CHAPTER 6

Addressing the co-epidemics of TB and HIV

KEY MESSAGES

- HIV testing of TB patients is now standard practice in many countries, especially in the African Region. In 68 countries and territories including 22 countries in the African Region, ≥75% of TB patients knew their HIV status in 2010. Further efforts are needed to achieve similar results at global level. In 2010, 34% of notified TB patients (2.1/6.2 million) knew their HIV status.
- The highest rates of HIV coinfection in TB patients are in the African Region, where 44% of TB patients with an HIV test result in 2010 were HIV-positive (range among high TB/HIV burden countries, 8%–82%), followed by the Region of the Americas (17%).
- The global coverage of antiretroviral therapy (ART) for TB patients living with HIV remains low (only 46%), despite the large increase in HIV testing among TB patients and the WHO recommendation that ART should be provided to all TB patients living with HIV regardless of their CD4 cell count. The provision of ART to TB patients living with HIV must be enhanced, including the use of TB services and infrastructure to allow decentralization of care delivery according to national guidelines and the local context.
- Implementation of WHO guidelines on TB screening and isoniazid preventive therapy among people living with HIV can result in a rapid expansion of TB prevention, diagnosis and treatment.
- The recording and reporting of the outcomes of TB treatment disaggregated by HIV status needs to be improved, using WHO-recommended TB registers (which should also be used by HIV service providers including in ART clinics).

People living with HIV who are also infected with TB are about 21–34 times more likely to develop TB disease compared with those who are HIV-negative.[1] Starting in the 1980s, the HIV epidemic led to a major upsurge in TB cases and TB mortality in many countries that persisted throughout the 1990s and up to around 2004, especially in southern and east Africa (**Chapter 2**, **Chapter 3**). Globally, just over one in ten of the almost 9 million people who develop TB each year is HIV-positive, equivalent to 1.1 million new TB cases among people living with HIV in 2010 (**Chapter 2**, **Table 2.1**). In the African Region, which accounted for 82% of the new TB cases that were living with HIV in 2010, an estimated 900 000 (39%) of the 2.3 million people who developed TB in 2010 were HIV-positive. Globally in 2010, there were an estimated 0.35 million deaths (range, 0.32 million–0.39 million) from TB among people who were HIV-positive. WHO, UNAIDS and the Stop TB Partnership have set a target that by 2015, TB mortality rates among people who are HIV-positive should be reduced by 50%, compared with 2004 (the year in which TB mortality among HIV-positive people is estimated to have peaked).[2]

WHO has provided clear recommendations about the interventions needed to prevent, diagnose and treat TB in people living with HIV since 2004.[3] The recommended interventions are collectively known as collaborative TB/HIV activities. They include HIV testing of TB patients, provision of antiretroviral therapy (ART) and co-trimoxazole preventive therapy (CPT) to TB patients living with HIV, HIV prevention services for TB patients, intensified TB case-finding among people living with HIV, isoniazid preventive therapy (IPT) for people living with HIV who do not have active TB, and infection control in health-

[1] The probability of developing TB among people living with HIV divided by the probability of developing TB among HIV-negative people is the incidence rate ratio (IRR). The median value of the IRR in countries with a generalized HIV epidemic was 21 (inter-quartile range 14–25) in 2010. A generalized epidemic is defined by UNAIDS as a prevalence of HIV infection >1% in those aged 15–49 years old. The IRR was 34 (inter-quartile range 20–34) in 115 other countries with low-level or concentrated HIV epidemics.

[2] *Getting to zero. 2011–2015 strategy*. Geneva, Joint United Nations Programme on HIV/AIDS.

[3] *Policy on collaborative TB/HIV activities*. Geneva, World Health Organization, 2004 (WHO/HTM/TB/2004.330; WHO/HTM/HIV/2004.1).

TABLE 6.1

HIV testing, treatment for HIV-positive TB patients and prevention of TB among people living with HIV, 41 high TB/HIV burden countries and WHO regions, 2010. Numbers in thousands except where indicated

	HIV-POSTIVE INCIDENT TB CASES			NUMBER OF TB PATIENTS WITH KNOWN HIV STATUS	% OF NOTIFIED TB PATIENTS TESTED FOR HIV	% OF TESTED TB PATIENTS HIV-POSITIVE	% OF IDENTIFIED HIV-POSITIVE TB PATIENTS STARTED ON CPT	% OF IDENTIFIED HIV-POSITIVE TB PATIENTS STARTED ON ART	NUMBER OF HIV-POSITIVE PEOPLE SCREENED FOR TB	NUMBER OF HIV-POSITIVE PEOPLE PROVIDED WITH IPT
	BEST	LOW	HIGH							
Angola	5.2	3.7	7.1	2.4	4.9	28	18	12	–	–
Botswana	6.5	5.8	7.3	6.1	80	65	79	45	0.2	0.7
Brazil	18	15	22	37	45	23	–	93	–	–
Burkina Faso	1.6	1.4	1.9	4.3	83	18	96	41	–	–
Burundi	2.5	2.2	2.8	5.5	71	23	95	40	–	–
Cambodia	4.0	3.4	4.7	32	77	6.6	65	45	–	0.5
Cameroon	14	11	17	19	78	40	–	–	–	–
Central African Republic	5.3	4.0	6.8	2.6	39	33	–	62	–	–
Chad	9.2	6.4	12	3.8	39	17	–	–	–	–
China	18	10	28	150	16	3.1	–	45	65	–
Congo	1.2	1.0	1.4	9.7	94	7.8	2.9	2.9	0.1	–
Côte d'Ivoire	6.7	5.7	7.6	17	73	24	80	26	31	–
Djibouti	0.6	0.5	0.8	2.2	52	11	–	11	–	–
DR Congo	18	13	24	29	24	18	24	9.3	3.9	–
Ethiopia	–	–	–	67	43	15	69	39	44	6.6
Ghana	4.9	4.3	5.6	10	69	23	86	20	57	–
Haiti	4.6	3.8	5.5	9.5	67	20	13	9.8	6.2	4.1
India	110	75	160	480	32	8.6	90	57	200	–
Indonesia	18	9.9	29	–	–	–	–	–	3.2	–
Kenya	50	45	55	97	91	41	100	48	–	–
Lesotho	11	9.2	12	11	84	77	96	27	–	–
Malawi	21	19	22	20	88	63	94	46	230	–
Mali	1.5	1.0	2.0	2.3	43	17	100	40	25	0
Mozambique	77	53	110	41	88	61	97	25	0.4	8.9
Myanmar	37	21	57	4.4	3.2	22	100	94	6.4	0.5
Namibia	7.6	7.1	8.1	9.5	76	55	92	42	25	14
Nigeria	51	25	87	72	79	25	59	33	57	1.8
Russian Federation	8.1	6.8	9.4	170	100	6.2	–	82	–	–
Rwanda	3.6	3.2	4.0	6.9	98	32	97	–	13	–
Sierra Leone	4.0	3.3	4.8	9.7	74	10	6.4	19	–	–
South Africa	300	240	350	210	53	60	74	54	760	120
Sudan	7.1	4.8	9.9	11	41	6.2	58	54	1.5	–
Swaziland	13	10	15	9.5	86	82	93	35	–	–
Thailand	15	13	18	53	77	16	71	53	25	–
Togo	5.4	4.3	6.5	2.3	78	20	–	–	–	–
Uganda	38	30	46	37	81	54	90	24	400	–
Ukraine	6.0	5.0	7.1	35	95	13	–	–	–	5.0
UR Tanzania	30	28	32	57	90	38	92	35	320	–
Viet Nam	7.6	4.6	11	42	43	8.3	62	43	–	1.3
Zambia	40	36	44	41	83	65	77	47	12	–
Zimbabwe	60	47	76	38	80	75	18	30	–	–
High TB/HIV burden countries	**1 000**	**960**	**1 100**	**1 900**	**39**	**25**	**77**	**46**	**2 300**	**170**
AFR	900	820	980	880	59	44	76	42	2 000	160
AMR	35	31	38	100	46	17	47	65	15	13
EMR	12	9.8	15	46	11	3.4	51	37	6.8	0.3
EUR	20	19	22	290	80	6.0	48	77	5.6	6.6
SEAR	190	140	230	540	23	9.5	87	57	230	0.6
WPR	35	26	45	250	19	4.8	55	41	69	2.0
Global	**1 100**	**1 000**	**1 200**	**2 100**	**34**	**23**	**77**	**46**	**2 300**	**180**

care and congregate settings (the latter three activities are referred to as the "*Three Is for HIV/TB*").

Testing TB patients for HIV and providing CPT to TB patients living with HIV are typically the responsibility of national TB control programmes (NTPs). National HIV programmes are usually responsible for initiating intensified case-finding for TB among people living with HIV as well as providing IPT to those without active TB. Provision of ART to TB patients living with HIV has often been the responsibility of national HIV programmes, but should also be done by NTPs. When NTPs do not provide ART directly, they are responsible for referring TB patients living with HIV to ART services. The latest policy guidance from WHO recommends that ART should be provided to all TB patients living with HIV, irrespective of their CD4 count (and to all people living with HIV with a CD4 cell count ≤350).[1]

WHO began monitoring the implementation and expansion of collaborative TB/HIV activities in 2004. This chapter presents the latest status of progress, using data for 2003 up to 2010.[2] The need for better data on treatment outcomes for TB patients living with HIV, and the recent and rapid expansion of TB screening among people living with HIV and associated uptake of IPT following new policy guidance in Cambodia and South Africa are also highlighted.

6.1 HIV testing, co-trimoxazole preventive therapy and antiretroviral therapy for patients with TB

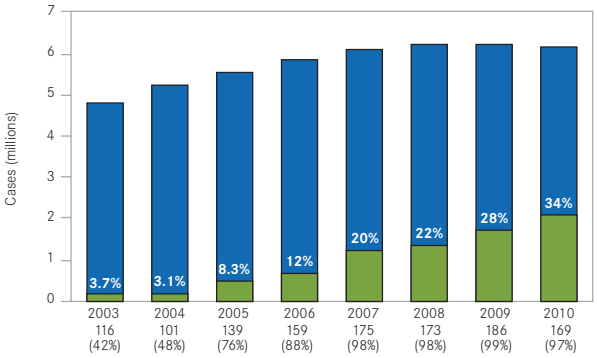
The number of TB patients who knew their HIV status reached 2.1 million in 2010, equivalent to 34% of notified cases of TB (**Table 6.1**). This was an improvement from 28% in 2009 and almost 10 times better than the 3.7% reported in 2003 (**Figure 6.1**). The coverage of HIV testing for TB patients was particularly high in the African and European regions, where 59% and 80% of TB patients respectively knew their HIV status. Impressively, ≥75% of TB patients living in almost half of the countries in the African Region (22 out of 46 countries) knew their HIV status in 2010. This was an increase from 16 in 2009 and double the 11 countries that achieved testing rates of ≥75% in 2008. More than three quarters of the African countries that reported data (31/41) achieved ≥50% (**Figure 6.2**). Five African countries did not report data for 2010: Algeria, Cape Verde, Comoros, Eritrea and Gabon. Globally, the percentage of TB patients who knew their HIV status was ≥75% in 68 countries and territories in 2010, up from 55 countries in 2009.

Among TB patients with an HIV test result in 2010, 23% were HIV-positive at the global level (**Table 6.1**). Among the 41 countries identified as priorities for TB/HIV at the global level in 2002 (listed in **Table 6.1**), 25% were HIV-positive. Much higher rates of HIV coinfection were reported for TB patients in the African Region,

FIGURE 6.1

HIV testing for TB patients, all countries, 2003–2010

The number of notified new and retreatment cases is shown in blue and the number of cases for which the HIV status was recorded in the TB register is shown in green. The percentage of notified TB cases with known HIV status is indicated above the green bars.[a]



[a] The numbers under each year show the number of countries reporting data on HIV testing followed by the percentage of total estimated HIV-positive TB cases accounted for by reporting countries.

where 44% of those tested were found to be HIV-positive. The percentage of TB patients found to be HIV-positive in the 31 African countries in the list of 41 priority countries ranged from 8% in Congo to 82% in Swaziland. Besides Swaziland, more than half of the TB patients who were tested were HIV-positive in Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Uganda, Zambia and Zimbabwe.

In the Region of the Americas, the percentage of TB patients found to be HIV-positive was 17%. In the Eastern Mediterranean, European, South-East Asia and Western Pacific regions, less than 10% of TB patients tested for HIV were HIV-positive. Among the 11 countries identified as priorities for TB/HIV at the global level in 2002 that are outside the African Region, the percentage of TB patients who were HIV-positive ranged from 3% in China to 23% in Brazil in 2010.

Globally, the number of TB patients living with HIV who were enrolled on CPT levelled off between 2009 and 2010, at just over 0.3 million (**Figure 6.3**). This was equivalent to 77% of TB patients known to be HIV-positive (**Table 6.1**, **Figure 6.4**). Further progress is needed to reach the target of 100% that is included in the Global Plan to Stop TB, 2011–2015[3] (see **Chapter 1**). The African

[1] **www.who.int/hiv/pub/arv/advice**

[2] This chapter does not discuss infection control or services aimed at HIV prevention among TB patients. Data for the former are limited for most countries, but available data can be accessed at www.who.int/tb/data. Data on HIV prevention services for TB patients are not part of routine recording and reporting in TB registers, and are not requested on the annual WHO TB data collection form.

[3] *The Global Plan to Stop TB, 2011–2015*. Geneva, World Health Organization, 2010 (WHO/HTM/STB/2010.2).

FIGURE 6.2

HIV testing for TB patients, by country, 2010

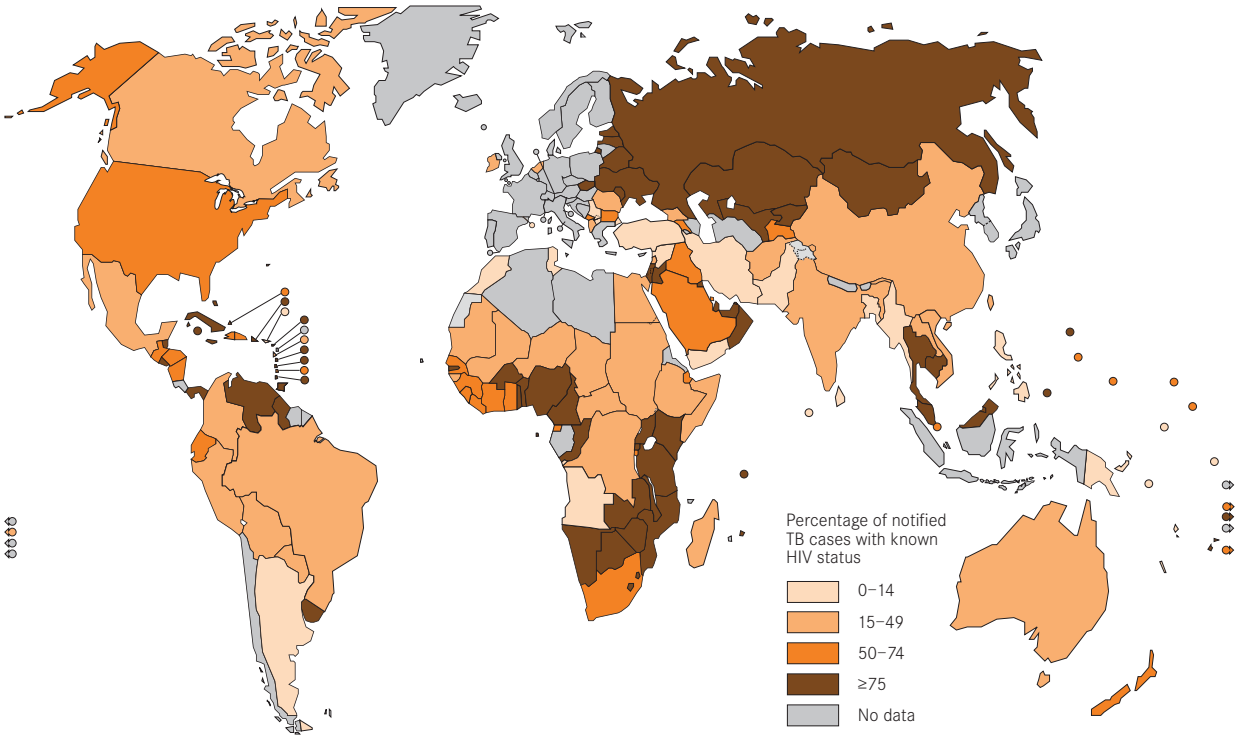
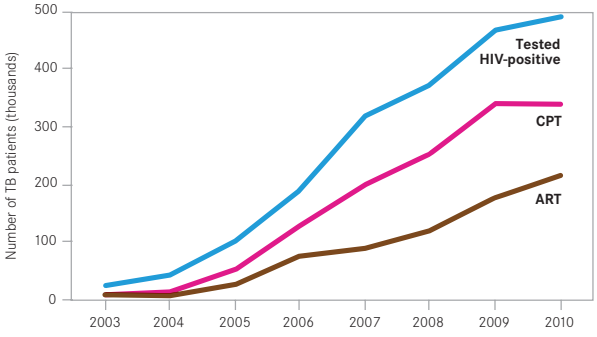


FIGURE 6.3

Co-trimoxazole preventive therapy (CPT) and antiretroviral therapy (ART) for HIV-positive TB patients, 2003–2010



and South-East Asia regions achieved particularly high levels of enrolment on CPT, with 76% and 87% of TB patients known to be living with HIV provided with CPT, respectively (Table 6.1). Countries that achieved the highest rates of enrolment on CPT in 2010 included Burkina Faso (96%), Burundi (95%), India (90%), Kenya (100%), Lesotho (96%), Mozambique (97%), Malawi (94%), Mali (100%), Myanmar (100%), Namibia (92%), Rwanda (97%), Swaziland (93%), the United Republic of Tanzania (92%) and Uganda (90%).

The number of HIV-positive TB patients on ART has grown steadily from a very low level in 2004 (Figure 6.3), reaching over 200 000 in 2010.[1] Among TB patients known to be living with HIV, 46% were on ART globally (Table 6.1, Figure 6.4). In the African Region, 42% of TB patients known to be living with HIV were on ART in 2010 and only a few countries (Botswana, Central African Republic, Kenya, Malawi, South Africa and Zambia, at 47–62%) exceeded this level, despite the WHO recommendation that all HIV-positive TB patients are eligible for ART irrespective of their CD4 cell count. Most of the ART being provided to TB patients living with HIV is accounted for by African countries, notably South Africa

[1] In the annual WHO TB data collection form, countries are asked to report the number of TB patients living with HIV who "started or continued on ART".

BOX 6.1

Better reporting of the outcomes of TB treatment by HIV status is urgently needed

The Stop TB Partnership, WHO and UNAIDS have set a target of halving the number of TB deaths among HIV-positive people by 2015 compared with 2004 (the year in which TB mortality among HIV-positive people is estimated to have peaked). Earlier and prompt diagnosis and treatment of TB as well as antiretroviral therapy (ART) and co-trimoxazole preventive therapy (CPT) can cut mortality rates among TB patients living with HIV. To assess whether the goal is achieved, data on mortality rates among HIV-positive TB patients during TB treatment are needed. In turn, this requires that treatment outcomes for TB patients are disaggregated by HIV status; that is, outcomes are available for HIV-positive and HIV-negative TB patients separately.

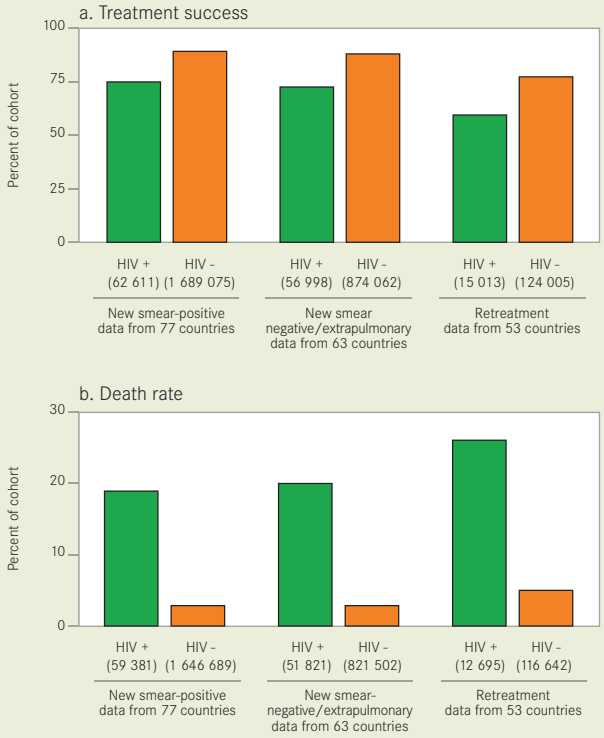
In 2010, a large number of countries (n=81) reported data on the outcomes of TB treatment disaggregated by HIV status (these data are for 2009, given the lag-time in reporting of treatment outcomes). However, these countries accounted for only 21% of the estimated global number of HIV-related TB cases. The treatment success and death rates reported for HIV-positive TB cases in 2009 were 72% and 20%, respectively, compared with 88% and 3% among HIV-negative TB cases (see figure right); the remaining patients had treatment outcomes of failed treatment, transferred out of the district during treatment or their treatment outcome was not evaluated.[1] Among the 63 high TB/HIV burden countries (see list below),[2] less than half (n=28) reported treatment outcomes disaggregated by HIV status.

The recording and reporting of the outcomes of TB treatment disaggregated by HIV status needs to be improved, using WHO-recommended TB registers (which should also be used by HIV service providers including in ART clinics).

[1] The death rate for HIV-positive TB cases cited here assumes that those who were recorded as having defaulted from treatment also died from TB.

[2] The 63 high TB/HIV burden countries are a combination of 41 countries that were identified as priorities for TB/HIV at global level in 2002 and that account for 97% of estimated HIV-positive TB cases globally, plus 22 additional countries that UNAIDS has defined as having a generalized HIV epidemic. The 41 countries are listed in **Table 6.1**. The other 22 countries are (in alphabetical order) the Bahamas, Barbados, Belize, Benin, the Dominican Republic, Equatorial Guinea, Eritrea, Estonia, Gabon, Guatemala, Guinea, Guinea-Bissau, Guyana, Honduras, Jamaica, Liberia, Madagascar, the Niger, Panama, Somalia, Suriname, and Trinidad and Tobago.

Treatment outcomes for HIV-positive and HIV-negative TB patients, 2009. Numbers under bars indicate the number of patients in each cohort, which are slightly larger for a. because patients "not evaluated" are included.



(**Figure 6.5**, **Figure 6.6**). The highest rates of enrolment on ART were reported by countries in the Region of the Americas, notably Brazil at 93% (**Figure 6.6**).

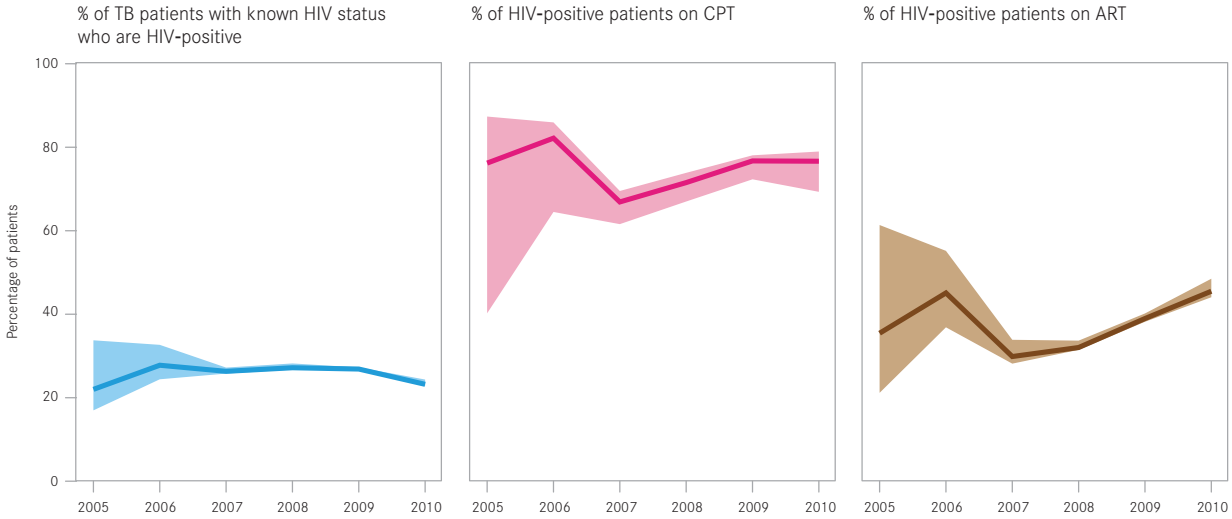
A substantial improvement in ART provision will be needed to reach the Global Plan target of providing ART to all TB patients known to be living with HIV by 2015. This could be facilitated by using TB services and infrastructure to allow decentralization of care delivery according to national guidelines and the local context.

6.2 Intensified case-finding and isoniazid preventive therapy among people living with HIV

Until 2010, data on intensified screening for TB among people living with HIV and provision of IPT to those without active TB were requested from NTPs as part of the global TB data collection form. In 2011, in an effort to streamline efforts to collect data and improve the quality of data, information about these two interventions was collected by the WHO's HIV department from national HIV programmes. It should be noted that monitoring of access to these two interventions at country level is considered weaker than for interventions such as ART, and thus the reported data need to be interpreted with some caution.

FIGURE 6.4

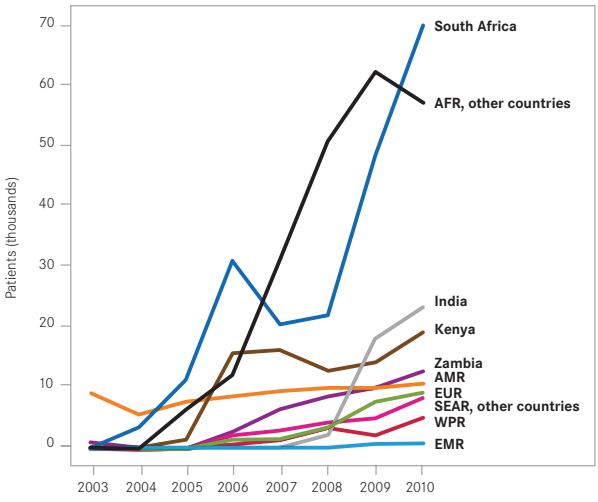
TB patients with known HIV status who are HIV-positive and HIV-positive TB patients on co-trimoxazole preventive therapy (CPT) and antiretroviral therapy (ART), 2005–2010[a]



[a] The solid lines show values for countries that reported data. The shaded areas show upper and lower limits when countries that did not report data are considered.

FIGURE 6.5

Antiretroviral therapy for HIV-positive TB patients by WHO region and selected countries, 2003–2010



The data reported indicate that TB screening among people living with HIV and provision of IPT have steadily increased, particularly since 2007 (**Figure 6.7**, **Figure 6.8**). In 2010, 2.3 million were screened for TB (up from 1.7 million in 2009) and 178 000 of those without active TB were enrolled on IPT (double the level achieved in 2009).

The number of people living with HIV who were screened for TB was equivalent to more than half (58%, 2 302 680/3 956 326) of the reported number of people who were enrolled in HIV care worldwide in 2010. The number started on IPT was 12% (178 144/1 464 579) of the reported number of people living with HIV newly enrolled in HIV care in 2010. Intensified efforts are needed to approach the Global Plan's targets of providing screening for TB for all those enrolled in HIV care and providing IPT to all those attending HIV care services who are eligible for it by 2015. The examples of Cambodia and South Africa illustrate the major progress that can be achieved in a short time when new WHO guidelines are adopted and implemented (**Box 6.2**).

FIGURE 6.6

ART provision and percentage of HIV-positive TB patients on ART, 2010. The area of each box represents the number of HIV-positive TB patients on ART

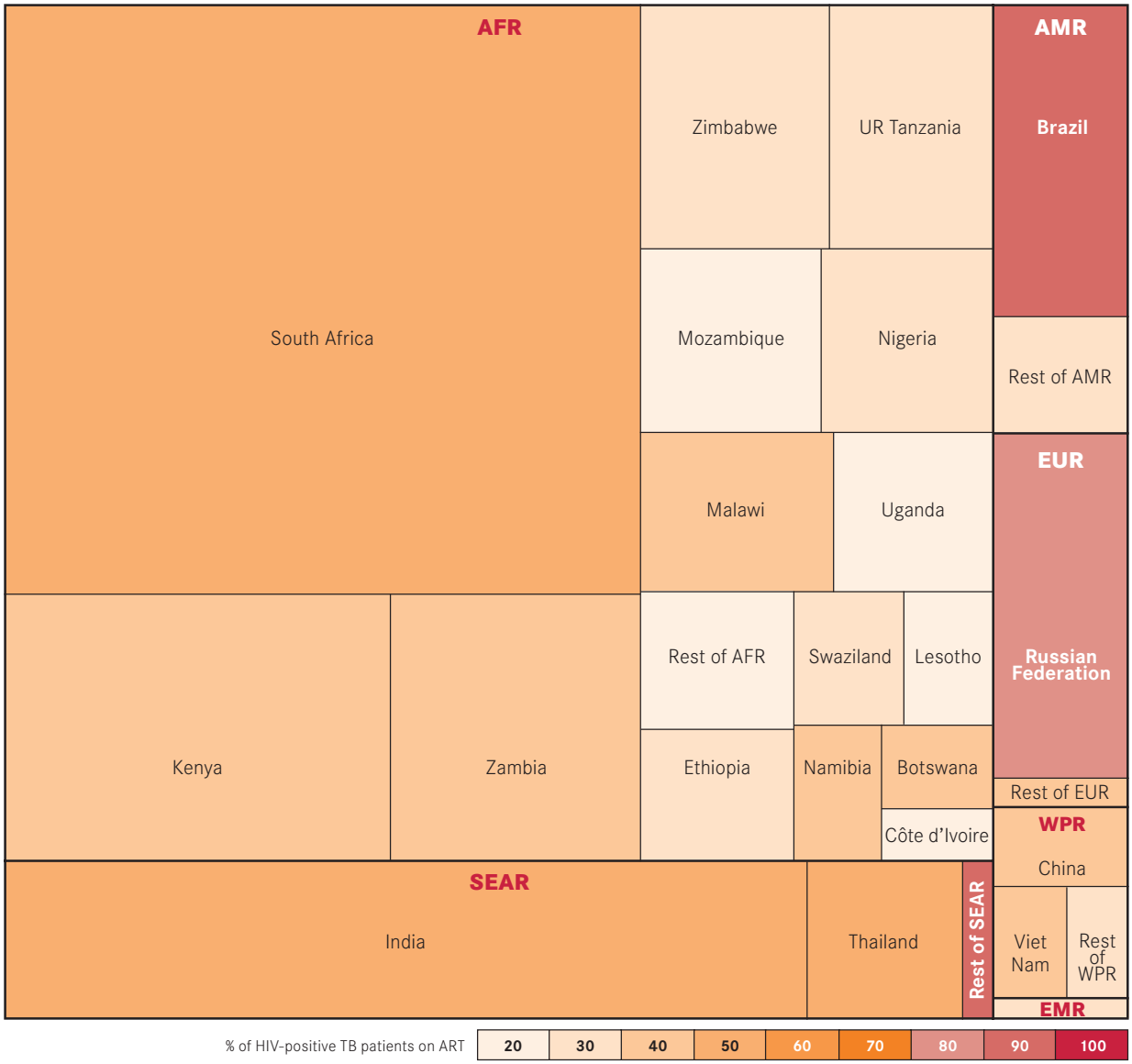


FIGURE 6.7

Intensified TB case-finding among HIV-positive people, 2005–2010

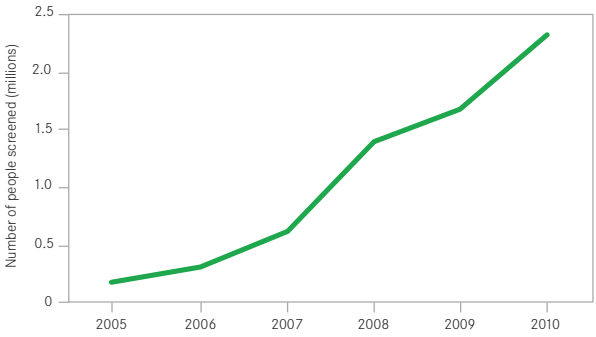
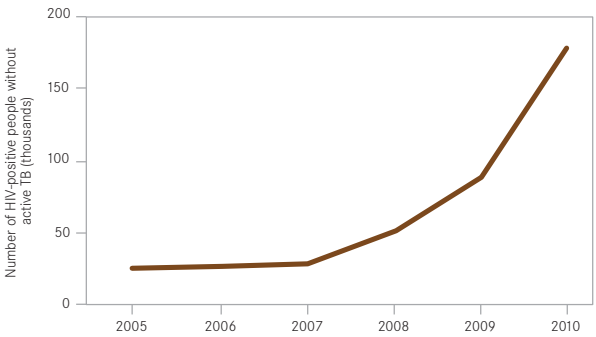


FIGURE 6.8

IPT provision among HIV-positive people, 2005–2010



BOX 6.2

Uptake of new WHO guidelines leads to rapid scale up of isoniazid preventive therapy

Recent WHO guidelines on TB screening and isoniazid preventive therapy (IPT) among people living with HIV were adopted and implemented by Cambodia and South Africa in 2010. The guidelines recommend screening using four symptoms (current cough, fever, weight loss and night sweats) and providing IPT if these symptoms are absent.[1] This symptom-based screening algorithm has been found to have a negative predictive value of 97.7% (95%confidence interval, 97.4–98.0) in settings where the prevalence of TB among people living with HIV is 5%.[2]

An HIV counselling and testing campaign in South Africa in 2010 aimed at all sexually-active individuals aged >12 years included TB screening based on the new guidelines. The guidelines were also reflected in planning and implementation of collaborative TB/HIV activities in Cambodia in 2010.

In South Africa, the number of people living with HIV who were provided with IPT increased by more than five-fold in one year, from 23 583 in 2009 to 124 049 in 2010. In Cambodia, the numbers provided with IPT increased seven-fold in one year, from 66 in 2009 to 491 in 2010.

To complement this large and rapid scale-up in the provision of IPT, emphasis on adherence to therapy as well as monitoring of resistance to isoniazid are needed.

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

[2] Getahun H et al. Development of a standardized screening rule for tuberculosis in people living with HIV in resource constrained settings: individual participant data meta-analysis of observational studies. *PLoS Medicine*, 2011, 8(1) e1000391 (doi:10.1371/journal.pmed).