrade/renovate as necessary Conduct annual surveillance for TB disease among health care workers						
Objective 3	**To reduce the burden of HIV in patients with active TB disease and in those with signs and symptoms of TB (TB suspects), their families and communities by providing HIV prevention, diagnosis and treatment including ART**	Scale-up access to HIV testing among TB patients	Percentage of TB patients who had an HIV test result recorded in TB register	Provide HIV rapid tests in TB clinics up to township level and in public hospitals Train at least 2 NTP staff (team leader, nurse or social worker) in provider-initiated HIV counselling and testing including the use of HIV rapid tests Ensure supervision and quality assurance of HIV rapid tests in TB clinics Introduce HIV testing into mobile team activities for TB intensified case finding organized by the NTP	TB register	3%	60%	75%	90%	100% of all registered TB patients
		Scale-up access to CPT for HIV-infected TB patients based on international guidelines	Number of HIV-positive TB patients who are started on or continue previously initiated CPT, during TB treatment, expressed as a proportion of all HIV-positive TB patients registered over the reporting period	Provide cotrimoxazole in TB clinics up to township level and in public hospitals	TB register	100%	50%	70%	90%	100% of all registered HIV-positive TB patients
		Scale-up access to ART for HIV-infected TB patients based on international guidelines	Number of HIV-positive TB patients who are started on or continue previously initiated ART, during TB treatment, expressed as a proportion of all HIV-positive TB patients registered over the reporting period	Provide ARV drugs for TB patients living with HIV up to township level and in public hospitals	TB register	94%	30%	60%	80%	100% of all registered HIV-positive TB patients

Objective 3	**To reduce the burden of HIV in patients with active TB disease and in those with signs and symptoms of TB (TB suspects), their families and communities by providing HIV prevention, diagnosis and treatment including ART**	Scale-up access to HIV testing among TB patients	Percentage of TB patients who had an HIV test result recorded in TB register	Provide HIV rapid tests in TB clinics up to township level and in public hospitals Train at least 2 NTP staff (team leader, nurse or social worker) in provider-initiated HIV counselling and testing including the use of HIV rapid tests Ensure supervision and quality assurance of HIV rapid tests in TB clinics Introduce HIV testing into mobile team activities for TB intensified case finding organized by the NTP	TB register	3%	60%	75%	90%	100% of all registered TB patients
		Scale-up access to CPT for HIV-infected TB patients based on international guidelines	Number of HIV-positive TB patients who are started on or continue previously initiated CPT, during TB treatment, expressed as a proportion of all HIV-positive TB patients registered over the reporting period	Provide cotrimoxazole in TB clinics up to township level and in public hospitals	TB register	100%	50%	70%	90%	100% of all registered HIV-positive TB patients
		Scale-up access to ART for HIV-infected TB patients based on international guidelines	Number of HIV-positive TB patients who are started on or continue previously initiated ART, during TB treatment, expressed as a proportion of all HIV-positive TB patients registered over the reporting period	Provide ARV drugs for TB patients living with HIV up to township level and in public hospitals	TB register	94%	30%	60%	80%	100% of all registered HIV-positive TB patients

Appendix-3: Detailed budget per activity per year

NATIONAL TBHIV SCALE-UP YEARLY BUDGET

Source of cost estimation: GF R9 proposals and WHO TB budget tool unless indicated otherwise*

		2011 baseline	2012	2013	2014	2015
	Assumptions					
	Population	59,000,000	59,000,000	59,000,000	59,000,000	59,000,000
	TB case notification (all cases)	140,000	150,000	153,500	157,000	160,000
	Estimated HIV prevalence among TB patients (%)	10	10	10	10	10
	Estimated number of TB HIV+ patients	14,000	15,000	15,350	15,700	16,000
	Estimated number of PLHIV	240,000	240,000	240,000	240,000	240,000
	Estimated number of people in HIV care (receiving CPT as a proxy)	52,212	80,000	100,000	120,000	140,000
	Estimated % of PLHIV without active TB after symptoms screen		30	40	50	50
	Scale-up					
	Number of new townships and hospitals per year	18	36	55	70	182
	Cumulative number of townships and hospitals	18	54	109	179	361
Objective 1	***Activities to strengthen the mechanisms for delivering integrated TB and HIV services***					
Sub-objective 1 Coordination	Meeting of the Central TB/HIV Coordinating Committee					
	Number of meetings per year		2	2	2	2
	Cost per 1-day meeting 15 participants		907	907	907	907
	Meeting of the TB/HIV Technical Strategy sub-Group					
	Number of meetings per year		4	4	4	4
	Cost per year		816	816	816	816
	Meeting of TB/HIV coordinating committee at township and public hospital level					
	Number of meetings per year		4	4	4	4
	Cost per meeting for 15 participants		336	336	336	336
	Total cost sub-objective 1		**75,144**	**149,001**	**243,001**	**487,401**
Sub-objective 2 Training	Revise TB/HIV recommendations, clinical guidelines and training material - 4-day workshop - 15 participants		3,629			
	Print and distribute clinical guidelines on TB/HIV* - 5$ unit cost - 500 copies		2,500			
	Number of HCW trained on collaborative TB/HIV activities and management of HIV-associated TB		180	275	350	910
	Total cost for 5-day training		32,567	44,157	58,906	152,714
	Partnership with MMA and PSI to train GP - number of MMA and PSI trainors of trainee		10	10	10	10
	Cost participation of MMA and PSI TOT to 5-day TB/HIV training		1,557	1,557	1,557	1,557
	Revision of medical and nursing schools curricula*			2,000		
	Total cost sub-objective 2		**40,253**	**47,714**	**60,463**	**154,271**
Sub-objective 3 M&E	Revise HIV R&R formats based on the 3ILPMS - 2-day workshop - 15 participants		1,814			
	Print and distribute HIV R&R formats based on the 3ILPMS* - 5$ unit cost - 500 copies		2,500			
	Print and distribute TB R&R formats based on the 3ILPMS* - 5$ unit cost - 500 copies		2,500			
	Number of TB/HIV evaluation meeting		1	1	1	1
	Cost for 2-days TB/HIV evaluation meeting for 30 participants		2,814	2,814	2,814	2,814
	Cost for annual jointly supervision per location		200	200	200	200
	Cost of annual joint supervision from Central to all townhips and hospitals		10,800	21,800	35,800	72,200
	Cost of HIV sentinel sero-surveillance among new TB patients		11,250	13,500	15,750	18,000
	Total cost sub-objective 3		**31,679**	**38,114**	**54,364**	**93,014**
Sub-objective 4 NGO, CBO, CSC	Partner with CSO and CBO advocacy meetings at township level - 285$ per meeting		15,390	31,065	51,015	102,885
	Develop IEC materials in collaboration with CSO and CBO, print and disseminate*		5,000			
	Total cost sub-objective 4		**20,390**	**31,065**	**51,015**	**102,885**
	SUB-TOTAL OBJECTIVE 1		**167,466**	**265,895**	**408,844**	**837,572**

Objective 2	***Activities to decrease the burden of TB in people living with HIV***				
Sub-objective 5	Percentage of PLHIV screened for TB	60	75	90	100
TB screening	Number of PLHIV screened for TB	48,000	75,000	108,000	140,000
	Cost of TB screening in PLHIV per person	-	-	-	-
	Train at least 2 HCW of townships already implementing activities on updated TB symptom screen and IPT	36			
	Cost of 1-day refresher training on updated TB sympton screen and IPT	3,443			
	Cumulative number of PMTCT services implementing TB screening	100	180	260	335
	Cumulative number of harm reduction services implementing TB screening	10	20	30	40
	Print and distributeTB screening registers in PMTCT and HR services - 3$ unit cost	330	600	870	1,125
	Train at least 1 HCW per PMTCT and HR services on TB screening and IPT				
	Cost of 1-day training on TB screening and IPT for PMTCT and HR services	8,173	18,256	26,429	34,194
	Total cost sub-objective 5	**11,946**	**18,856**	**27,299**	**35,319**
Sub-objective 6	Percentage of eligible PLHIV receiving IPT	20	50	75	100
IPT	Number of PLHIV without active TB receiving IPT	4,800	20,000	45,000	70,000
	Cost of 6 months IPT + pyridoxine per patient	2	2	2	2
	Total cost sub-objective 6	**9,600**	**40,000**	**90,000**	**140,000**
Sub-objective 7	Asses IC & upgrade/renovate health care facilities providing collaborative TB/HIV activities - 1000$ per township/hospital	36,000	55,000	70,000	182,000
IC	Conduct annual surveillance of TB disease among HCW*	2,000	2,000	2,000	2,000
	Total cost sub-objective 7	**38,000**	**57,000**	**72,000**	**184,000**
	SUB-TOTAL OBJECTIVE 2	***59,546***	***115,856***	***189,299***	***359,319***

Objective 3	***Activities to decrease the burden of HIV among TB patients***				
Sub-objective 8	Percentage of TB patients tested for HIV	60	75	90	100
HIV testing	Number of TB patients tested for HIV	90,000	115,125	141,300	160,000
	Cost of HIV rapid tests (Determine + Unigold) per patient	3	3	3	3
	Train at least 4 staff (including 2NTP) on PICT (including 17 staff of mobile teams in Y1)	161	220	280	728
	Cost of 2-day training on PICT	17,917	24,423	31,029	80,069
	Supervision and QA HIV rapid test in TB clinics*	1,000	1,500	2,000	2,500
	Total cost sub-objective 8	**252,017**	**324,097**	**398,996**	**496,969**
Sub-objective 9	Percentage of HIV+ TB patients receiving CPT	50	70	90	100
CPT	Number of TB patients tested + for HIV	9,000	11,513	14,130	16,000
	Number of HIV+TB patients receiving CPT	4,500	8,059	12,717	16,000
	Cost of CPT for HIV+ TB patients for 1 year per patient	7	7	7	7
	Total cost sub-objective 9	**31,500**	**56,411**	**89,019**	**112,000**
Sub-objective 10	Percentage of HIV+ TB patients receiving ART	30	60	80	100
ART	Number of HIV+TB patients receiving ART	2,700	6,908	11,304	16,000
	Cost of ART for HIV+ TB patients for 1 year per patient (TDF/3TC/EFZ regimen)	180	180	180	180
	Cost of ART for PLHIV having completed TB treatment the previous year		486,000	1,243,350	2,034,720
	Total cost sub-objective 10	**486,000**	**1,243,350**	**2,034,720**	**2,880,000**
	SUB-TOTAL OBJECTIVE 3	***769,517***	***1,623,858***	***2,522,735***	***3,488,969***

TOTAL	***996,529***	***2,005,609***	***3,120,877***	***4,685,860***
Operational research (10% of total budget)	***99,653***	***200,561***	***312,088***	***468,586***
Technical assistance (3% of total budget)	***29,896***	***60,168***	***93,626***	***140,576***
GRAND TOTAL	***1,126,077***	***2,266,338***	***3,526,591***	***5,295,022***