



Pan American
Health
Organization



World Health
Organization

REGIONAL OFFICE FOR THE Americas

Tuberculosis in the Americas

Regional Report 2014

Epidemiology, Control, and Financing

Table of Contents

Abbreviations	iv
Acknowledgments	vi
Executive summary.....	vii
Introduction	1
Chapter 1. Estimated burden of tuberculosis in the Americas	3
1.1. Incidence.....	4
1.2. Prevalence	10
1.3. Mortality	10
1.4. Multidrug-resistant TB.....	12
1.5. TB and HIV.....	13
Chapter 2: Progress toward the 2015 global targets for TB control.....	15
2.1. Reducing TB incidence, prevalence, and mortality	16
2.2. Increasing case detection and treatment success.....	17
2.3. Addressing the co-epidemic of TB/HIV.....	17
2.4. Addressing the epidemic of MDR-TB.....	17
Chapter 3: TB case notification and treatment outcomes.....	21
3.1. Case notification	22
3.1.1. Case notification by treatment history	23
3.1.2. Case notification by site of disease.....	24
3.1.3. Case notification by bacteriology.....	24
3.1.4. Case notification by age and sex.....	25
3.1.5. Case notification in associate member states and participating states	26
3.2. Case detection	27
3.3. Treatment outcomes	29
Chapter 4: TB diagnostics and laboratory strengthening	33
4.1. Laboratory capacity	34
4.2. Rollout of rapid TB diagnostics	34
Chapter 5: Management of drug-resistant TB	37
5.1. Coverage of DST.....	38
5.2. MDR-TB case detection and treatment.....	38
5.2. MDR-TB treatment outcomes	42
Chapter 6: TB/HIV collaborative activities	44
6.1. Coverage of HIV testing among TB patients.....	45
6.2. HIV coinfection among TB patients with HIV test results.....	48
6.3. ART and CPT for HIV-positive TB patients	48
6.4. Intensified TB case-finding and IPT among people living with HIV	48
Chapter 7: Childhood TB	51
7.1. Estimating the regional burden of TB in children.....	52
7.2. Childhood TB case notification	52
Chapter 8: Social inequalities in TB and trends over time.....	56
Chapter 9: Financing TB control.....	61
Chapter 10: Conclusions.....	73

(Legal page)

Abbreviations

ACSM	Advocacy, communication, and social mobilization
AIDS	Acquired immunodeficiency syndrome
ART	Antiretroviral therapy
CTBC	Community-based tuberculosis care
CDR	Case detection rate
CPT	Co-trimoxazole preventive therapy
DFID	Department for International Development (UK)
DOT	Directly observed treatment
DR-TB	Drug-resistant tuberculosis
DST	Drug-susceptibility testing
EPTB	Extrapulmonary tuberculosis
EQA	External quality assurance
EXPAND-TB	Expanding Access to New Diagnostics for TB project
FIND	Foundation for Innovative New Diagnostics
GDF	Global Drug Facility
GDP	Gross domestic product
GLI	Global Laboratory Initiative (Stop TB Partnership)
The Global Fund	Global Fund to fight AIDS, Tuberculosis and Malaria
HDI	Human Development Index
HIV	Human immunodeficiency virus
IPT	Isoniazid preventive therapy
LAC	Latin America and the Caribbean
LPA	Line probe assay
MDG	Millennium Development Goal
MDR-TB	Multidrug-resistant tuberculosis
NTP	National tuberculosis program
PAL	Practical Approach to Lung Health
PAHO	Pan American Health Organization
PPM	Public–private mix
PTB	Pulmonary tuberculosis
RR-TB	Rifampicin-resistant tuberculosis
SII	Slope index of inequality
TB	Tuberculosis

Abbreviations

UNAIDS	Joint United Nations Program on HIV/AIDS
USAID	U.S. Agency for International Development
WHO	World Health Organization
XDR-TB	Extensively drug-resistant tuberculosis

Acknowledgments

This report was produced by Florian Marx (Chapters 1–7), Oscar Mujica and Cesar Munaico (Chapter 8), and Andrea Pantoja (Chapter 9), and led by Mirtha del Granado, Regional Advisor for Tuberculosis, and Rafael López and Anna Volz, TB Advisors in the HIV, Hepatitis, Tuberculosis, and Sexually Transmitted Infections (HT) Unit, at the Pan American Health Organization/World Health Organization (PAHO/WHO).

The data used were those collected, analyzed, and presented in WHO's Global Tuberculosis Report 2014 from the Americas. Colleagues from the TB Monitoring and Evaluation (TME) team from the Global TB Program at WHO, especially Hazim Timimi, were fully involved. Likewise, all the TB focal points in the PAHO/WHO country offices supported the process.

The following staff members from national tuberculosis programs (NPTs) were involved in data collection:

Christian Acosta, Rosmond Adams, Eugenia Aguilar, Sarita Aguirre García, Shalauddin Ahmed, Valentina Antonieta Alarcón Guizado, Xochil Alemán de Cruz, Kiran Kumar Alla, Valeria Almanza, Mirian Alvarez, Alister Antoine, Chris Archibald, Virginia Asin, Carlos Alberto Marcos Ayala Luna, Wiedjaiprekash Balesar, Draurio Barreira, Patricia Bartholomay, Soledad Beltrame, María del Carmen Bermúdez, Vaughn Bernard, Lynrod Brooks, Mariana Caceres, Linette Carty, Martín Castellanos Joya, Jorge Castillo Carbajal, Annabell Cedeño Ugalde, Gemma Chery, Eric Commiesie, Ofelia Cuevas, Cleophas d'Auvergne, Marta Isabel de Abrego, Cecilia de Arango, Nilda de Romero, Camille Deleveaux, Dy-Juan DeRoza, Mercedes F. España Cedeño, Manuel Salvador España Rueda, Hugo Fernández, Cecilia Figueroa Benites, Victor Gallant, Julio Garay Ramos, Jennifer George, Izzy Gerstenbluth, Margarita Godoy, Roscio Gomez, Ilse María Góngora Rivas, Yaskara Halabi, Dorothea Hazel, Maria Henry, Tania Herrera, Herrmann Juan, Carla Jeffries, Tracy-Ann Kernanet-Huggins, Jeremy Knight, Athelene Linton, María Josefa Llanes Cordero, Andrea Y. Maldonado Saavedra, Marvin Manzanero, Belkys Marcelino, Antonio Marrero Figueroa, María de Lourdes Martínez, Zeidy Mata Azofeifa, Timothy E.D. McLaughlin-Munroe, Roque Miramontes, Leilawati Mohammed, Jeetendra Mohanlall, Ernesto Moreno, Francis Morey, Willy Morose, Alice Neymour, Cheryl Peek-Ball, Tomasa Portillo, Irad Potter, Maria Auxiliadora Quezada Martinez, Rajamanickam Manohar Singh, Dottin Ramoutar, Anna Esther Reyes Godoy, Milo Richard, Paul Ricketts, Andres Rincon, Yohance Rodriguez, Jorge Rodriguez De Marco, Myrian Román, Joan Simon, Natalia Sosa, Diana Sotto, Julio Sumi Mamani, Jackurlyn Sutton, Ana Torrens, Clarita Torres Montenegro, Maribelle Tromp, William Turner, Melissa Valdez, Daniel Vázquez, Nestor Vera, Dorothea Bergen Weichselberger, Michael Williams, David Yost, and Oritta Zachariah.

This publication was made possible through support provided by the Office of Regional Sustainable Development, Bureau for Latin America and the Caribbean, U.S. Agency for International Development (USAID), under the terms of Award No. AID-LAC-IO-11-00001. The opinions expressed in this publication are those of the authors and do not necessarily reflect the views of USAID.

Executive summary

The goal of this report was to provide a comprehensive and up-to-date assessment of the current burden of tuberculosis (TB) and the status of TB control in the Americas. The information contained within it is based on TB surveillance and control data for the year 2013 reported to PAHO/WHO as part of the 2014 global round of TB data collection. The main findings of the report are as follows:

1. In the year 2013, an estimated 285 200 (uncertainty range: 254 000–327 100) incident TB cases occurred in the Americas, equivalent to 29 (26–34) per 100 000 population. More than two-thirds (69%) of all incident TB cases occurred in South America's two subregions (Andean and Other¹). The incidence rate was highest in the Caribbean subregion (70 per 100 000) followed by South America–Andean (63 per 100 000), South America–Other (41 per 100 000), and Mexico and Central America subregion (28 per 100 000). Incidence was lowest in the North America subregion (3.6 per 100 000). TB incidence is declining in all Americas subregions except Mexico and Central America, where it remained constant between 2007 and 2013. There were an estimated 368 200 prevalent TB cases in the Americas in 2013 (**Chapter 1**).
2. In 2013, an estimated 17 000 (12 200–23 100) TB deaths occurred among people without human immunodeficiency virus (HIV) infection and an additional 6 100 (4 600–8 000) TB deaths occurred among HIV-positive people. TB mortality has substantially declined in the Americas since 1990 (**Chapter 1**).
3. An estimated 6 900 (5 200–9 100) cases of multidrug-resistant tuberculosis (MDR-TB) occurred among notified TB cases in the Americas in 2013. MDR-TB cases represented an estimated 2.1% (1.5%–2.9%) of new pulmonary tuberculosis (PTB) cases and 13% (10%–17%) of re-treatment PTB cases. Peru and Brazil accounted for 55% of all estimated MDR-TB cases in the Americas (**Chapter 1**).
4. An estimated 31 800 (uncertainty range: 29 700–34 600) incident TB cases in the Americas were coinfecting with HIV in 2013. Brazil and Haiti accounted for more than half of all HIV-positive incident TB cases in the region. The estimated prevalence of HIV coinfection among incident TB cases was 11%. HIV prevalence varied across the subregions from 6.6% (North America) to 21% (Caribbean) (**Chapter 1**).
5. Good progress has been made in the Americas toward reaching the 2015 global targets for reducing TB incidence, prevalence, and mortality defined in WHO's Global Plan to Stop TB 2011–2015. At the regional level, the targets of reaching a declining trend in TB incidence and reducing TB prevalence and mortality by 50% relative to 1990 have been met. At the country level, annual TB incidence is currently rising only in Belize, El Salvador, Nicaragua, and Uruguay. Despite good progress overall, several countries in the Americas are currently not on track to meet the targets for prevalence and mortality (**Chapter 2**).
6. In 2013, a total of 233 000 TB cases (220 500 new and relapse TB cases) were notified in the Americas. About 76% of new and relapse cases notified were bacteriologically confirmed. The region has met the 2015 global target for TB case detection ($\geq 70\%$). The case detection rate (CDR) was 77% (67%–87%) of estimated incident TB cases.

¹ The Andean subregion includes Bolivia, Colombia, Ecuador, Peru, and Venezuela; the South America–Other subregion includes the countries of the Southern Cone (Argentina, Chile, Paraguay, and Uruguay) plus Brazil, Guyana, and Suriname (**Table 1**).

Executive summary

Case detection across the region has increased in recent years, particularly in the Caribbean, Mexico and Central America, and South America–Other subregions (**Chapter 3**).

7. The Americas region is currently not on track to meet the 2015 global target of at least 85% treatment success in new and relapse patients. Of TB patients treated in the 2012 cohort, 75% were successfully treated, 0.5% failed treatment, 6.4% died, and 7.7% were lost to follow-up (11% were not evaluated). Treatment success varied across the countries from 44% to 93%. Eight of the 36 countries analyzed in this document reported unfavorable treatment outcomes (“failed,” “died,” or “lost to follow-up”) for 20% or more patients. TB treatment success was low, particularly among re-treatment patients other than relapse, and among HIV-positive patients (**Chapter 3**).
8. Strengthening laboratory capacity and improving access to rapid TB diagnostics remain a priority for TB control in the Americas. In 2013 a total of 23 countries reported data for laboratory capacity and external quality assurance (EQA). Laboratory capacity was below the regional target for smear microscopy in six of the 23 countries, and below target for culture testing in nine of them. Capacity for drug-susceptibility testing (DST) was below target in 14 of the 23 countries. Considerable progress has been made in the rollout of rapid diagnostics: 14 of the 36 countries have procured and used GeneXpert² for the diagnosis of TB and the determination of drug-resistant tuberculosis (DR-TB). The line probe assay (LPA) has also been implemented in nine of the 36 countries.³ Two countries, Haiti and Peru, currently participate in the EXPAND-TB⁴ project, which aims to accelerate access to diagnostics for patients at risk of MDR-TB in 27 countries worldwide (**Chapter 4**).
9. Although substantial efforts have been made to accelerate access to DST and adequate treatment for DR-TB in the Americas, the region is currently not on track to meet the 2015 targets of 100% MDR-TB case detection and $\geq 75\%$ treatment success. In 2013, about 23% of laboratory-confirmed new PTB cases and 25% of all re-treatment cases had a DST result available. DST coverage varied substantially across countries but was low, particularly in the South America–Other subregion. A total of 2 962 MDR-TB cases and 403 rifampicin-resistant tuberculosis (RR-TB) cases were detected region-wide, representing 49% of estimated MDR-TB cases. Treatment was initiated for 90% of MDR-TB cases detected. Treatment success in the 2011 cohort of patients was 56%. Several countries reported high rates of patients being lost to follow-up during MDR-TB treatment (**Chapter 5**).
10. In 2013, 69% of all TB cases notified in the Americas had their HIV status recorded, suggesting considerable progress in HIV test coverage in recent years. The proportion of HIV-positive patients among those with recorded HIV status was 13% overall. It was highest in the Caribbean and in South America–Other (20% and 18% respectively) and lowest in North America (6.7%). Data from countries with the highest estimated burden of TB/HIV suggest that the increase of test coverage in the Americas was associated with a decrease in the proportion of positive test results, consistent with countries

² Xpert MTB/RIF® (Cepheid Inc., Sunnyvale, California, United States).

³ GenoType MTBDRplus® (Hain Lifescience, Nehren, Germany).

⁴ Expanding Access to New Diagnostics for TB.

Executive summary

moving away from testing at clinical suspicion of HIV toward universal testing. There seems to be a scale-up of antiretroviral treatment (ART) and co-trimoxazole preventive therapy (CPT) for HIV-positive patients in countries with a high burden of TB/HIV. However, more consistent reporting is needed to monitor trends. Similarly, better reporting is needed to monitor trends in TB screening and provision of isoniazid preventive therapy (IPT) to people living with HIV in the Americas (**Chapter 6**).

11. In 2013, a total of 11 379 children were notified, equivalent to 4.9 per 100 000 children. The proportion of children among notified TB cases was 5.3%, varying between 0% and 11% across countries. Very low TB notification rates for childhood TB in some countries, particular among children under 5 years old, suggest considerable under-diagnosis (**Chapter 7**).
12. Social inequalities and TB are closely linked. This is analyzed through the distribution of TB incidence in relation to the Human Development Index (HDI), by country, and its trends. Although the incidence of TB has been declining systematically since the year 2000, inequality in the risk of ill-health has not changed substantially. There is a need to improve the effectiveness of targeting strategies directed toward the most disadvantaged segments of the population in both social programs and programs for TB prevention and control in the Americas (**Chapter 8**).
13. Based on reports to WHO from NTPs, the 15 countries that together account for 73% of the notified cases in the region (Bolivia, Brazil, Chile, Colombia, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, and Paraguay) received up to US\$ 230 million for treatment of drug-susceptible TB in 2013, double the level of 2006. Increases in funding were accompanied by increases in the number of patients successfully treated. Cost per patient successfully treated is less than or equal to gross domestic product (GDP) per capita in all 15 countries except Jamaica. Funding for TB prevention, diagnosis, and treatment reached US\$ 267 million in 2014, more than double the level of 2006. Overall, most resources have been obtained from domestic sources (US\$ 248 million or 93% of total available funding in 2014). Donor funding in total remained stable at about US\$ 20 million per year (for the period 2006–2014), mostly from the Global Fund to Fight AIDS, Tuberculosis and Malaria (“The Global Fund”). Funding gaps amounted to US\$ 36 million in 2014. Reported NTP funding gaps are mainly for program management and NTP staff. The Global Fund is the principal donor for the region; in 2014 it disbursed US\$ 93 million through 16 TB grants to 13 countries (Bolivia, Colombia, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Nicaragua, Panama, Paraguay, Peru, and Suriname) (**Chapter 9**).
14. In conclusion, considerable progress has been made in the Americas to reduce the regional burden of TB. Control efforts need to be targeted toward countries and areas with a high burden of TB. Current main priorities for TB control in the Americas include 1) strengthening laboratories and rolling out rapid diagnostics to increase MDR-TB case detection; 2) improving treatment programs to achieve better outcomes for all TB patients; 3) enhancing TB/HIV collaborative activities; and 4) increasing efforts to improve detection of TB in children and other vulnerable populations. In addition, social inequalities must be addressed and funding gaps reduced (**Chapter 10**).

Introduction

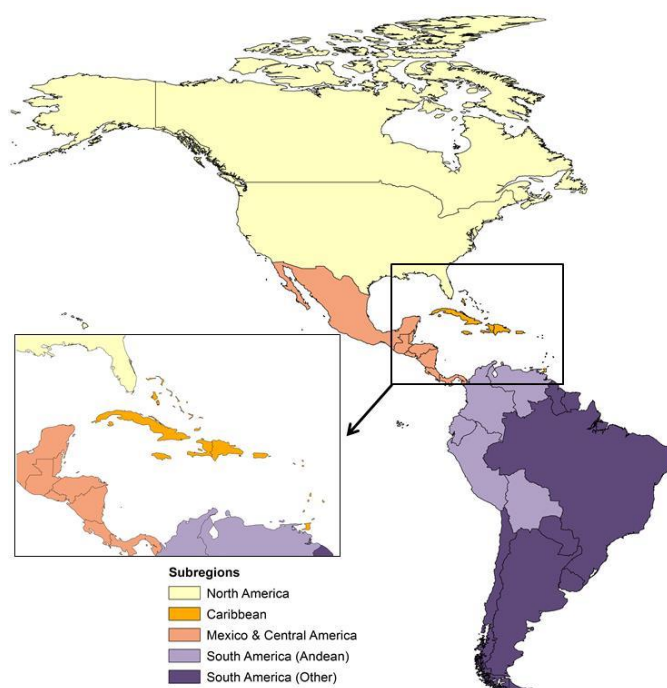
This report was produced and published by PAHO's Regional Tuberculosis Program. Its purpose is to provide a comprehensive and up-to-date overview of the current epidemiological situation of TB in the Americas and to report on efforts toward TB control in the Americas region.

The analysis presented in this report is based on data submitted to PAHO/WHO by 36 countries of the Americas during the 2014 round of data collection. Data are presented by the region as a whole; by subregions; and by country (**Figure 1**). Subregions and countries are listed in **Table 1**. Data from TB case reports from 11 PAHO associate member states and participating states⁵ are also included (**Box 6**).

The report provides estimates of the current burden of TB and shows the progress toward the 2015 global targets for TB control in the Americas. It presents regional data on case notification and treatment outcomes, diagnostics and laboratory strengthening, management of DR-TB and TB/HIV collaborative activities, and financing for TB control. For the first time in this yearly report, separate chapters on childhood TB and the effects of social inequalities on TB are included to highlight the importance of these aspects. The last chapter of the report provides key conclusions on regional TB epidemiology, control, and financing.

The report incorporates revised WHO case definitions for TB and DR-TB and the revised WHO categories for assigning treatment outcomes that were used for the first time in the 2014 round of global TB data collection.⁶

Figure 1. Region of the Americas: division of subregions



⁵ Anguilla; Aruba; Bermuda; Bonaire, Saint Eustatius and Saba; British Virgin Islands; Cayman Islands; Curaçao; Montserrat; Sint Maarten (Dutch part); Turks and Caicos Islands; and the US Virgin Islands.

⁶ WHO. Definitions and reporting framework for tuberculosis–2013 revision. Geneva: WHO; 2013. (WHO/HTM/TB/2013.2). Available at: <http://www.who.int/tb/publications/definitions/en/>

Introduction

Table 1. Subregions, and countries, with population data,^a Americas region, 2013

Sub-region/country	Population
North America	349,399,166
Canada	34,487,414
United States of America	314,911,752
Caribbean	40,500,000
Antigua and Barbuda	88,152
Bahamas	366,331
Barbados	281,804
Cuba	11,276,053
Dominica	71,401
Dominican Republic	10,147,598
Grenada	105,074
Haiti	10,032,864
Jamaica	2,754,669
Puerto Rico	3,701,373
Saint Kitts and Nevis	52,971
Saint Lucia	179,271
Saint Vincent and the Grenadines	109,357
Trinidad and Tobago	1,333,082
Mexico & Central America	162,800,110
Belize	316,280
Costa Rica	4,737,680
El Salvador	6,256,242
Guatemala	14,706,578
Honduras	7,776,669
Mexico	119,361,233
Nicaragua	5,905,146
Panama	3,740,282
South America (Andean)	131,765,230
Bolivia (Plurinational State of)	10,324,445
Colombia	47,078,792
Ecuador	15,246,481
Peru	29,614,887
Venezuela (Bolivarian Republic of)	29,500,625
South America (Other)	266,249,547
Argentina	40,728,738
Brazil	196,935,134
Chile	17,308,449
Guyana	790,882
Paraguay	6,573,097
Suriname	529,761
Uruguay	3,383,486
Total (Americas)	950,714,053

^a Population data obtained from United Nations population estimates (<http://www.un.org/en/development/desa/population>).

Chapter 1

Estimated burden of tuberculosis in the Americas

The burden of disease caused by TB in the Americas is measured in terms of incidence, prevalence, and mortality. Estimates are produced annually by WHO using information gathered through case notification, death registration, expert opinion, and consultation with countries.

Incidence is defined as the number of new and relapse⁷ episodes of TB occurring in a given year. *Prevalence* is defined as the estimated number of TB cases at a given point in time. *Mortality* from TB is defined as the number of deaths caused by TB. This year, for the first time, the report presents data on estimated TB deaths among both HIV-negative and HIV-positive people.⁸ Estimates of TB incidence, prevalence, and mortality include both diagnosed and undiagnosed cases. The estimates are usually presented as absolute numbers of TB cases and deaths, and as rates per 100 000 of the population using United Nations population estimates.

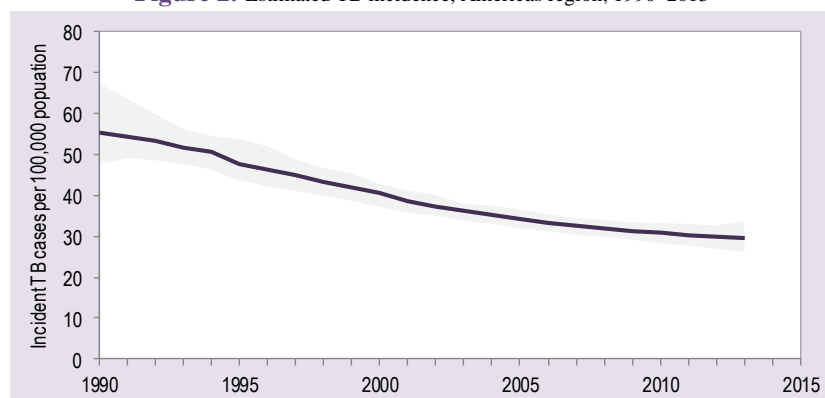
Although every effort is made to use existing data and information, there is considerable uncertainty about several variables related to the burden estimates. These variables include the data recorded and reported; missing data, and the extrapolations used to impute them; and the parameter values used to estimate the number of undiagnosed (or untreated) TB cases. Unless indicated otherwise, the WHO estimates include uncertainty ranges defined as the 2.5th and 97.5th percentiles of outcome distributions established with the use of simulations.⁹ Annual trends in the estimates should be interpreted with caution as surveillance systems, reporting practices, and estimation methodology may be subject to changes over time.

1.1. Incidence

In the year 2013, an estimated 285 200 (uncertainty range: 254 000–327 100) incident TB cases occurred in the Americas. The incidence rate was 29 per 100 000 of the population, with an uncertainty range of 26 to 34 per 100 000.

Estimated annual incidence rates have constantly declined since 1990, although this decline appears to have slowed in recent years (**Figure 2**).

Figure 2. Estimated TB incidence, Americas region, 1990–2013^a



^a Shaded areas represent uncertainty intervals.

⁷ Relapse episodes are defined as a new episode of TB in people who have had TB in the past and for whom there was bacteriological confirmation of cure and/or documentation that treatment was completed.

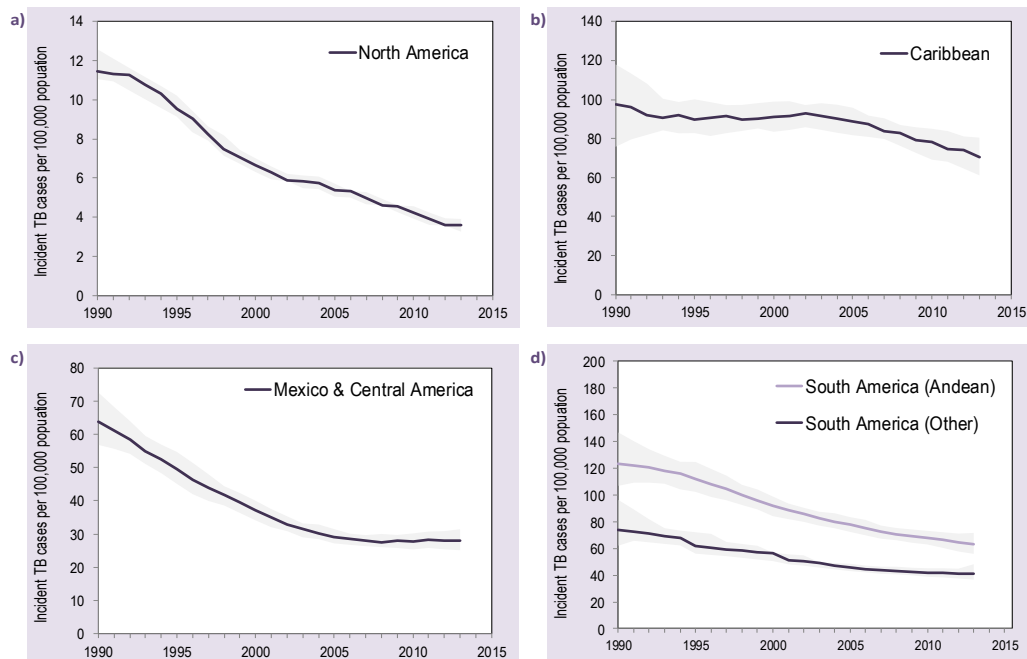
⁸ TB deaths among HIV-positive people are classified as HIV deaths according to the ICD-10 (10th revision of the International Classification of Diseases) and were thus not included in mortality estimates in previous years.

⁹ More information can be found in the Technical Appendix of WHO's Global Tuberculosis Report 2014, available at: http://www.who.int/entity/tb/publications/global_report/gtbr14_online_technical_appendix.pdf?ua=1

At the subregional level, estimated incidence in 2013 was highest in the Caribbean subregion (70 per 100 000; uncertainty: 61–81) followed by South America–Andean (63 per 100 000; uncertainty: 56–72), South America–Other (41 per 100 000; uncertainty: 37–48), and Mexico and Central America (28 per 100 000; uncertainty: 25–32). It was lowest in North America (3.6 per 100 000; uncertainty: 3.3–3.9). The rate is declining in all subregions except Mexico and Central America where it remained constant over the past six years (Figure 3a–d).

The highest absolute number of incident TB cases occurred in South America–Other, which had an estimated 110 780 cases—39% of all cases in the Americas. More than two-thirds (69%) of all incident TB cases occurred in South America (Andean and Other).

Figure 3a–d. Estimated TB incidence by subregion in the Americas, 1990–2013^a



^a Shaded areas represent uncertainty intervals.

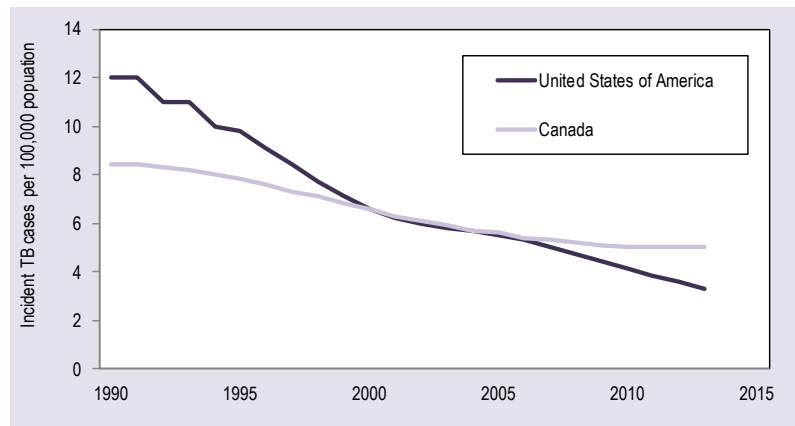
Countries of the North America subregion

In the two countries of the North America subregion (United States and Canada), an estimated total of 12 800 and 1 800 incident TB cases occurred in 2013, respectively.

TB incidence rates in this subregion are among the lowest in the Americas. In 2013, the rate was 3.3 (uncertainty: 1.8–7.4) per 100 000 in the United States, following a continuous decline over the past two decades. In Canada, the rate was 5.0 (uncertainty: 2.7–11) per 100 000 and appears to have remained constant in recent years after a continuous decline until 2010 (Figure 4a).

Figure 4a–e. Estimated TB incidence by subregion and country in the Americas, 1990–2013

Figure 4a. Countries of North America

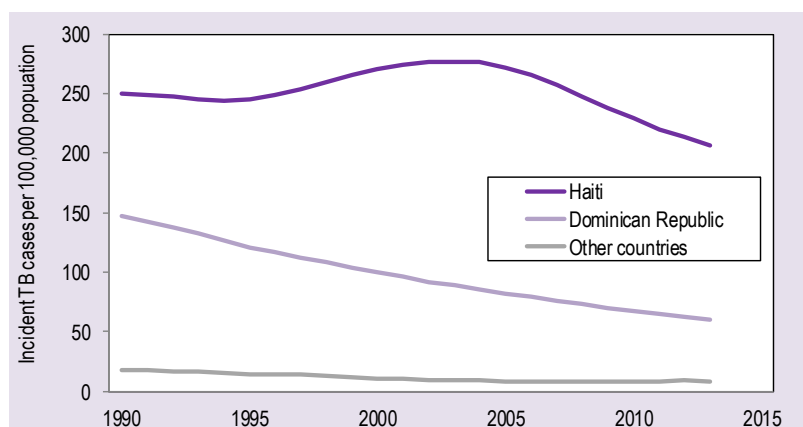


Countries of the Caribbean subregion

The 28 800 incident TB cases estimated for 2013 for the 14 countries in the Caribbean subregion (Antigua and Barbuda, Bahamas, Barbados, Cuba, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, and Trinidad and Tobago) mainly occurred in three countries: Haiti (21 000 or 73%), the Dominican Republic (6 200 or 22%), and Cuba (1 000 or 3.5%). The remaining 600 (2.1%) cases occurred in the other 11 countries, which have smaller populations. TB incidence in Haiti was 206 (uncertainty: 179–231) per 100 000—the highest of all countries in the Americas. It was lower in the Dominican Republic (60 per 100 000; uncertainty: 54–68), and much lower in Cuba (9.3 per 100 000; uncertainty: 8.3–11) and the 11 remaining countries (overall: 6.8 per 100 000; uncertainty: 6.1–7.7).

In the past two decades, TB incidence has been declining in Haiti and the Dominican Republic; in the other 12 countries in the subregion it has either declined or remained constant at a low level (Figure 4b).

Figure 4b. Countries of the Caribbean

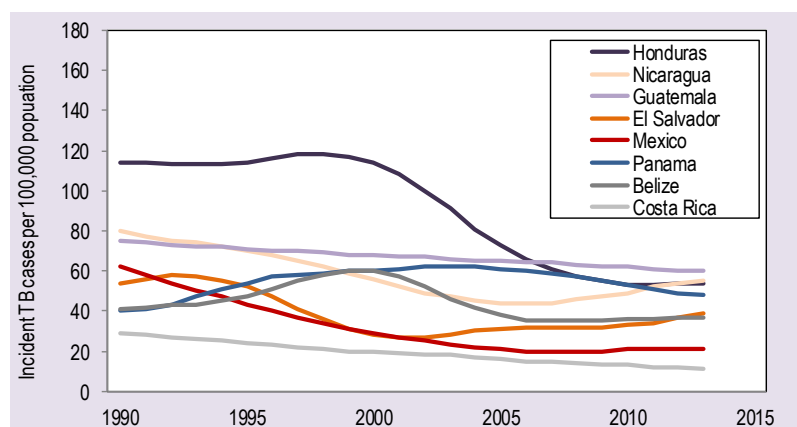


Countries of the Central America and Mexico subregion

In Mexico, an estimated 25 000 incident TB cases occurred in 2013—more than half (53%) of the estimated TB burden in the eight countries of the Mexico and Central America subregion (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, and Panama). Mexico was followed by Guatemala (9 200 cases or 20%), Honduras (4 400 cases or 9.4%), and Nicaragua (3 400 cases or 7.2%). A total of 5 000 cases (11%) occurred in the four remaining countries.

In 2013, TB incidence per 100 000 was highest in Guatemala (60 per 100 000; uncertainty: 53–67) and lowest in Costa Rica (11 per 100 000; uncertainty: 10–13). The rates have been declining in both these countries in the past few years. TB incidence has been increasing in recent years in Belize, El Salvador, and Nicaragua, and appears to be stable in Mexico and Honduras (Figure 4c).

Figure 4c. Countries of Central America and Mexico

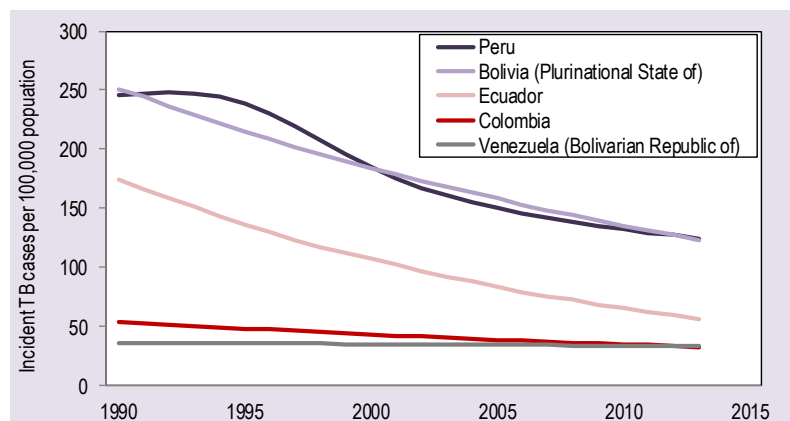


Countries of the South America—Andean subregion

With 38 000 incident TB cases in 2013, Peru accounted for 44% of the estimated TB burden in the five countries of the South America—Andean subregion (Bolivia, Colombia, Ecuador, Peru, and Venezuela). Peru is followed by Colombia (16 000 cases or 19%), Bolivia (13 000 cases or 15%), Venezuela (10 000 cases or 12%), and Ecuador (8 800 cases or 10%).

Peru currently ranks second in the Americas for total number of incident TB cases, after Brazil.

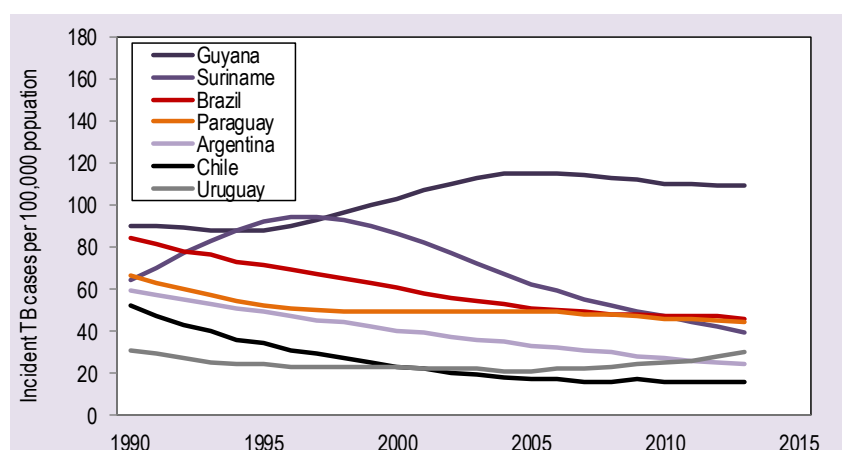
Estimated TB incidence in 2013 was highest in Peru (124 per 100 000; uncertainty: 110–142) and Bolivia (123 per 100 000; uncertainty: 110–140). In the past few decades, TB incidence has been declining in all Andean countries except Venezuela, where it remained constant (Figure 4d).

Figure 4d. Countries of South America—Andean

Countries of the South America—Other subregion

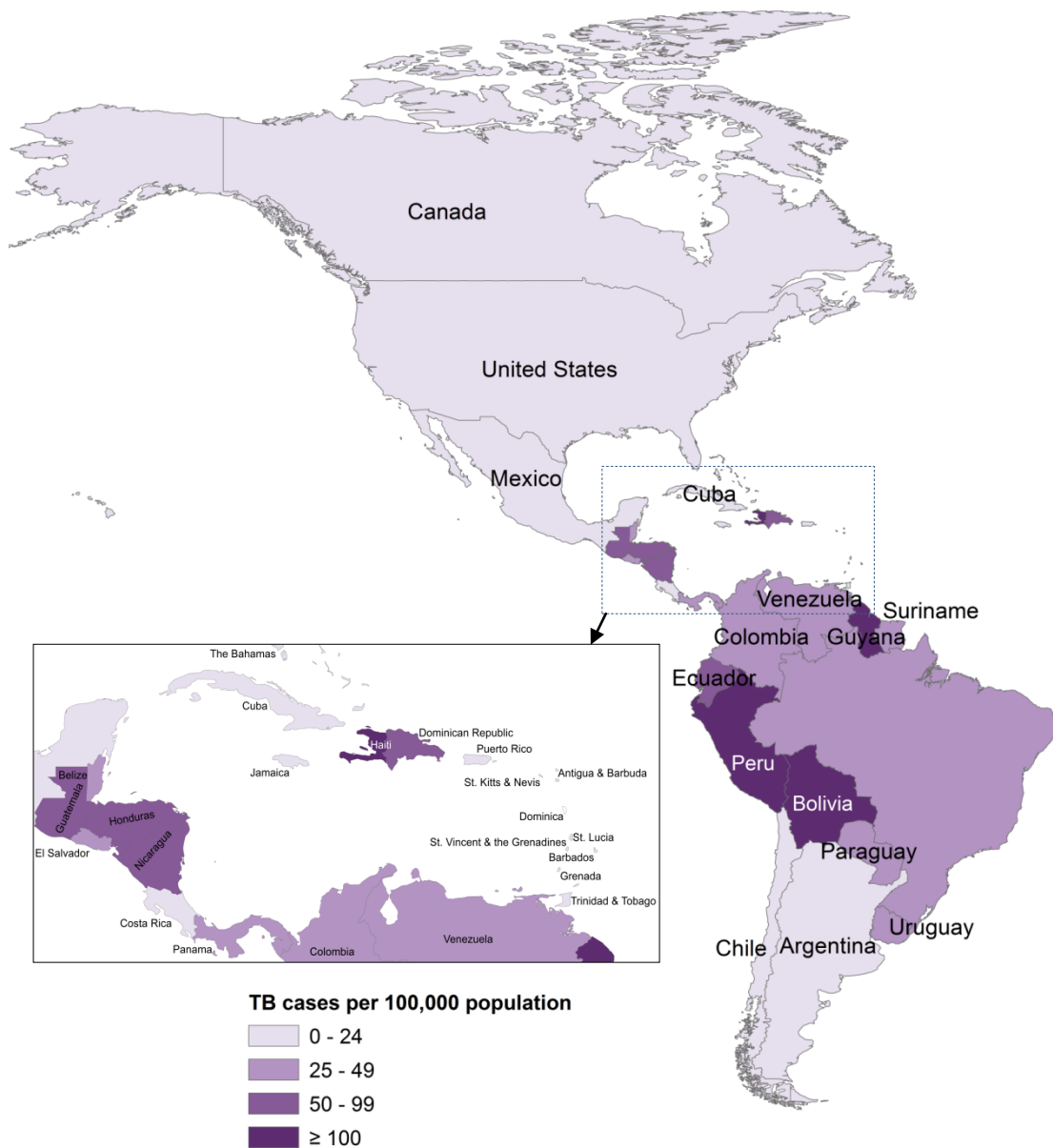
With 93 000 incident TB cases estimated for 2013, Brazil accounted for nearly one-third (33%) of the incident TB burden in the Americas and 84% of the incident TB burden for the seven countries of the South America—Other subregion (Argentina, Brazil, Chile, Guyana, Paraguay, Suriname, and Uruguay). Brazil ranks first among all countries in the Americas (and 16th among countries globally) for estimated number of incident TB cases, followed by Argentina, which has 10 000 cases (9.0%). The other five countries share the remaining TB burden (7 800 TB cases or 7.0%) in the subregion.

In 2013, estimated TB incidence in the subregion was highest in Guyana (109 per 100 000; uncertainty: 97–123), followed by Brazil (46 per 100 000; uncertainty: 41–52), and lowest in Chile (16 per 100 000; uncertainty: 14–17). Over the past 15 years, TB incidence has been declining in all countries except Uruguay, where it has been increasing, and Chile, where it remained constant (**Figure 4e**)

Figure 4e. Countries of South America—Other

The geographic distribution of estimated TB incidence in the Americas is shown in **Figure 5**. **Box 1** and **Figure 6** show the top 10 countries in the Americas by estimated total numbers and rates of incident TB cases.

Figure 5. Estimated TB incidence per 100 000 population, Americas region, 2013



Box 1. Top 10 countries by estimated numbers of incident TB cases, Americas region, 2013

#	Country	Incident TB Cases	%	Cumulative %
1	Brazil	93,000	33%	33%
2	Peru	38,000	13%	46%
3	Mexico	25,000	8.8%	55%
4	Haiti	21,000	7.4%	62%
5	Colombia	16,000	5.6%	68%
6	Bolivia	13,000	4.6%	72%
7	United States	11,000	3.9%	76%
8	Argentina	10,000	3.5%	80%
9	Venezuela	10,000	3.5%	83%
10	Guatemala	9,200	3.2%	86%
	Others	38,971	14%	100%

Figure 6. Top 10 countries by estimated TB incidence per 100 000 population, Americas region, 2011^a



^a Error bars represent uncertainty ranges.

1.2. Prevalence

Due to the lack of data from recent prevalence surveys, there is considerable uncertainty about the estimates of prevalent TB in the Americas.

In 2013, there were an estimated 368 200 (uncertainty range: 177 800–638 500) prevalent TB cases in the Americas, equivalent to 38 (18–66) per 100 000 population.

At the subregional level, best estimates for the number of prevalent TB cases were 15 200 for North America (4.1% of the regional estimate); 35 800 (9.7%) in the Caribbean; 64 500 (18%) in Mexico and Central America; 120 000 (33%) in South America (Andean); and 132 800 (36%) in South America (Other).

1.3. Mortality

In 2013, an estimated 17 000 (uncertainty range: 12 200–23 100) TB deaths occurred among HIV-negative people in the Americas. An additional 6 100 (4 600–8 000) TB deaths occurred among HIV-positive people, representing 26% of all TB deaths in the region.

Two countries, Brazil (6 500 TB deaths; uncertainty 4 000–9 500) and Haiti (3 600; uncertainty: 2 200–5 300), accounted for 59% of the regional burden of death caused by TB.

Figure 7 shows the relative contribution of HIV-positive and -negative people to the estimated burden of TB deaths in the Americas since 1990.

The TB mortality rate (all TB deaths) in the Americas was 2.4 (uncertainty range: 1.7–3.2) per 100 000 population. Along with incidence, TB mortality has substantially declined in the Americas since 1990 (**Figure 8**). In the past 10–15 years, a rapid decline in TB mortality occurred, most notably in the Caribbean, where the rate of TB deaths per 100 000 remained, nevertheless, twice as high compared to the other subregions in the Americas (**Figure 9**).

Figure 7. Estimated number of TB deaths, Americas region, 1990–2013

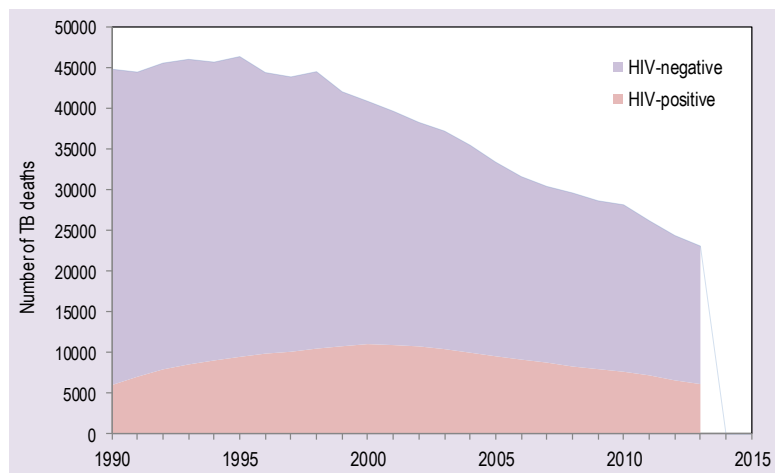


Figure 8. Estimated TB mortality (HIV-positive and -negative), Americas region, 1990–2013

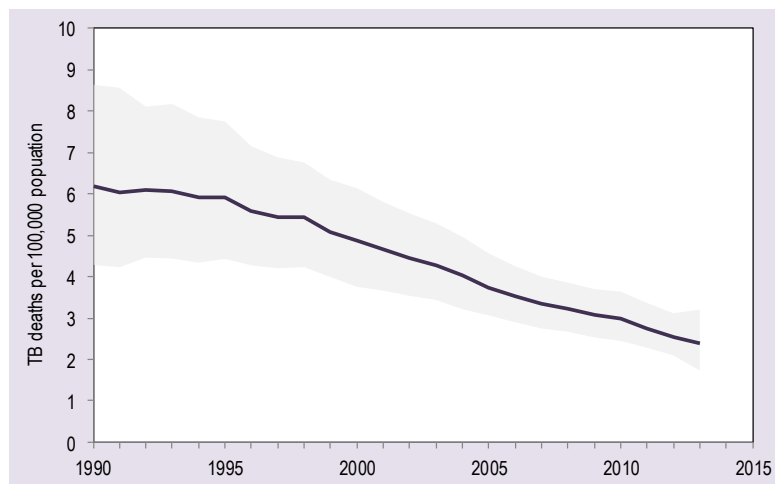
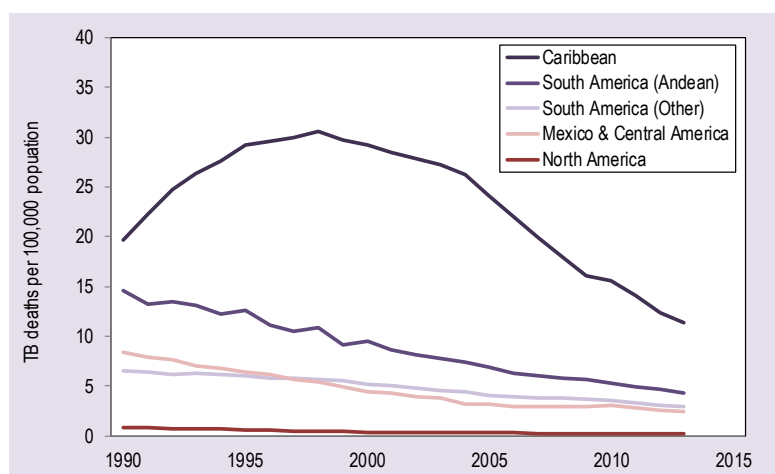


Figure 9. Estimated TB mortality (HIV-positive and -negative) by subregion, Americas region, 1990–2013



1.4. Multidrug-resistant TB

In 2013, there were an estimated 6 900 (uncertainty range: 5 200–9 100)¹⁰ cases of MDR-TB among notified PTB cases in the Americas. Peru and Brazil accounted for more than half of all MDR-TB cases in the Americas (**Box 2**).

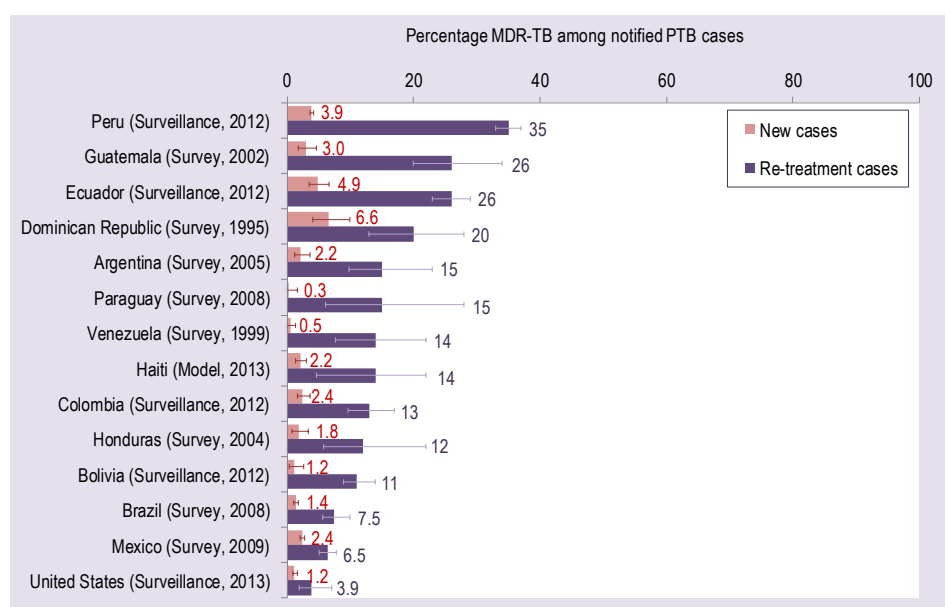
MDR-TB cases represented an estimated 2.1% (1.5%–2.9%) of notified new PTB cases and 13% (10%–17%) of re-treatment PTB cases. At the country level, the proportion of MDR-TB varied between 0.3% and 6.6% of new PTB cases and between 3.9% and 35% of re-treatment PTB cases (**Figure 10**).¹¹

See **Chapter 5** for details on the management of DR-TB in the Americas.

Box 2. Top 10 countries by estimated numbers of MDR-TB cases, Americas region, 2013

#	Country	Estimated MDR-TB cases	% of all	Cumulative %
1	Peru	2,000	29%	29%
2	Brazil	1,800	26%	55%
3	Mexico	490	7.1%	62%
4	Haiti	390	5.6%	68%
5	Argentina	360	5.2%	73%
6	Ecuador	340	4.9%	78%
7	Dominican Republic	340	4.9%	83%
8	Colombia	330	4.8%	88%
9	Bolivia	160	2.3%	90%
10	Guatemala	150	2.2%	92%
	Others	550	8%	100%

Figure 10. Proportions of notified PTB cases estimated to have MDR-TB, Americas region, 2013^a



^a Countries with at least 50 estimated MDR-TB cases; error bars show uncertainty ranges.

¹⁰ Due to recent updates of the country data, the regional MDR-TB estimates differ from those reported in WHO's Global TB Report 2014.

¹¹ WHO estimates for MDR-TB are based on drug-resistance surveys, data from drug-resistance surveillance, and mathematical models.

1.5. TB and HIV

In 2013, there were an estimated 31 800 (uncertainty range: 29 700–34 600) HIV-positive incident TB cases in the Americas. Brazil and Haiti accounted for more than half of all HIV-positive incident TB cases in the region (**Box 3**).

The estimated prevalence of HIV coinfection among incident TB cases was 11%. HIV prevalence varied across the subregions from 6.6% (North America) to 21% (Caribbean) and across countries from 1.7% to 27% (**Figure 11**).

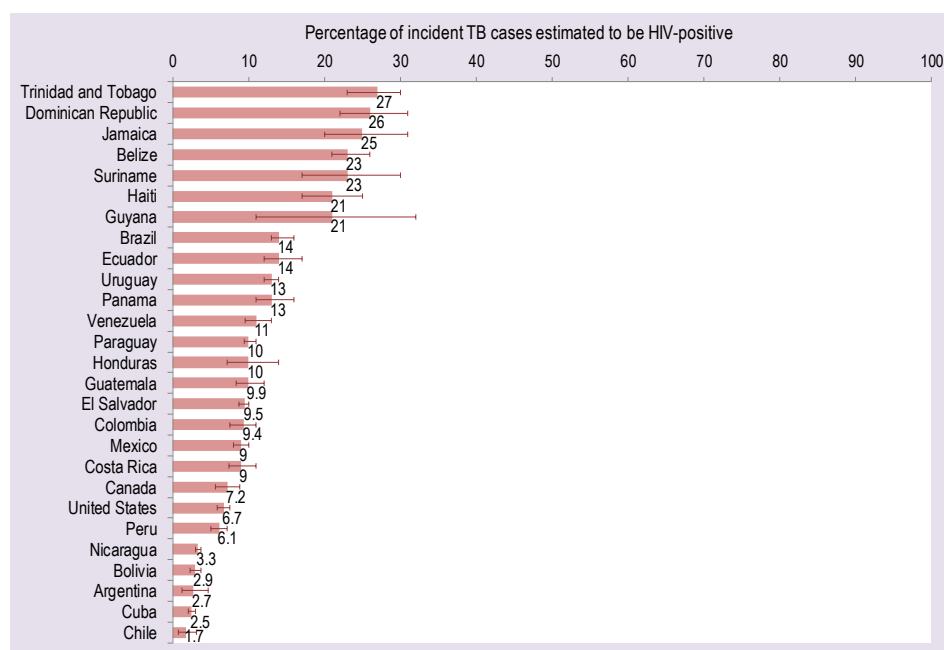
See **Chapter 6** for details on TB/HIV collaborative activities in the Americas.

Data on estimated TB incidence, prevalence, and mortality; MDR-TB; and TB/HIV in the Americas are summarized in **Table 2**.

Box 3. Top 10 countries by estimated number of HIV-positive incident TB cases, Americas region, 2013

#	Country	Incident TB-HIV cases	% of all	Cumulative %
1	Brazil	13,000	41%	41%
2	Haiti	4,400	14%	55%
3	Mexico	2,300	7.2%	62%
4	Peru	2,300	7.2%	69%
5	Dominican Republic	1,600	5.0%	74%
6	Colombia	1,500	4.7%	79%
7	Ecuador	1,200	3.8%	83%
8	Venezuela	1,100	3.5%	86%
9	Guatemala	910	2.9%	89%
10	United States	710	2.2%	91%
	Others	2,783	8.8%	100%

Figure 11. Estimated prevalence of HIV coinfection among incident TB cases, Americas region, 2013^a



^a Countries with at least 100 incident TB cases; error bars show uncertainty ranges.

Table 2. Estimated epidemiological burden of TB globally and by WHO region and Americas subregion, 2013

a) Per absolute numbers in thousands

	Incidence		Prevalence		MDR-TB* notified PTB cases
	All forms	HIV-positive	All forms	HIV-negative	
North America	13	0.8	15	0.6	0.1
Caribbean	29	6.2	36	3.4	0.8
Mexico & Central America	47	4.3	64	3.1	0.8
South America (Andean)	86	6.5	120	4.3	3.0
South America (Other)	111	14	133	5.6	2.3
America	285	32	368	17	6.9
AFR	2,596	869	2,795	389	44
EMR	742	8	988	141	17
EUR	360	21	461	37	74
SEAR	3,364	166	4,477	432	89
WPR	1,611	22	2,249	108	71
World	8,958	1,118	11,338	1,124	300

b) Per 100 000 population

	Incidence		Prevalence		MDR-TB* notified PTB cases
	All forms	HIV-positive	All forms	HIV-negative	
North America	3.6	0.2	4.3	0.2	0.03
Caribbean	70	15	87	8.3	1.8
Mexico & Central America	28	2.6	39	1.9	0.5
South America (Andean)	63	4.8	89	3.2	2.2
South America (Other)	41	5.2	49	2.1	0.8
America	29	3.3	38	1.7	0.7
AFR	280	94	301	42	4.7
EMR	120	1.3	160	23	2.8
EUR	40	2.3	51	4.1	8.2
SEAR	181	9.0	241	23	4.8
WPR	87	1.2	122	5.8	3.8
World	126	16	159	16	4.2

AFR = African Region

EMR = Eastern Mediterranean Region

EUR = European Region

SEAR = South East Asian Region

WPR = Western Pacific Region

* MDR-TB cases estimated among notified pulmonary tuberculosis (PTB) cases

Chapter 2

Progress toward the 2015 global
targets for TB control

The year 2015 marks the final year of the current Global Plan to Stop TB 2011–2015 (“Global Plan”) developed by WHO and the Stop TB Partnership.¹² The main global indicators and targets for TB control are based on Millennium Development Goal (MDG) 6 and the targets set in the Global Plan (see **Box 4**) and include 1) reducing TB incidence, prevalence, and mortality and 2) increasing TB case detection and treatment success. Additional targets were defined in the Global Plan to address the specific challenges of MDR-TB and the TB/HIV co-epidemic.

This chapter summarizes the recent progress in the Americas toward these targets. **Table 3** and **Table 4** highlight key findings at the regional, subregional, and country level. More details on TB incidence, prevalence, and mortality; case detection; treatment success; and the indicators for MDR-TB and TB/HIV can be found in various chapters of this report.

Box 4

Global targets and indicators for TB control to be met until 2015

Millennium Development Goal (MDG) 6:
Combat HIV/AIDS, malaria and other Diseases

Indicators in the MDG framework and associated targets: The indicators in the MDG framework are TB incidence, prevalence and mortality rates; the case detection rate; and the percentage of TB patients successfully treated. The Stop TB Partnership set targets to halve prevalence and mortality rates by 2015 compared with a baseline of 1990. In 1991, the World Health Assembly (WHA) set targets to detect at least 70% of incident cases and to successfully treat at least 85% of TB patients by 2000 (later reset to 2005); these WHA targets were not updated after 2005 but are still used for reference.

Table 3 shows the current progress towards the targets associated with MDG 6 in the Americas.

Global Plan to Stop TB 2011–2015 (additional targets):

Indicators and associated targets for the response to TB/HIV and MDR-TB: Key indicators for addressing the co-epidemics of TB/HIV are the proportion of TB patients who know their HIV status (target: 100%), the proportion of HIV-positive patients enrolled in antiretroviral treatment (ART; target: 100%) and the proportion of individuals newly enrolled in HIV care and eligible for treatment for latent TB infection that are provided with isoniazid preventive therapy (IPT; target: 100%).

Key indicators for addressing the epidemic of MDR-TB are the proportion of MDR-TB cases that are detected and notified (target: 100%) and the treatment success rate among confirmed MDR-TB cases (target: ≥75%).

Table 4 shows the current progress towards the targets for the response to TB/HIV and MDR-TB in the Americas.

2.1. Reducing TB incidence, prevalence, and mortality

In the Americas, the 2015 global targets for reducing TB incidence, prevalence, and mortality have been met (**Table 3**).

TB incidence is declining in the region as a whole and in all subregions except Mexico and Central America, where only Costa Rica and Guatemala show a declining trend in TB incidence over the past five years. Incidence continues to rise in Belize, El Salvador, Nicaragua, and Uruguay.

TB prevalence in the Americas was 38 per 100 000 population in 2013, equivalent to 43% of the 1990 level (89 per 100 000). Based on the current decline, TB prevalence in 2015 is expected to equal about 41% of the 1990 level.

TB mortality was 2.4 per 100 000 population in 2013, equivalent to 39% of the 1990 level (6.2 per 100 000), and is projected to be about 34% of the 1990 level by 2015.

¹² WHO. Global Plan to Stop TB 2011–2015. Geneva: WHO; 2010. (WHO/HTM/STB/2010.2). Available at: http://www.stoptb.org/assets/documents/global/plan/TB_GlobalPlanToStopTB2011-2015.pdf

The encouraging regional trend in TB prevalence and mortality is mainly due to countries with high absolute numbers of TB cases and TB deaths, such as Brazil, Colombia, Peru, and Bolivia, having met (or are on track to meet) both targets for 2015. However, 18 of the 36 countries analyzed in this report are currently not on track to halve TB prevalence—and 12 of them are not on track to halve TB mortality—relative to 1990 (**Table 3**).

2.2. Increasing case detection and treatment success

The Americas region has met the target of 70% TB case detection (reaching 77% in 2013), along with all of its subregions and most countries (**Table 3**).

However, the region remains short of the global target for treatment success (85%); as of 2013, the regional treatment success rate in new and relapse cases was only 75%. The 85% target was met in six of the 36 countries analyzed in this report, but treatment success was below 70% in 10 of the remaining countries (**Table 3**).

2.3. Addressing the co-epidemic of TB/HIV

In the Americas, a growing number of TB patients know their HIV status. In 2013, the percentage of TB patients who were tested or knew their HIV status was 69% of those notified compared to 44% in 2008 (see Chapter 6, **Figure 26a**). Across countries, this percentage ranged from 18% to 100% in 2013. In addition, 65% of all HIV-positive TB patients were on ART as reported by 25 countries. This percentage should be interpreted with caution, given that several countries with high absolute numbers of TB/HIV patients, including Brazil did not report these data in 2013. Only 10 countries reported data on treatment for latent TB infection in HIV-positive people. In those countries, the percentage of people on IPT among those enrolled in HIV care ranged from 4% to 83%. Regional trends over time in the scale-up of ART and IPT cannot be assessed, given the high number of countries not reporting these data in 2013 (**Table 4**).

2.4. Addressing the epidemic of MDR-TB

The Americas are currently not on track to reach the 2015 targets for MDR-TB case detection and MDR-TB treatment success. In 2013, only 49% of the MDR-TB cases estimated among notified PTB cases in the region were detected. The proportion of cases detected varied substantially across countries; in the Caribbean, Mexico and Central America, and South America–Other subregions, it was below 40% (**Table 4**). The target of $\geq 75\%$ treatment success in the 2011 cohort of MDR-TB patients was reached only in the North America subregion (80%). The MDR-TB treatment success rate was 56% overall in the region and ranged from 30% to 88% across countries (**Table 4**).

Chapter 2: Progress toward the 2015 global targets for TB control 18

Table 3. Progress toward 2015 targets set within the MDG framework, Americas region^a

MDG Framework (Indicators and Targets)						
Indicator	TB Incence Rate	TB Prevalence Rate	TB Mortality Rate	TB Case Detection Rate (%)	TB Treatment Success Rate: New and Relapse Cases 2012 (%)	
Target	Indidence Rate Falling ¹⁾	50% Reduction in Prevalence Rate by 2015 compared with 1990	50% Reduction in Mortality Rate by 2015 compared with 1990	at least 70% ²⁾	at least 85% ^{2) 3)}	
Region						
Americas	Target met	Target met	Target met	77 (67-87)	75	
Subregions						
North America	Target met	Target met	Target met	84 (77-93)	83	
Caribbean	Target met	On track	On track	79 (69-91)	81	
Mexico & Central America	Uncertain	Target met	Target met	73 (65-81)	83	
South America (Andean)	Target met	Target met	Target met	72 (64-81)	74	
South America (Other)	Target met	Target met	Target met	82 (70-92)	70	
Countries						
North America	Canada	Uncertain	Not on track	Target met	92 (85-100)	79
	United States of America	Target met	Target met	Target met	86 (77-92)	84
Caribbean	Antigua and Barbuda	Uncertain	Not on track	Target met	87 (77-99)	-
	Bahamas	Target met	Target met	Target met	89 (83-94)	84
	Barbados	Uncertain	Not on track	Not on track	100 (80-100)	-
	Cuba	Uncertain	Target met	Not on track	72 (62-82)	85
	Dominica	Uncertain	Target met	Target met	87 (77-99)	-
	Dominican Republic	Target met	Target met	Target met	72 (63-80)	82
	Grenada	Uncertain	Not on track	On track	-	-
	Haiti	Target met	Not on track	On track	80 (72-92)	81
	Jamaica	Uncertain	Not on track	Not on track	53 (47-59)	65
	Puerto Rico	Uncertain	Target met	Not on track	87 (77-99)	66
	Saint Kitts and Nevis	Uncertain	Not on track	Not on track	-	-
	Saint Lucia	Uncertain	Target met	Target met	87 (77-99)	64
	Saint Vincent and the Grenadines	Uncertain	Not on track	Not on track	11 (9.6-14)	-
	Trinidad and Tobago	Uncertain	Not on track	Not on track	90 (80-95)	63
Mexico & Central America	Belize	Not on track	Not on track	Not on track	99 (91-110)	55
	Costa Rica	Target met	Target met	Target met	74 (64-83)	86
	El Salvador	Not on track	Not on track	Not on track	87 (82-97)	93
	Guatemala	Target met	Not on track	Target met	36 (32-40)	88
	Honduras	Uncertain	Target met	On track	68 (54-89)	89
	Mexico	Uncertain	Target met	Target met	82 (73-92)	80
	Nicaragua	Not on track	Not on track	Target met	87 (81-96)	87
	Panama	Target met	Not on track	On track	77 (67-87)	80
S. America (Andean)	Bolivia (Plurinational State of)	Target met	Target met	On track	63 (56-71)	84
	Colombia	Target met	On track	Target met	75 (66-84)	72
	Ecuador	Target met	Target met	Target met	60 (52-66)	75
	Peru	Target met	Target met	Target met	79 (69-89)	67
	Venezuela (Bolivarian Republic of)	Uncertain	Not on track	Not on track	65 (58-73)	82
South America (Other)	Argentina	Target met	Target met	Target met	89 (78-98)	56
	Brazil	Target met	Target met	Target met	82 (72-92)	72
	Chile	Uncertain	Target met	Target met	88 (80-94)	44
	Guyana	Target met	Not on track	Not on track	78 (69-88)	65
	Paraguay	Target met	Not on track	Not on track	75 (71-78)	70
	Suriname	Target met	Target met	Not on track	67 (54-80)	66
	Uruguay	Not on track	Not on track	Not on track	87 (81-96)	78
Legend	Target met	Target met	Target met	≥ 70%	≥ 85%	
	Uncertain ⁴⁾	On track ⁵⁾	On track ⁵⁾	55-69%	70-84%	
	Not on track	Not on track ⁵⁾	Not on track ⁵⁾	< 55%	< 70%	
¹⁾ Analysis of trend is based on TB incidence for the past five years (2009-2013)						
²⁾ The bands are defined according to the targets that existed when the MDGs were established.						
³⁾ Data not shown for countries with a cohort size of less than 10 TB patients.						
⁴⁾ Uncertain means that there was no statistically significant trend of TB incidence in the past five years. It is therefore uncertain whether the target will be reached in 2015.						
⁵⁾ On track / Not on track means that the indicator will likely be achieved / not achieved by 2015 based on the current predicted trend.						

a 2013 data unless otherwise specified.

Chapter 2: Progress toward the 2015 global targets for TB control 19

Table 4. Progress toward 2015 targets for TB/HIV and MDR-TB response set by the Global Plan to Stop TB, Americas region, 2011–2015^a

Indicator	TB/HIV: 2015 Global plan targets			MDR-TB: 2015 Global plan targets	
	TB Patients with Known HIV Status (%) ¹⁾	Notified HIV-Positive TB Patients Started on ART (%) ¹⁾	People Living with HIV Newly Enrolled in HIV Care who where Started on IPT (%) ¹⁾²⁾	Estimated MDR-TB cases that were detected and notified ^{1) 3)4)}	Treatment Success Rate: Confirmed MDR-TB cases, 2011 cohort (%) ¹⁾
Target	100%	100%	50%	100%	≥75%
Region					
Americas	69	65		49	56
Subregions					
North America	81			>100	80
Caribbean	83	65		31	65
Mexico & Central America	78	56		35	66
South America (Andean)	71	67		64	54
South America (Other)	60			37	52
Countries					
North America	Canada	41		-	88
	United States of America	87		97	79
Caribbean	Antigua and Barbuda	91	-	14	-
	Bahamas	100	50	-	-
	Barbados		-	-	-
	Cuba	92	70	77	-
	Dominica		-	-	-
	Dominican Republic	71	96	32	61
	Grenada			4	-
	Haiti	86	57	0	26
	Jamaica	77	88	-	69
	Puerto Rico	94	60	-	-
	Saint Kitts and Nevis			-	-
	Saint Lucia		-	-	-
	Saint Vincent and the Grenadines			0	-
Mexico & Central America	Trinidad and Tobago	95	5	-	-
	Belize	98	100	-	-
	Costa Rica	96	100	-	-
	El Salvador	98	77	83	74
	Guatemala	80	91	13	34
	Honduras	86	92	0	9
	Mexico	74	43		33
	Nicaragua	69		0	56
S. America (Andean)	Panama	87			60
	Bolivia (Plurinational State of)	70	82		60
	Colombia	74	40		50
	Ecuador	90	100		34
	Peru	66	64		73
	Venezuela (Bolivarian Republic of)	73	90		37
	Argentina	18			24
	Brazil	65			39
South America (Other)	Chile	35			>100
	Guyana	90	56	0	9
	Paraguay	75	68		14
	Suriname	92	45		-
	Uruguay	93	43		-
		≥ 95%	≥ 95%	≥ 75%	≥ 95%
		80-94%	80-94%	50-74%	70-94%
		50-79%	50-79%	25-49%	50-69%
		< 50%	< 50%	< 25%	< 50%
Legend					
¹⁾ Data not shown for countries with a cohort size of less than 10 individuals (-). Blank cells indicate no data available. ²⁾ Approximately 50% of patients newly enrolled in HIV care are expected to be eligible for IPT. ³⁾ The numerator is the number of notified rifampicin-resistant and MDR-TB cases. The denominator is the estimated number of MDR-TB cases among notified. ⁴⁾ The denominator (i.e. estimated number of MDR-TB cases) may be too low for countries with more than 100% MDR-TB cases detected.					

^a 2013 data unless otherwise specified.

Chapter 3

TB case notification and
treatment outcomes

Recording and reporting of TB cases and monitoring of treatment outcomes represent cornerstones of TB control programs worldwide. This chapter provides an overview on TB case notification and treatment outcomes in the Americas based on data collected and submitted by 36 PAHO/WHO member states and information on TB case reports submitted by 11 associated member states and participating states in the region.

3.1. Case notification

In 2013, the WHO definitions of TB cases were revised to take into consideration the worldwide introduction of rapid molecular diagnostics and the scale-up of treatment for DR-TB. **Box 5** provides an overview of the WHO case definitions recommended for use since March 2013. Data on TB case notifications by age and sex are now being reported for new and relapse cases combined.

In 2013, about 233 000 TB cases were reported in the Americas, equivalent to 25 per 100 000 population. Notifications of different categories of TB cases in the Americas are summarized in **Table 5**.

Box 5

WHO definitions of TB cases recommended for use since March 2013 and that were used in the 2014 round of TB data collection in the Americas and globally^a

Bacteriologically confirmed case of TB A patient from whom a biological specimen is positive by smear microscopy, culture or WHO-approved rapid diagnostic test (such as Xpert MTB/RIF). All such cases should be notified, regardless of whether TB treatment is started.

Clinically diagnosed case of TB A patient who does not fulfil the criteria for bacteriologically confirmed TB but has been diagnosed with active TB by a clinician or other medical practitioner who has decided to give the patient a full course of TB treatment. This definition includes cases diagnosed on the basis of X-ray abnormalities or suggestive histology and extrapulmonary cases without laboratory confirmation. Clinically diagnosed cases subsequently found to be bacteriologically positive (before or after starting treatment) should be reclassified as bacteriologically confirmed.

Case of pulmonary TB Any bacteriologically confirmed or clinically diagnosed case of TB involving the lung parenchyma or the tracheobronchial tree. Miliary TB is classified as pulmonary TB because there are lesions in the lungs. Tuberculous intra-thoracic lymphadenopathy (mediastinal and/or hilar) or tuberculous pleural effusion, without radiographic abnormalities in the lungs, constitute a case of extrapulmonary TB. A patient with both pulmonary and extrapulmonary TB should be classified as a case of pulmonary TB.

Case of extrapulmonary TB Any bacteriologically confirmed or clinically diagnosed case of TB involving organs other than the lungs, e.g. pleura, lymph nodes, abdomen, genitourinary tract, skin, joints and bones, meninges.

New case of TB A patient who has never been treated for TB or has taken anti-TB drugs for less than one month. Re-

treatment cases are further classified by the outcome of their most recent course of treatment into four categories.

1. Relapse patients have previously been treated for TB, were declared cured or treatment completed at the end of their most recent course of treatment, and are now diagnosed with a recurrent episode of TB (either a true relapse or a new episode of TB caused by reinfection).

2. Treatment after failure patients have previously been treated for TB and their most recent course of treatment failed i.e. they had a positive sputum smear or culture result at month 5 or later during treatment.

3. Treatment after loss to follow-up patients have previously been treated for TB and were declared 'lost to follow-up' at the end of their most recent course of treatment.

4. Other previously treated patients are those who have previously been treated for TB but whose outcome after their most recent course of treatment is unknown or undocumented.

Case of multidrug-resistant TB (MDR-TB) TB that is resistant to two first-line drugs: isoniazid and rifampicin. For most patients diagnosed with MDR-TB, WHO recommends treatment for 20 months with a regimen that includes second-line anti-TB drugs.

Case of rifampicin-resistant TB (RR-TB) A patient with TB that is resistant to rifampicin detected using phenotypic or genotypic methods, with or without resistance to other anti-TB drugs. It includes any resistance to rifampicin, whether mono-resistance, multidrug-resistance, polydrug-resistance or extensive drug-resistance.

^a Sources: WHO Global TB report 2014 / Definitions and reporting framework for tuberculosis – 2013 revision. Geneva, World Health Organization, 2013 (WHO/HTM/TB/2013.2). Available at: <http://www.who.int/tb/publications/definitions/en/>.

Chapter 3: TB case notification and treatment outcomes 23

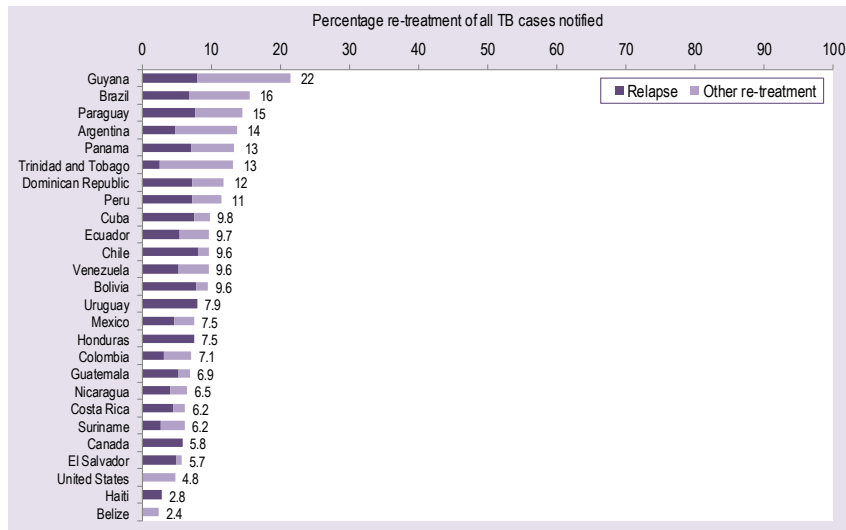
Table 5. TB case notification, Americas region, 2013

Region	Total Notified	New and Relapse	Retreatment Excl. Relapse	New or Treatment History Unknown			Relapse		
				Pulmonary Bacteriol. confirmed	Pulmonary Clinically Diagnosed	Extra-Pulmonary	Pulmonary Bacteriol. confirmed	Pulmonary Clinically Diagnosed	Extra-Pulmonary
Americas	233,032	220,487	12,545	130,372	42,496	34,259	10,073	2,424	863
Subregions									
North America	11,208	10,751	457	6,900	1,355	2,401	69	8	18
Caribbean	22,968	22,705	263	13,329	5,824	2,661	884	5	2
Mexico & Central America	34,937	34,083	854	22,102	4,958	5,261	1,432	223	107
South America (Andean)	64,113	61,627	2,486	37,129	8,875	11,684	3,330	412	197
South America (Other)	99,806	91,321	8,485	50,912	21,484	12,252	4,358	1,776	539
Countries									
North America	Canada	1,638	1,638		929	128	486	69	8
	United States of America	9,570	9,113	457	5,971	1,227	1,915		
Caribbean	Antigua and Barbuda	11	10	1	1	6	2	0	1
	Bahamas	33	33	0	26	4	0	3	0
	Barbados	4	4	0	4	0	0	0	0
	Cuba	775	757	18	484	142	73	52	1
	Dominica	3	3	0	1	0	2	0	0
	Dominican Republic	4,663	4,450	213	2,732	821	559	338	0
	Grenada	1	0	1					
	Haiti	17,040	17,040	0	9,830	4,732	1,995	483	
	Jamaica	96	96	0	59	29	7	1	0
	Puerto Rico	50	50	0	43	3	4	0	0
	Saint Kitts and Nevis	0	0	0	0	0	0	0	0
	Saint Lucia	9	9	0	8	0	1	0	0
	Saint Vincent and the Grenadines	3	3	0	3	0	0	0	0
	Trinidad and Tobago	280	250	30	138	87	18	7	0
Mexico & Central America	Belize	124	121	3	75	43	3	0	0
	Costa Rica	417	410	7	330	29	32	14	5
	El Salvador	2,193	2,176	17	1,424	310	333	109	0
	Guatemala	3,369	3,311	58	2,849	0	287	175	0
	Honduras	2,981	2,981		1,941	460	356	187	29
	Mexico	21,306	20,708	598	13,239	2,841	3,623	770	161
	Nicaragua	3,028	2,952	76	1,540	904	386	122	
	Panama	1,519	1,424	95	704	371	241	55	33
S. America (Andean)	Bolivia (Plurinational State of)	8,473	8,327	146	5,419	575	1,668	555	59
	Colombia	12,222	11,737	485	6,996	1,999	2,354	388	0
	Ecuador	5,509	5,277	232	3,741	324	911	301	0
	Peru	31,052	29,731	1,321	17,435	4,481	5,588	1,802	289
	Venezuela (Bolivarian Republic of)	6,857	6,555	302	3,538	1,496	1,163	284	64
South America (Other)	Argentina	9,814	8,933	881	5,223	2,054	1,188	357	74
	Brazil	83,310	76,020	7,290	41,885	18,303	10,148	3,613	1,604
	Chile	2,450	2,412	38	1,420	234	560	162	11
	Guyana	785	679	106	308	249	59	23	38
	Paraguay	2,420	2,255	165	1,426	435	208	143	40
	Suriname	146	141	5	108	18	11	2	0
	Uruguay	881	881	0	542	191	78	58	9

3.1.1. Case notification by treatment history

Of the 233 000 TB cases notified in 2013 in the Americas, about 25 900 (11%) were re-treatment cases. Of these, 13 400 (52%) were classified as relapse and 12 500 (48%) as “other” re-treatment cases. At the country level, the proportion of re-treatment among all notified TB cases varied between 2.4% and 22% (**Figure 12**).

Figure 12. Percentage of re-treatment TB cases among all notified cases, Americas region, 2013^a

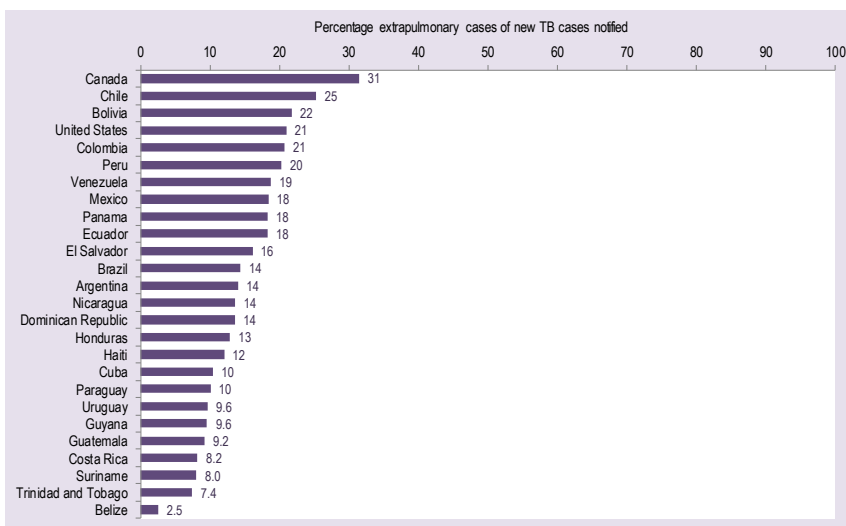


^a Countries with at least 100 TB cases notified.

3.1.2. Case notification by site of disease

Of 207 100 new TB cases notified, about 172 900 (83%) were PTB cases and 34 300 (17%) were extrapulmonary tuberculosis (EPTB) cases. At the country level, the proportion of EPTB among new cases varied between 2.5% and 31% (**Figure 13**). High variation in the proportion of EPTB cases across countries may be due to differences in case definitions or in the capacity to diagnose EPTB.

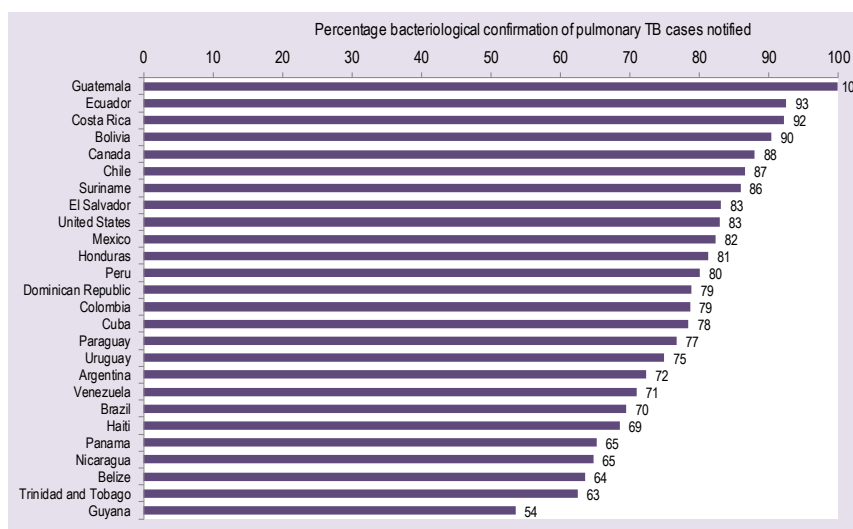
Figure 13. Proportion of EPTB among new cases, Americas region, 2013^a



^a Countries with at least 100 TB cases notified.

3.1.3. Case notification by bacteriology

Of 185 400 (new and relapse) PTB cases notified, 140 400 (76%) were bacteriologically confirmed and 44 900 (24%) were clinically diagnosed. The proportion of bacteriologically confirmed PTB varied at the country level from 54% to 100% (**Figure 14**).

Figure 14. Proportion of cases with bacteriological confirmation among new and relapse PTB cases, Americas region, 2013^a

^a Countries with at least 100 TB cases notified.

3.1.4. Case notification by age and sex

In 2013, all 36 countries included in this analysis reported data by age group and sex, and 28 of the countries included relapse cases in their age- and sex-specific case reports. Age group and sex was reported for a total of 213 800 new and relapse cases in the Americas, representing 97% of all new and relapse TB cases notified in 2013 (**Table 5**).

Of the 213 800 TB cases with available data, 80 000 were female (37%).

Figure 15 shows rates of new and relapse TB cases per 100 000 population by age and sex in the Americas region overall and in each of its five subregions.¹³

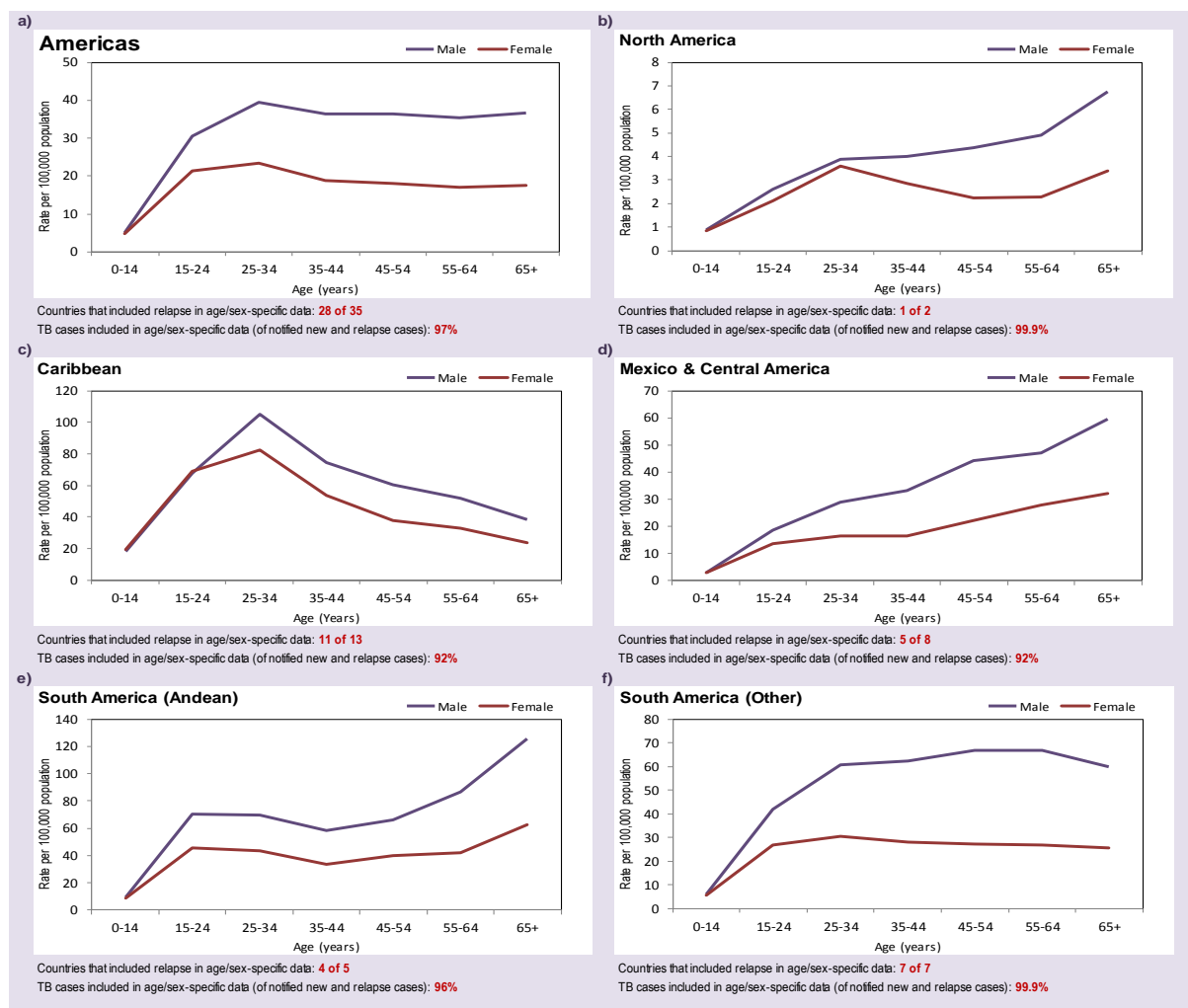
TB rates in the Americas vary considerably by age group and sex, which may be due to age- and sex-specific differences in case detection, recording, and reporting, and in TB incidence (**Figure 15a**). At the regional level, notification rates are lowest among children (0–14 years old) and highest among young adults (25–34 years old). TB rates among children are similar in males and females, but higher in young adolescent and adult males.

Distributions of age- and sex-specific TB rates at the subregional level show considerable heterogeneity (**Figure 15b–e**). In the Caribbean, notification rates are highest in young adults (25–34 years old) and decrease thereafter, a finding that may be related to the association of TB risk in this age group with the concurrent HIV epidemic. Notification rates in other subregions either show a second peak in older age (in females in North America and in both males and females in South America–Andean); a constant increase with age (in males in North America and in both males and females in Mexico and Central America); or a relatively constant level across adult age groups (in South America–Other).

Similarly, across all subregions, sex differences in notification rates appear greater in medium (and senior) adult age groups, with higher rates observed in males. TB rates in males and females appear to be more similar in children and younger adults (0–14 and 15–24 years old) (**Figure 15a–e**).

¹³ Age- and sex-specific TB rates for new and relapse cases were estimated using United Nations population estimates (by equal age groups and sex) for the year 2013. The rates represent underestimates of the true TB notification rates because not all countries included relapse cases along with new cases in age- and sex-specific case reports, and because there were notified new and relapse cases for whom age- and sex-specific information was not available. The number of countries that included relapse cases and the number of cases with age- and sex-specific information as a percentage of the total number of new and relapse cases are shown under each graph in **Figure 15a–e**.

Figure 15a-e. Age- and sex-specific rates of new and relapse TB cases, Americas region and five subregions, 2013



3.1.5. Case notification in associate member states and participating states

Eleven associate member and participating states contribute to TB case notification in the Americas (Anguilla; Aruba; Bermuda; Bonaire, Saint Eustatius and Saba; British Virgin Islands; Cayman Islands; Curaçao; Montserrat; Sint Maarten (Dutch part); Turks and Caicos Islands; and the US Virgin Islands). In 2013, a total of 26 cases were notified in these states (3.8 per 100 000 population) (**Box 6**).

Box 6. TB case notification in 11 PAHO associate member states and participating states, Americas region, 2013

Country/Territory	Population	TB cases notified	Rate per 100,000
Anguilla	14,300	2	14
Aruba	102,911	11	11
Bermuda	65,341	0	-
Bonaire, Saint Eustatius and Saba	19,130	0	-
British Virgin Islands	28,341	1	3.5
Cayman Islands	58,435	5	8.6
Curaçao	158,760	2	1.3
Montserrat	5,091	0	-
Sint Maarten (Dutch part)	45,233	3	6.6
Turks and Caicos Islands	33,098	2	6.0
US Virgin Islands	106,627	-	-
TOTAL	690,140	26	3.8

3.2. Case detection

The CDR for TB is one of the targeted indicators for global TB control (see Chapter 2, **Box 4**). It is defined as the number of new and relapse TB cases notified by the NTPs divided by the number of incident cases estimated per year.

In 2013, the estimated CDR in the Americas was 77% (uncertainty range: 67%–87%). It was highest in the North America subregion (84%; uncertainty: 77%–93%) and lowest in the South America–Andean subregion (72%; uncertainty: 64%–81%) (**Table 6**).

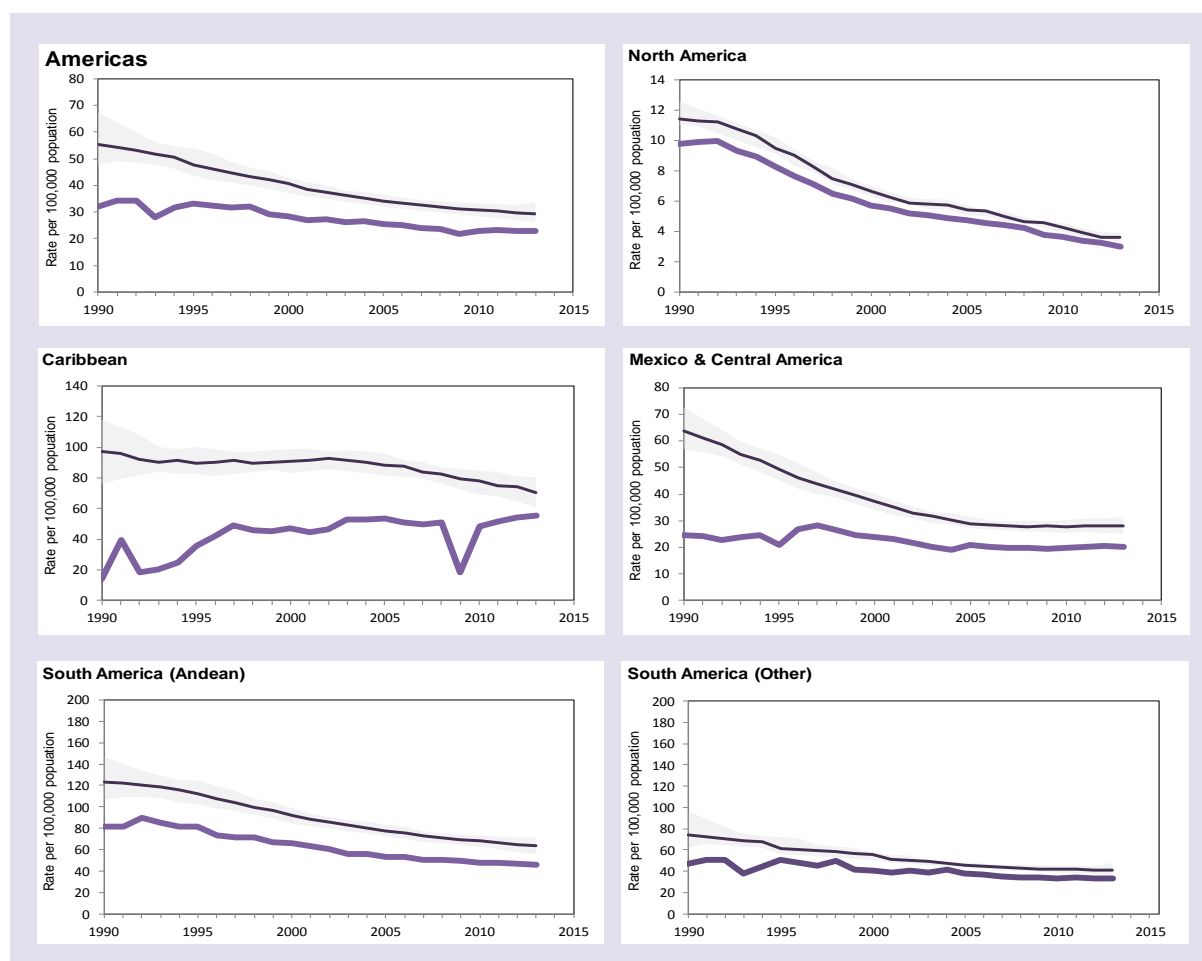
A comparison of the trends in TB case notification rate (new and relapse cases) and estimated TB incidence rate over time in the Americas and its five subregions are shown in **Figure 16**. Case detection is inversely associated with the “gap” between both rates (i.e., the greater the gap the lower the CDR). It is estimated that the CDR in the Americas has increased in the past few decades, particularly in the Caribbean, Mexico and Central America, and South America–Other subregions (**Table 6** and **Figure 16**).

Chapter 3: TB case notification and treatment outcomes 28

Table 6. TB case detection rates (and uncertainty ranges), Americas region, 1995–2013

		1995		2000		2005		2010		2013	
Region											
Americas		69	(61-76)	70	(66-77)	75	(70-80)	74	(68-80)	77	(67-87)
Subregions											
North America		87	(81-91)	86	(81-90)	87	(82-93)	85	(79-92)	84	(77-93)
Caribbean		40	(35-43)	52	(48-57)	60	(55-65)	62	(57-70)	79	(69-91)
Mexico & Central America		42	(38-46)	65	(60-70)	72	(66-77)	72	(66-79)	73	(65-81)
South America (Andean)		73	(66-80)	72	(67-79)	69	(64-74)	70	(65-76)	72	(64-81)
South America (Other)		82	(70-90)	72	(71-80)	83	(79-89)	79	(74-86)	82	(70-92)
Countries											
North America	Canada	86	(81-91)	85	(81-90)	86	(82-91)	79	(75-84)	92	(85-100)
	United States of America	87	(81-93)	87	(82-91)	86	(82-91)	87	(82-92)	86	(77-92)
Caribbean	Antigua and Barbuda			87	(77-99)	87	(77-99)	87	(77-99)	87	(77-99)
	Bahamas	70	(66-75)	110	(100-110)	87	(83-91)	65	(62-69)	89	(83-94)
	Barbados	60	(60-75)	50	(32-87)			120	(78-210)	100	(80-100)
	Cuba	76	(68-86)	82	(76-90)	74	(68-80)	79	(73-87)	72	(62-82)
	Dominica	87	(77-99)					87	(77-99)	87	(77-99)
	Dominican Republic	42	(37-47)	61	(57-66)	65	(61-70)	59	(55-64)	72	(63-80)
	Grenada	89	(77-100)	0	(0-0)			93	(78-110)		
	Haiti	32	(30-35)	45	(41-49)	57	(54-62)	63	(57-70)	80	(72-92)
	Jamaica	68	(61-76)	75	(70-81)	51	(48-55)	72	(67-78)	53	(47-59)
	Puerto Rico	87	(77-99)	87	(77-99)	87	(77-99)	87	(77-99)	87	(77-99)
	Saint Kitts and Nevis	87	(77-99)					87	(77-99)		
	Saint Lucia	87	(77-99)	87	(77-99)	87	(77-99)	87	(77-99)	87	(77-99)
	Saint Vincent and the Grenadines	45	(38-55)	57	(48-70)	26	(21-31)	56	(47-68)	11	(9.6-14)
	Trinidad and Tobago	81	(76-87)	93	(88-99)	78	(72-80)	73	(71-78)	90	(80-95)
Mexico & Central America	Belize	97	(88-100)	75	(74-81)	100	(93-100)	130	(130-140)	99	(91-110)
	Costa Rica	71	(64-78)	76	(71-83)	76	(71-83)	82	(76-90)	74	(64-83)
	El Salvador	82	(78-88)	90	(86-92)	95	(92-100)	84	(78-86)	87	(82-97)
	Guatemala	44	(39-49)	38	(36-42)	46	(43-50)	38	(35-41)	36	(32-40)
	Honduras	78	(64-93)	90	(80-110)	66	(57-77)	71	(60-85)	68	(54-89)
	Mexico	28	(25-30)	62	(58-66)	80	(74-85)	83	(78-90)	82	(73-92)
	Nicaragua	87	(81-92)	85	(81-89)	80	(75-83)	85	(80-89)	87	(81-96)
	Panama	87	(79-97)	63	(59-69)	79	(74-85)	79	(73-86)	77	(67-87)
S. America (Andean)	Bolivia (Plurinational State of)	88	(79-98)	65	(60-70)	66	(61-71)	61	(56-66)	63	(56-71)
	Colombia	56	(50-63)	68	(63-73)	62	(58-67)	71	(66-77)	75	(66-84)
	Ecuador	51	(46-57)	52	(48-56)	38	(36-41)	50	(46-54)	60	(52-66)
	Peru	79	(72-88)	80	(74-87)	81	(75-88)	80	(74-87)	79	(69-89)
South America (Other)	Venezuela (Bolivarian Republic of)	73	(65-81)	77	(72-84)	76	(70-81)	67	(62-72)	65	(58-73)
	Argentina	79	(70-88)	79	(73-85)	82	(76-88)	66	(62-72)	89	(78-98)
	Brazil	79	(71-89)	74	(69-80)	85	(79-91)	81	(75-87)	82	(72-92)
	Chile	86	(80-91)	84	(80-89)	91	(85-94)	84	(80-89)	88	(80-94)
	Guyana	46	(41-51)	55	(51-60)	73	(68-78)	82	(76-89)	78	(69-88)
	Paraguay	69	(66-72)	74	(72-77)	71	(69-74)	79	(76-81)	75	(71-78)
	Suriname			22	(19-26)	38	(32-44)	79	(69-94)	67	(54-80)
	Uruguay	82	(76-87)	85	(82-91)	88	(83-92)	83	(78-87)	87	(81-96)

Figure 16. Comparison of estimated TB incidence rate (with the thinner purple line indicating the uncertainty interval) and TB case notification rate by region and subregion, Americas region, 1990–2013



3.3. Treatment outcomes

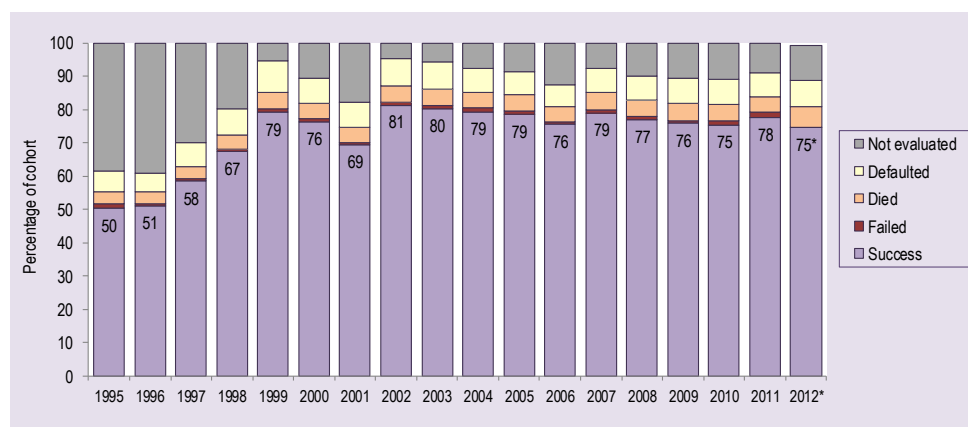
In 2012, a total of 219 900 new and relapse cases were notified in the Americas. Treatment outcomes were reported for a total of 201 800 new and relapse patients (2012 cohort), representing 92% of cases notified in 2012.¹⁴

Of TB patients included in the 2012 cohort, 150 600 (75%) were successfully treated; 1 500 (0.5%) failed their treatment; 12 900 (6.4%) died; and 15 600 (7.7%) were lost to follow-up. Treatment outcomes were not evaluated for 21 200 patients (11%).

Treatment success was slightly lower compared to previous years, given a higher proportion of patients failing treatment (6.4% versus 1.5% in the 2011 cohort), a finding that is probably associated with the inclusion of relapse cases in the 2012 cohort (Figure 17).

¹⁴ In the 2014 round of TB data collection, for the first time, the treatment cohorts reported by the countries comprised all new and relapse cases (regardless of bacteriological confirmation). In the Americas, nine of the countries included in this analysis did not include relapse cases. Those countries are marked with an asterisk in Figures 19a–b.

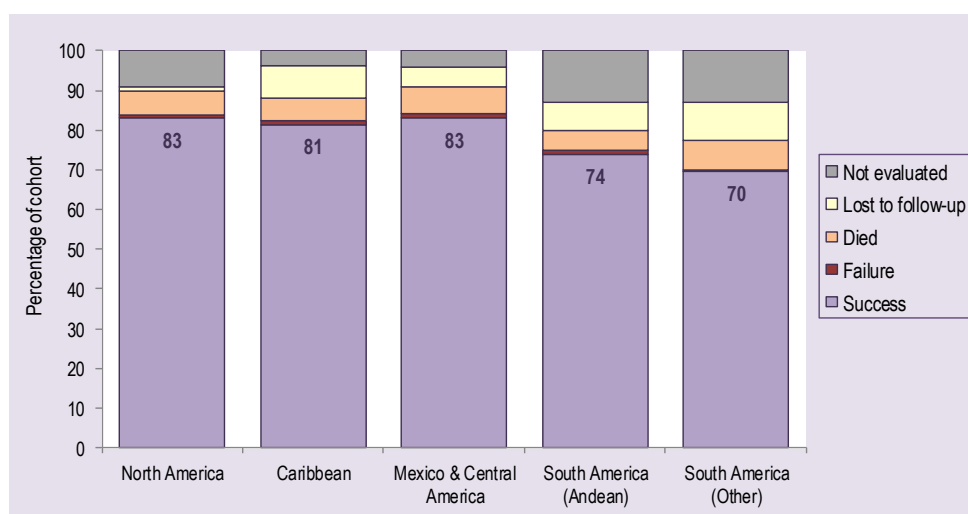
Figure 17. Treatment outcomes in new TB cases, by annual cohort, Americas region, 1995–2012



* The 2012 treatment cohort included relapse cases as well as new cases (versus previous year cohorts that only included new cases).

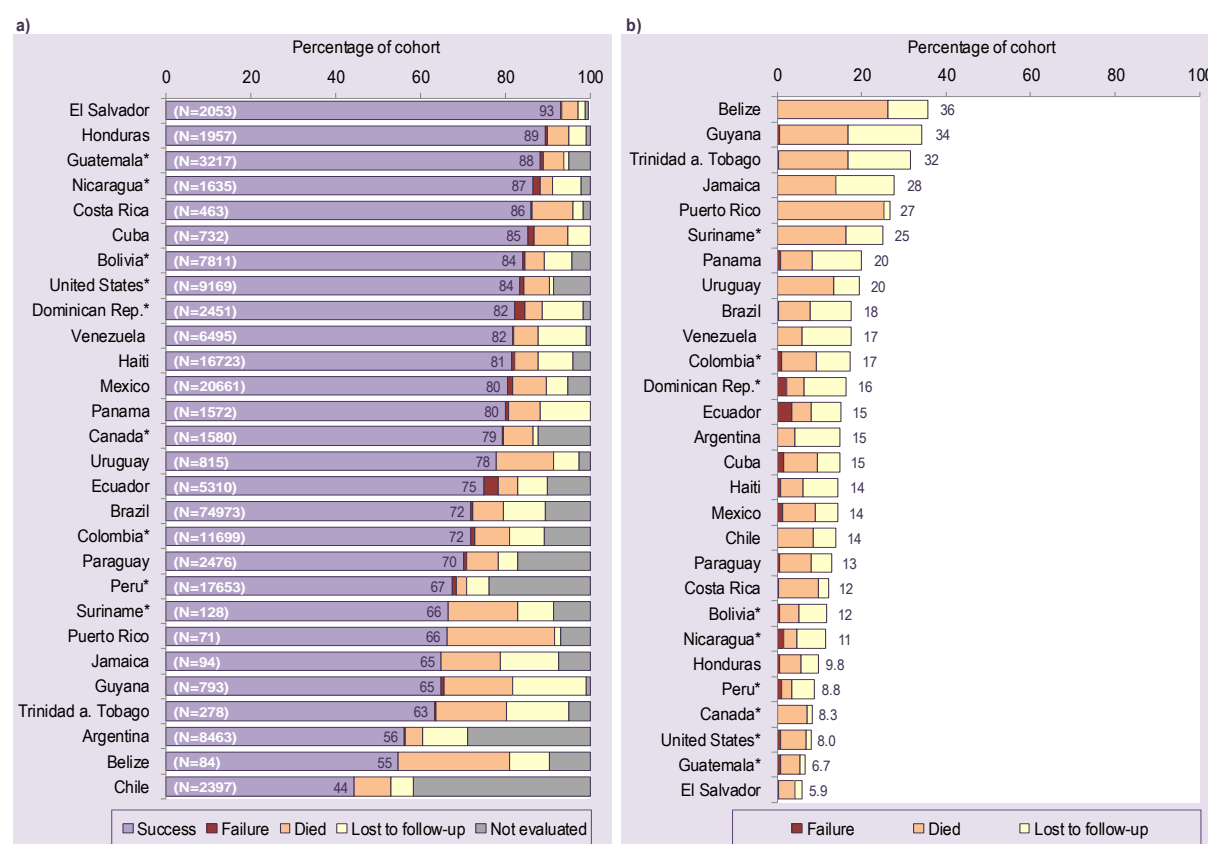
At the subregional level, treatment success varied between 70% (in South America–Other) and 83% (Mexico and Central America) (**Figure 18**).

Figure 18. Treatment outcomes for new and relapses cases in five subregions, annual cohort, Americas region, 2012



Among the 28 countries with at least 50 TB patients treated in the 2012 cohort, treatment success rates for new and relapse rates varied between 44% and 93% (**Figure 19a**). Eight of those countries reported unfavorable treatment outcomes for 20% of patients or more (**Figure 19b**). The proportion of patients who died during TB treatment was particularly high in Belize (22 of 84 patients or 26%) and Puerto Rico (18 of 71 or 25%).

Figure 19a–b. Treatment outcomes among new and relapse cases: (a) all (white numbers in brackets show cohort size) and (b) proportions with unfavorable outcomes (failure, died, default), annual cohort, Americas region, 2012^a



*Country reported new cases only.

^a Countries with a cohort size < 50 TB cases not included.

Treatment outcomes in re-treatment for TB patients other than relapse were less favorable compared to those among new and relapse cases. Among the 25 countries with at least 50 TB patients treated in the 2012 cohort, treatment success rates for re-treatment cases other than relapse varied between 36% and 79% (Figure 20).

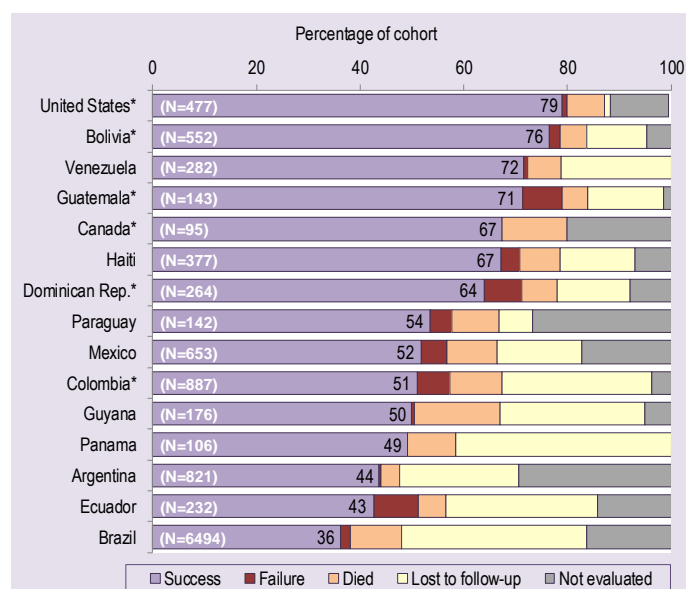
Treatment outcomes in HIV-positive TB patients were less favorable compared to HIV-negative TB patients. In countries with available data,¹⁵ treatment success in HIV-positive TB patients (new and relapse) was 54% compared to 75% in HIV-negative patients (Figure 21).

Treatment outcomes for MDR-TB patients are shown in Chapter 5.

¹⁵ Data on treatment results by HIV status (2012 cohort) were reported by NTPs from 20 of the 36 countries analyzed in this report, for a total of 134 400 patients (Figure 21).

Chapter 3: TB case notification and treatment outcomes 32

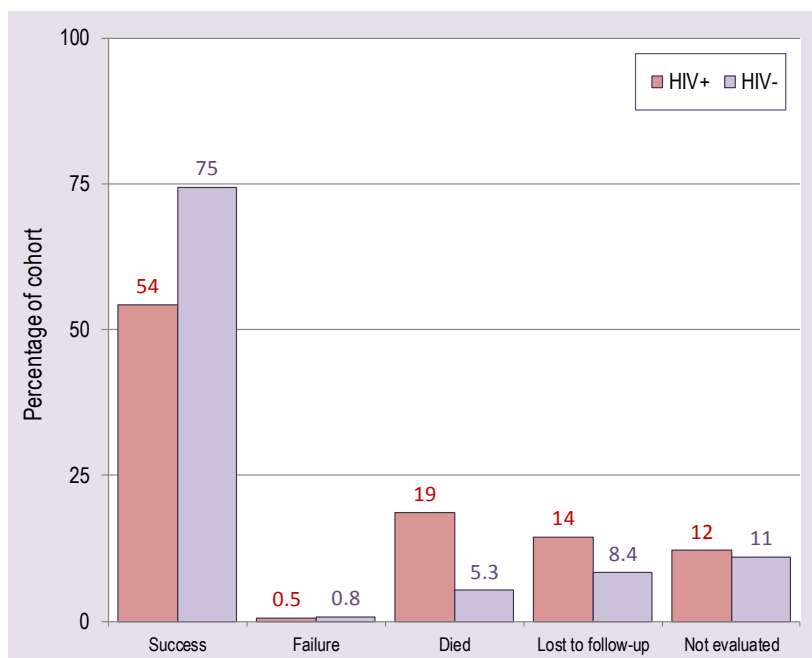
Figure 20. Treatment outcomes among re-treatment cases (excluding relapse, unless indicated otherwise), annual cohort, Americas region, 2012^a



*Country included relapse cases in the cohort.

^a White numbers in brackets show cohort size. Countries with a cohort size < 50 TB cases not included; no data available for Nicaragua and Peru.

Figure 21. Treatment outcomes by HIV status (new and relapse cases), annual cohort, Americas region, 2012^a



^a 20 countries reporting data on treatment outcome in HIV-positive and -negative patients.

Chapter 4

TB diagnostics and laboratory strengthening

Strengthening laboratory capacity and improving access to rapid diagnostics to ensure timely confirmation of TB and determination of drug resistance remain a priority for TB control in the Americas.

4.1. Strengthening of laboratory capacity

Regional targets for strengthening laboratory capacity throughout the Americas have been agreed upon by PAHO member states (**Box 7**). Within the network of the Global Laboratory Initiative (GLI),¹⁶ supranational reference laboratories in Atlanta and Boston (United States), Buenos Aires (Argentina), Guadeloupe (France), Mexico City (Mexico), and Santiago (Chile) provide EQA to laboratories in the Americas. National reference laboratories for TB have been established in 31 of the 36 countries included in this report.

Box 7

Targets for TB laboratory capacity in the Americas:

At least 1 laboratory providing smear microscopy per 50,000 to 100,000 population

At least 1 laboratory providing culture testing per 1,000,000 population

At least 1 laboratory providing DST per 5,000,000 population

A total of 23 countries reported data for laboratory capacity and EQA in 2013. These countries accounted for 95% of the estimated incident TB cases in the Americas.

Laboratory capacity for smear microscopy was below the regional target in six of the 23 countries and below target for culture testing in nine. Capacity for DST was below target in 14 of the 23 countries. EQA for smear microscopy laboratories was not available in one country and only partly established in 12 of the 23 countries. Capacity for DST was below target in 14 of the 23 countries. EQA for DST was only partly established in at least five of the 23 countries (**Table 7**).

4.2. Rollout of rapid TB diagnostics

Two WHO-endorsed rapid tests for the diagnosis of TB and determination of drug resistance, the GeneXpert MTB/RIF (Xpert MTB/RIF®, Cepheid Inc., Sunnyvale, California, United States), and the LPA (GenoType MTBDR_{plus}®, Hain Lifescience, Nehren, Germany), are currently being rolled out globally and in the Americas. Instruments and test cartridges/kits for both tests are being offered at concessional prices via the Foundation for Innovative New Diagnostics (FIND) (Geneva, Switzerland).¹⁷

In the Americas, 14 of the 36 countries have procured and used GeneXpert for the diagnosis of TB and the determination of DR-TB at concessional prices (**Box 8**). By the third quarter of 2014, a total of 993 GeneXpert modules and 434 400 cartridges had been procured at concessional prices by those countries. Most were procured by Brazil (which received 720 modules and 333 130 cartridges).

The LPA has been implemented at concessional prices in nine of the 36 countries.

Two countries, Haiti and Peru, participate in the EXPAND-TB project.¹⁸ The project provides technical assistance for laboratory strengthening; training; equipment and reagents (liquid

¹⁶ An initiative of the WHO/Stop TB Partnership (<http://www.stoptb.org/wg/gli>)

¹⁷ See: <http://www.finddiagnostics.org>

¹⁸ EXPAND-TB was initiated in 2009 to accelerate access to diagnostics for patients at risk of MDR-TB in 27 countries. The project is funded by UNITAID (Geneva, Switzerland) and was initiated collaboratively by WHO, the Stop TB Partnership's GLI, the Global Drug Facility (GDF), and FIND. For more information, see: http://www.finddiagnostics.org/programs/scaling_up/unitaid_expand_tb/about_expandtb.html

Chapter 4: TB diagnostics and laboratory strengthening 35

culture and DST with LPA); and on-site monitoring for the diagnosis of DR-TB in both countries. By the end of 2013, the cumulative total number of MDR-TB cases detected under the EXPAND-TB project was 365 in Haiti (project target: 476) and 1 015 in Peru (project target: 1 800).

Table 7. Laboratory capacity for smear microscopy, TB culture, and DST, Americas region, 2013^a

		Top 10 inc. TB cases	Top 10 MDR-TB cases	Microscopy			Culture		DST		
				Laboratories Number of	Laboratories per 100,000 population	Percentage laboratories with EQA	Laboratories Number of	Laboratories per 1 million population	Laboratories Number of	Laboratories per 5 million population	Percentage laboratories with EQA
North America	Canada										
	United States of America	x									
Caribbean	Antigua and Barbuda										
	Bahamas										
	Barbados										
	Cuba										
	Dominica										
	Dominican Republic		x	228	2.2	100%	11	1.1	1	0.5	100%
	Grenada										
	Haiti	x	x	223	2.2	68%	2	0.2	2	1.0	50%
	Jamaica			3	0.1	33%	1	0.4	0	0	
	Puerto Rico										
	Saint Kitts and Nevis										
	Saint Lucia										
	Saint Vincent and the Grenadines										
	Trinidad and Tobago										
Mexico & Central America	Belize			2	0.6	0%	0	0	0	0	
	Costa Rica			108	2.3	93%	20	4	1	1.1	100%
	El Salvador			204	3.3	100%	22	4	1	0.8	100%
	Guatemala	x	x	267	1.8	54%	12	0.8	3	1.0	33%
	Honduras			165	2.1	55%	5	0.6	1	0.6	100%
	Mexico	x	x	718	0.6	82%	64	0.5	16	0.7	50%
	Nicaragua			193	3.3	87%	3	0.5	1	0.8	100%
	Panama			54	1.4	100%	6	1.6	1	1.3	100%
S. America (Andean)	Bolivia (Plurinational State of)	x	x	531	5.1	92%	49	5	1	0.5	100%
	Colombia	x	x	3,659	7.8	100%	1,256	27	5	0.5	100%
	Ecuador		x	325	2.1	100%	17	1.1	1	0.3	100%
	Peru	x	x	1,527	5.2		66	2	7	1.2	
	Venezuela (Bolivarian Republic of)	x		553	1.9	40%	22	0.7	1	0.2	100%
South America (Other)	Argentina	x	x	708	1.7	27%	103	3	17	2.1	47%
	Brazil	x	x	4,028	2.0	33%	306	1.6	45	1.1	67%
	Chile			156	0.9		40	2	1	0.3	100%
	Guyana			20	2.5	100%	1	1.3	1	6.3	100%
	Paraguay			115	1.7	83%	9	1.4	1	0.8	100%
	Suriname			3	0.6	100%	1	1.9	0	0	
	Uruguay			1	0.03	100%	1	0.3	1	1.5	100%

^a Empty cells indicate that no data were made available; laboratory capacity below regional targets (listed in Box 7) are highlighted in red.

Box 8

WHO monitoring of Xpert MTB/RIF roll-out: Orders of GeneXperts and Xpert MTB/RIF cartridges^a

GeneXpert procured:	No GeneXpert yet:	Not eligible for preferential pricing:
Argentina	Bolivia	Bahamas
Chile	Dominica	Barbados
Colombia	Grenada	Brazil
Costa Rica	Honduras	Canada
Cuba	Jamaica	Puerto Rico
Dominican Republic	Nicaragua	United States
Ecuador	Panama	
El Salvador	Paraguay	
Guatemala	Peru	
Guyana	Saint Kitts and Nevis	
Haiti	Saint Lucia	
Mexico	Saint Vincent and the Grenadines	
Uruguay	Suriname	
Venezuela	Trinidad and Tobago	

^aData source: WHO / FIND ; more information available at: <http://www.who.int/tb/laboratory/mtbrifrollout/en/>

Chapter 5

Management of drug-resistant TB

Currently, an estimated 7 000 people per year are expected to develop MDR-TB in the Americas (see [Chapter 1](#)). To cure them and reduce the spread of DR-TB, appropriate case detection through DST for new and re-treatment patients and provision of effective treatment are essential. This chapter provides an overview of DST coverage, MDR-TB case detection, and treatment in the Americas.

5.1. Coverage of DST

The diagnosis of DR-TB requires that patients be tested for susceptibility to anti-TB drugs using either conventional DST or rapid molecular diagnostics. The following figures for DST coverage refer to TB cases tested at any time during their treatment for rifampicin resistance—with or without isoniazid—using conventional or molecular diagnostics.

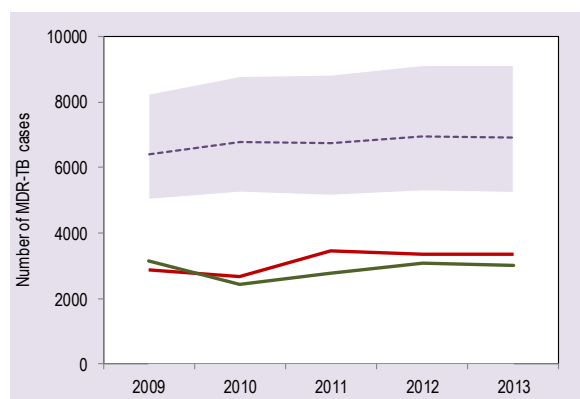
In 2013, about 29 800 new cases and 6 500 re-treatment cases had an available DST result. Notification data combined with data from drug-resistance surveillance suggest that in 2013, 23% of laboratory-confirmed new PTB cases and 25% of re-treatment cases had an available DST result. Data submitted by the NTPs suggest that coverage varies substantially across countries. Overall it is low, particularly in the South America—Other subregion ([Table 8](#)).

5.2. MDR-TB case detection and treatment

In 2013, a total of 2 962 cases of MDR-TB and 403 cases of RR-TB¹⁹ were detected in the Americas. The total number of MDR-TB/RR-TB cases detected represented 49% of estimated MDR-TB cases in the Americas ([Table 9](#)).

Treatment for MDR-TB was provided for 3 025 (90%) of MDR-TB/RR-TB cases detected. [Figure 22](#) shows the total numbers of MDR-TB cases estimated versus MDR-TB cases diagnosed and treated in the Americas over time. Data at the subregional and country level underscore the need to strengthen MDR case detection and scale up MDR-TB treatment ([Tables 9–10](#)), particularly in countries with high estimated numbers of MDR-TB cases ([Figure 23](#)).

Figure 22. MDR-TB cases estimated (dashed line with shaded uncertainty interval) versus detected (red line) and treated (green line), Americas region, 2009–2013



¹⁹ Defined as TB that is resistant to rifampicin but is not (or is not known to be) resistant to isoniazid (as opposed to MDR-TB, which is resistant to both drugs). WHO recommends that all patients with RR-TB be treated with a full MDR-TB regimen. For surveillance purposes, the proportion of MDR-TB/RR-TB cases detected is compared to the number of patients for whom MDR-TB treatment was provided, and to the best estimate of MDR-TB cases that occurred among notified TB cases.

Table 8. DST coverage among TB and MDR-TB cases, Americas region, 2013

		New bacteriologically confirmed cases		Re-treatment cases		Unknown ¹⁾	MDR-TB cases	
Region		with DST result ²⁾	% of total	with DST result ²⁾	% of total	with DST result ²⁾	with DST result ³⁾	% of total
Americas		29,776	23	6,468	25	6,556	1,378	47
Subregions								
North America		7,963	115	361	65	115	78	71
Caribbean		482	3.6	365	32	150	15	6.9
Mexico & Central America		554	2.5	675	26	250	4	1.6
South America (Andean)		18,455	50	4,009	62	4,964	1,098	68
South America (Other)		2,322	4.6	1,058	7.0	1,077	183	24
Countries								
North America	Canada	1,228	132	75	79	27	15	94
	United States of America	6,735	113	286	63	88	63	67
Caribbean	Antigua and Barbuda	0	0	0	0	0		
	Bahamas	16	62	3	100	0		
	Barbados	0	0			0		
	Cuba	274	57	60	79	5	3	75
	Dominica	1	100	0		0		
	Dominican Republic	60	2.2	184	33	144	10	9.8
	Grenada			0	0	0		
	Haiti	0	0	101	21	0	0	0
	Jamaica	59	100	0	0	0	1	100
	Puerto Rico	42	98			0	1	100
	Saint Kitts and Nevis					0		
	Saint Lucia	5	63			0		
	Saint Vincent and the Grenadines	3	100			0		
	Trinidad and Tobago	22	16	17	46	1	0	0
Mexico & Central America	Belize	6	8.0	8	-	0	0	0
	Costa Rica	1	0.3	0	0	0	0	0
	El Salvador	205	14	28	22	0	0	0
	Guatemala	5	0.2	126	54	131	0	0
	Honduras	133	6.9	152	68	81	0	0
	Mexico	33	0.2	188	12	3	4	2.6
	Nicaragua	9	0.6	75	38	0	0	0
	Panama	162	23	98	48	35	0	0
S. America (Andean)	Bolivia (Plurinational State of)	329	6.1	395	49	0	(no data)	
	Colombia	4,758	68	188	22	1,641	137	99
	Ecuador	19	0.5	70	13	6	94	99
	Peru	13,601	78	3,541	100	3,317	844	66
	Venezuela (Bolivarian Republic of)	77	2.2	210	32	0	23	100
South America (Other)	Argentina	1,429	27	728	54	1,000	75	88
	Brazil	670	1.6	217	1.7	0	84	13
	Chile	179	13	171	72	77	18	95
	Guyana	3	1.0	5	3.0	0	1	100
	Paraguay	267	19	117	33	0	5	100
	Suriname	76	70	2	22	0		
	Uruguay	371	68	40	57	0	0	0

Blank cells indicate no cases in this category.

¹⁾ Unknown: DST results for TB cases with unknown previous TB treatment history

²⁾ DST is for rifampicin resistance only or for both rifampicin and isoniazid resistance.

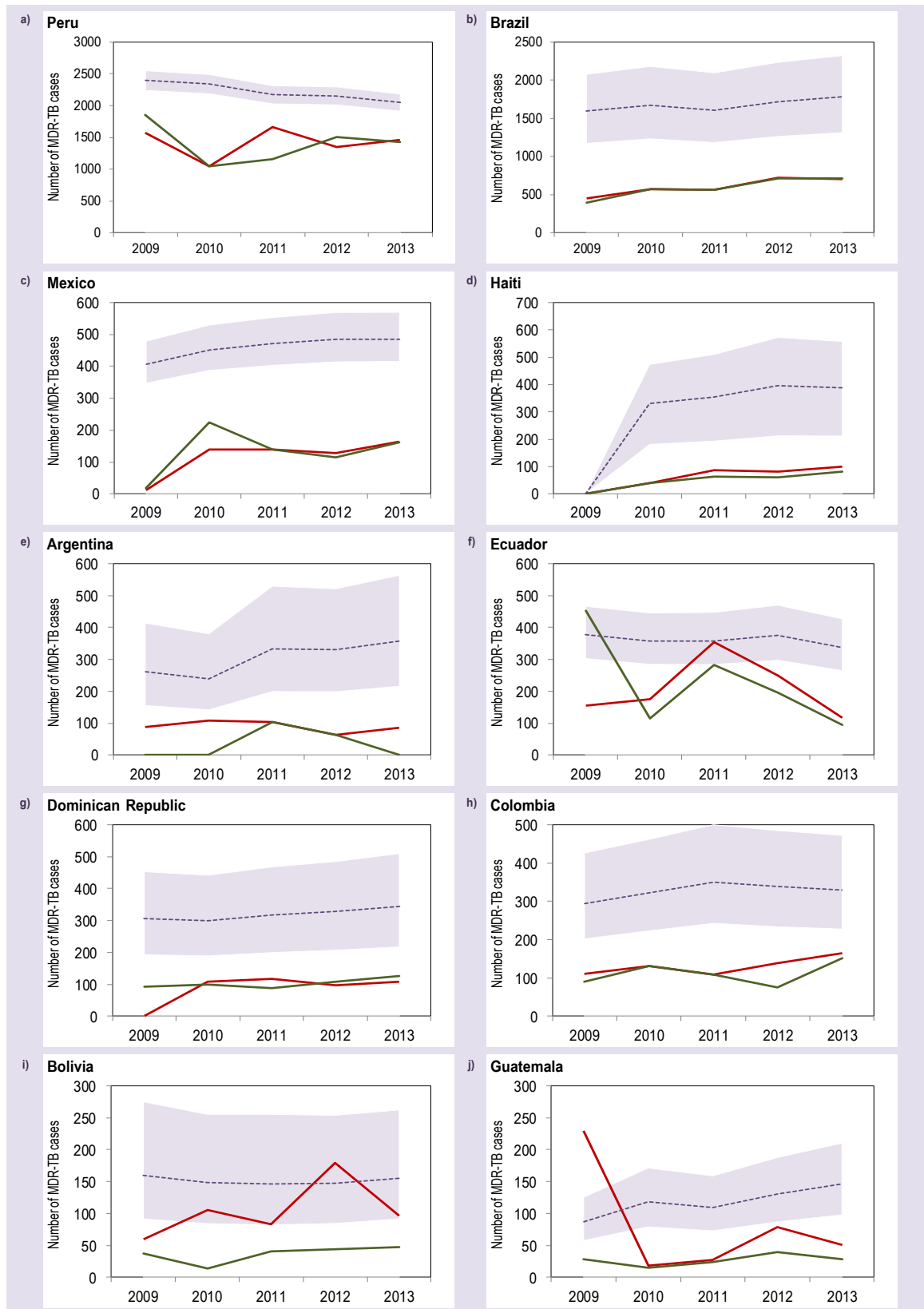
³⁾ DST is for a fluoroquinolone and a second-line injectable drug.

Table 9. MDR-TB cases estimated, diagnosed, and treated, Americas region, 2013

Region		MDR-TB cases estimated ¹⁾		MDR/RR-TB diagnosed		Enrolled on MDR-TB treatment	
		Best estimate	Uncertainty	Number	% of estimated	Number	% of diagnosed
Americas		6,927	(5,243 - 9,123)	3,366	49	3,026	90
Subregions							
North America		111	(82 - 167)	124	111	105	85
Caribbean		753	(437 - 1,131)	236	31	226	96
Mexico & Central America		817	(593 - 1,141)	290	35	219	76
South America (Andean)		2,988	(2,554 - 3,553)	1,881	63	1,738	92
South America (Other)		2,257	(1,578 - 3,132)	835	37	738	88
Countries							
North America	Canada	7	(2 - 19)	17	234	16	94
	United States of America	104	(79 - 148)	107	103	89	83
Caribbean	Antigua and Barbuda	0		0		0	
	Bahamas	1	(0 - 8)	2	180	0	
	Barbados	0		0		0	
	Cuba	7	(1 - 26)	9	125	3	33
	Dominica	0		1		1	
	Dominican Republic	345	(217 - 510)	108	31	126	117
	Grenada	0		0		0	
	Haiti	388	(212 - 558)	101	26	81	80
	Jamaica	2	(0 - 11)	1	47	0	
	Puerto Rico	1	(0 - 6)	1	87	1	100
	Saint Kitts and Nevis	0		0		0	
	Saint Lucia	0		0		0	
	Saint Vincent and the Grenadines	0		0		0	
	Trinidad and Tobago	9	(6 - 11)	13	151	14	108
Mexico & Central America	Belize	6	(2 - 7)	3	54	1	33
	Costa Rica	6	(2 - 19)	4	63	1	25
	El Salvador	19	(6 - 46)	14	73	4	29
	Guatemala	146	(98 - 210)	51	35	28	55
	Honduras	69	(32 - 129)	6	8.7	4	67
	Mexico	485	(416 - 570)	163	34	162	99
	Nicaragua	36	(15 - 87)	20	55	15	75
	Panama	49	(23 - 74)	29	59	4	14
S. America (Andean)	Bolivia (Plurinational State of)	156	(92 - 262)	96	62	47	49
	Colombia	329	(228 - 472)	165	50	152	92
	Ecuador	338	(265 - 427)	117	35	95	81
	Peru	2,049	(1,915 - 2,183)	1,462	71	1,425	97
	Venezuela (Bolivarian Republic of)	116	(54 - 208)	41	35	19	46
South America (Other)	Argentina	357	(216 - 564)	85	24	0	
	Brazil	1,781	(1,315 - 2,322)	706	40	717	102
	Chile	21	(9 - 43)	25	119	14	56
	Guyana	36	(15 - 54)	3	8.4	1	33
	Paraguay	58	(21 - 129)	8	14	5	63
	Suriname	4	(2 - 5)	4	107	0	
	Uruguay	2	(0 - 15)	4	249	1	25

¹⁾ Notified cases of MDR/RR-TB in 2013 as a percentage of the best estimate of MDR-TB cases among all cases of pulmonary TB in the same year. The percentage may exceed 100% if estimates of the number of MDR-TB cases are too conservative and if linkage between the clinical and laboratory registers is inadequate.

Figure 23. MDR-TB cases estimated (dashed line with shaded uncertainty interval) versus detected (red line) and treated (green line) in the 10 countries with the highest estimated burden of MDR-TB, Americas region, 2009–2013^a



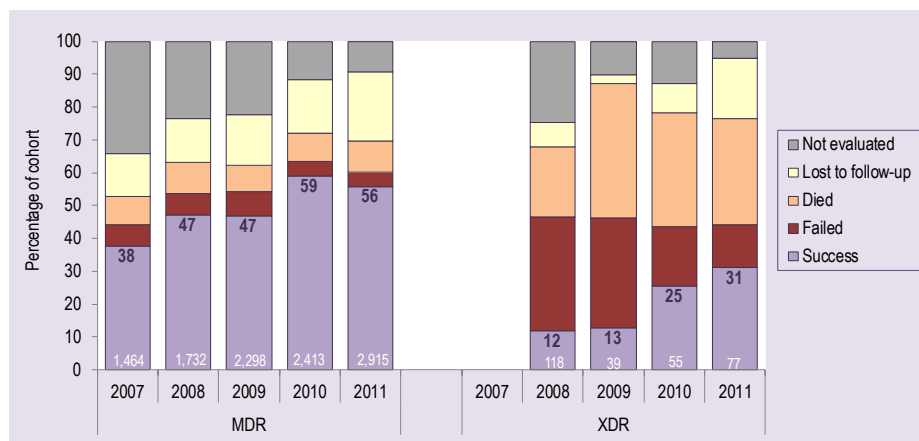
^a The numbers of MDR-TB cases for 2009–2013 were estimated by applying the most recent estimates for the proportion of MDR-TB cases to the total number of PTB cases notified in the same year. The annual trends for estimated MDR-TB cases shown in the figure should be interpreted with caution as they are due to annual changes in the number of notified new and re-treatment PTB cases and do not take into

account annual changes in the relative burden of MDR-TB. Detected cases include confirmed MDR-TB cases as well as confirmed cases of rifampicin resistance (without confirmed isoniazid resistance).

5.2. MDR-TB treatment outcomes

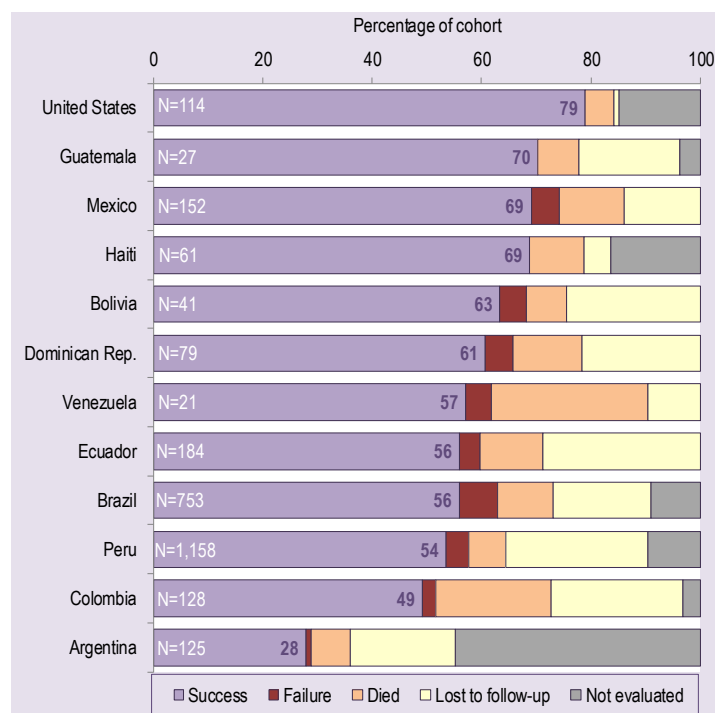
Of the 2 015 patients treated in the 2011 cohort of MDR-TB patients in the Americas, 1 629 (56%) were successfully treated, 127 (4.4%) failed treatment, 279 (9.6%) died, and 609 (20.9%) were lost to follow-up. Treatment success rates among MDR-TB and extensively drug-resistant TB (XDR-TB) patients have been increasing in the Americas in the past few years (**Figure 24**). Among the 12 countries with at least 20 MDR-TB patients treated, treatment success rates ranged from 28% to 79%. Several countries reported high rates of patients lost to follow-up during MDR-TB treatment (**Figure 25**).

Figure 24. Treatment outcomes for MDR-TB and XDR-TB cases, by annual cohort, Americas region, 2007–2011^a



^a White numbers at the base of the bars show cohort size.

Figure 25. Treatment outcomes for MDR-TB cases, annual cohort, Americas region, 2011^a



^a Countries with a cohort size ≥ 20 MDR-TB patients only; white numbers show cohort size.

Chapter 6

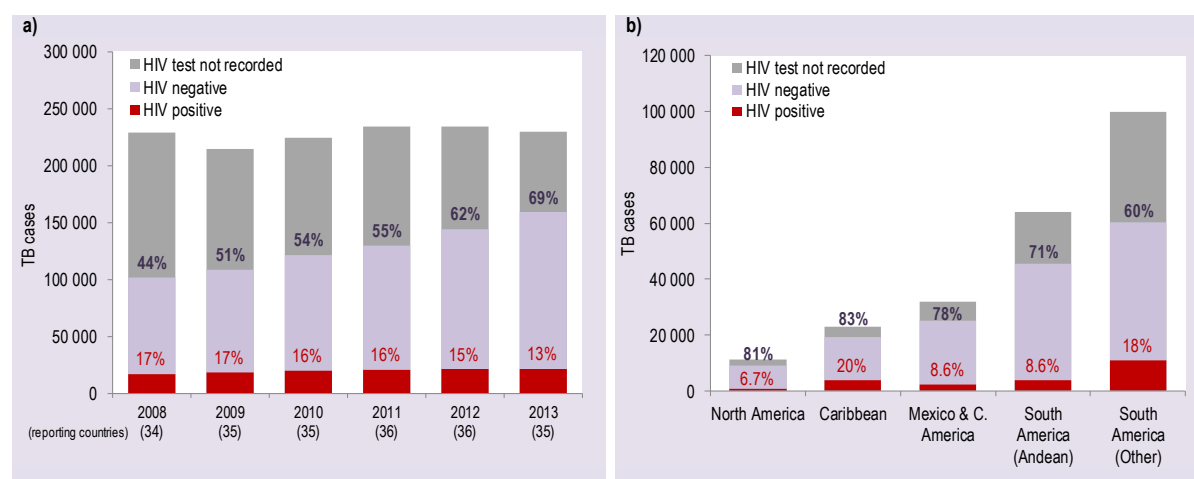
TB/HIV collaborative activities

By the end of 2012, 2.4–4.3 million people²⁰ were estimated to be living with HIV in the Americas. WHO estimates that in the following year, 31 800 people living with HIV developed TB.²¹ The Regional Plan for Tuberculosis Control²² aims to strengthen collaborative activities between TB and HIV programs in the Americas. It is recommended that all TB patients get tested or know their HIV status. CPT and ART should be initiated or continued in HIV-positive TB patients. All people living with HIV should be screened for TB, and those without active TB should receive IPT. To meet these recommendations, strengthening of collaboration between NTPs and HIV/AIDS programs is essential. This chapter provides an overview of 1) HIV testing and the provision of CPT and ART for HIV-positive TB patients and 2) intensified TB case-finding (TB screening) and IPT among people living with HIV in the Americas.

6.1. Coverage of HIV testing among TB patients

WHO recommends that routine HIV testing be offered to all patients with presumptive and diagnosed TB and to partners of known HIV-positive TB patients.²³ In 2013, about 161 000 TB cases had an HIV test result recorded (or knew their status)—69% of all TB cases notified in the Americas (**Table 10**). Coverage of HIV test results among notified TB cases has been increasing in the past few years (**Figure 26a**), most notably in the countries with the highest estimated burden of TB/HIV (**Figure 27**). At the subregional level, in 2013, the HIV test coverage was lowest in South America–Other (60%) and highest in the Caribbean (83%) (**Figure 26b**).

Figure 26a–b. HIV test coverage and status among TB cases (a) region-wide (2008–2013) and (b) in five WHO subregions (2013), Americas region^a



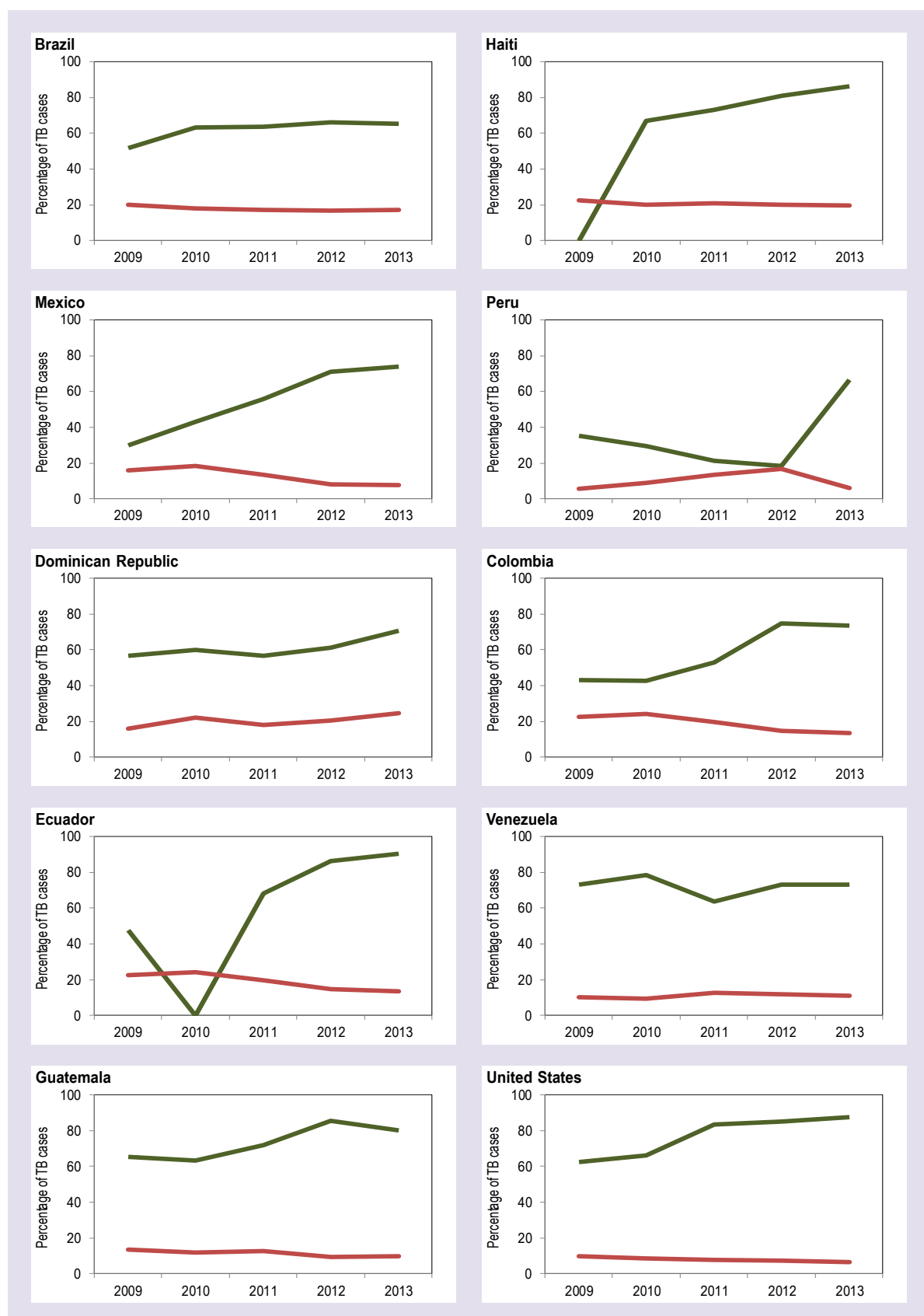
²⁰ Lower and upper estimates for people living with HIV (all sexes, all ages) were available for 29 of the 36 countries in the Americas, representing 99.6% of the regional population in 2012 (UNAIDS). For more information see <http://www.unaids.org/>

²¹ WHO estimate for incident TB cases among people living with HIV in 29 of the 36 countries in the Americas (uncertainty interval: 29 700–34 600 people).

²² PAHO. Regional Plan for Tuberculosis control, 2006–2015. Washington: PAHO; 2006.

²³ WHO. WHO policy on collaborative TB/HIV activities: guidelines for national programmes and other stakeholders. Geneva: WHO; 2012. (WHO/HTM/TB/2012.1). Available at: http://whqlibdoc.who.int/publications/2012/9789241503006_eng.pdf

Figure 27. Percentage of cases with recorded HIV status of all notified TB cases (green line) and percentage HIV-positive of all TB cases with known status (red line) in the 10 countries with the highest number of estimated incident HIV-positive TB cases, Americas region, 2009–2013



6.2. HIV coinfection among TB patients with HIV test results

In 2013, about 21 400 TB patients in the Americas were HIV-positive, 13% of all patients with a test result recorded (or with known HIV status). The percentage of HIV-positive TB patients was highest in South America–Other and in the Caribbean. It varied considerably across subregions and countries (**Figure 26b, Table 10**). At the regional level, the percentage HIV-positive has slightly declined over the past few years (**Figure 26a**). A comparison of test coverage and percentage HIV-positive in the 10 countries with the highest estimated burden of TB/HIV in the Americas suggests that the proportion of HIV-positive test results has been declining along with an increase in test coverage in most countries (**Figure 27**). This may be due to a relative decrease in positive test results as countries move from testing of TB patients at clinical suspicion of HIV toward universal testing of patients. The inverse relationship between test coverage and HIV-positive test results has not been observed in the Dominican Republic, where the percentage of test coverage rose from 57% to 71% and the percentage HIV-positive from 16% to 25% between 2009 and 2013 (**Figure 27**).

6.3. ART and CPT for HIV-positive TB patients

Both ART and CPT are important interventions that can substantially reduce morbidity and mortality in TB patients living with HIV. WHO recommends that ART and CPT be continued, or initiated as soon as possible, in all HIV-positive individuals diagnosed with TB.

Twenty-four countries reported data on the provision of ART and CPT for HIV-positive TB patients in 2013. Among them, the proportion of HIV-positive TB patients on ART varied from 5.4% to 100% and the proportion for CPT varied from 0% to 100% (**Table 10**).

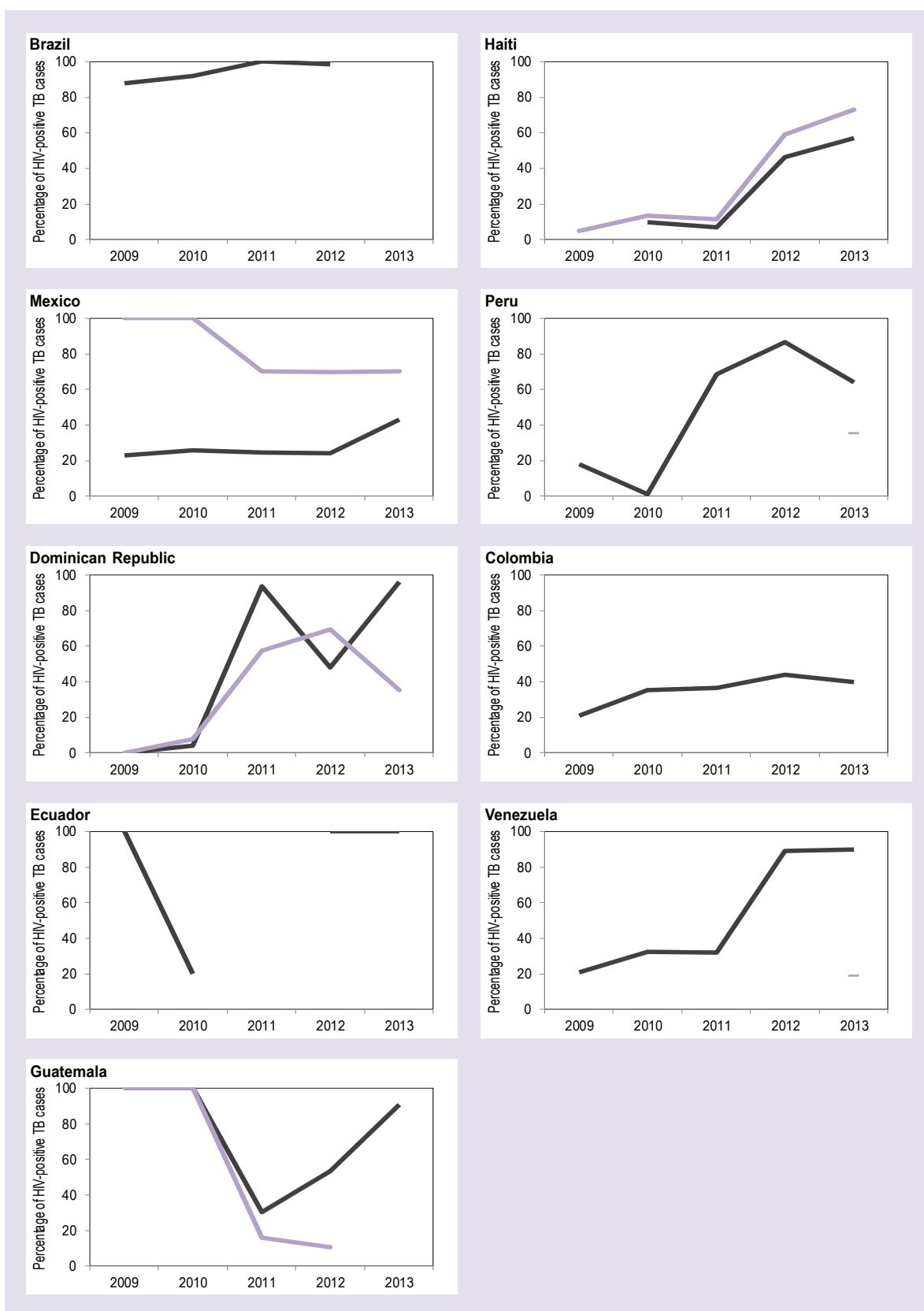
Although data reported between 2009 and 2013 suggest an increase in CPT and ART coverage in some of the countries with the highest estimated burden of TB/HIV (**Figure 28**), trends in most countries are currently unclear. Better reporting will be needed in forthcoming years to monitor whether HIV-positive TB patients benefit from a scale-up in CPT and ART in the Americas.

6.4. Intensified TB case-finding and IPT among people living with HIV

WHO recommends systematic screening for TB (“intensified TB case-finding”) among people living with HIV, along with the provision of ART, IPT, and infection control.

In 2013, more countries than in previous years (21 of the 36) provided data on TB screening and IPT among people living with HIV (**Table 11**). The numbers from countries that provided data for multiple years suggest that there is a considerable increase in the number of HIV-positive people screened for TB and on IPT in the Americas. For example, in Nicaragua, the number of people screened for TB increased from 60 in 2009 to 1 332 in 2013. In Haiti, the number of people living with HIV in whom IPT was initiated rose from 4 112 in 2010 to 38 594 in 2013. Better reporting is needed to monitor trends for the scale-up of TB screening and IPT in the Americas in forthcoming years.

Figure 28. Coverage of ART (black lines) and CPT (light purple lines) among HIV-positive patients notified in nine of the top 10 countries^a by estimated incidence of HIV-positive TB cases, Americas region, 2009–2013



^a No data were available for the United States.

Chapter 7

Childhood TB

There is increasing attention to the particular challenge of diagnosing TB in children, in the Americas, and globally. This chapter provides an overview of TB case notification in children in relation to the estimated burden of childhood TB in the Americas.

7.1. Estimating the regional burden of TB in children

There is considerable uncertainty about the estimates for the burden of childhood TB globally. WHO has therefore not published regional estimates for childhood TB, and further consultation about the estimates is ongoing.

7.2. Childhood TB case notification

In the Americas, 11 379 new and relapse TB cases among children (0–14 years old) were notified in 2013, equivalent to 4.9 per 100 000 children. **Table 12** provides an overview of notified TB cases among children in the region.

Children accounted for 5.3% of all notified TB cases in 2013. The proportion of childhood TB varied from 0% to 11% across countries (**Table 12** and **Figure 29**).

Low numbers of children among notified TB cases may be mostly due to insufficient case detection among infants and preschool children.²⁴ In the Americas, TB case notification rate-ratios for children 0–4 years old versus 5–14 years old²⁵ varied across countries from 0.30 to 3.3 (**Figure 30**). **Figure 31** shows that in some countries with a very low proportion of children among TB cases notified, this rate-ratio was very low, which may indicate that under-diagnosis of TB occurred more frequently in children less than 5 years old. Continued efforts are therefore needed to increase detection of TB in children, particularly among the very young.

²⁴ Children < 5 years old are known to be at highest risk of disease progression following primary infection. (See: Marais BJ, Gie RP, Schaaf HS, Beyers N, Donald PR, Starke JR Childhood pulmonary tuberculosis: old wisdom and new challenges. *Am J Respir Crit Care Med*. 2006;173(10):1078–90.)

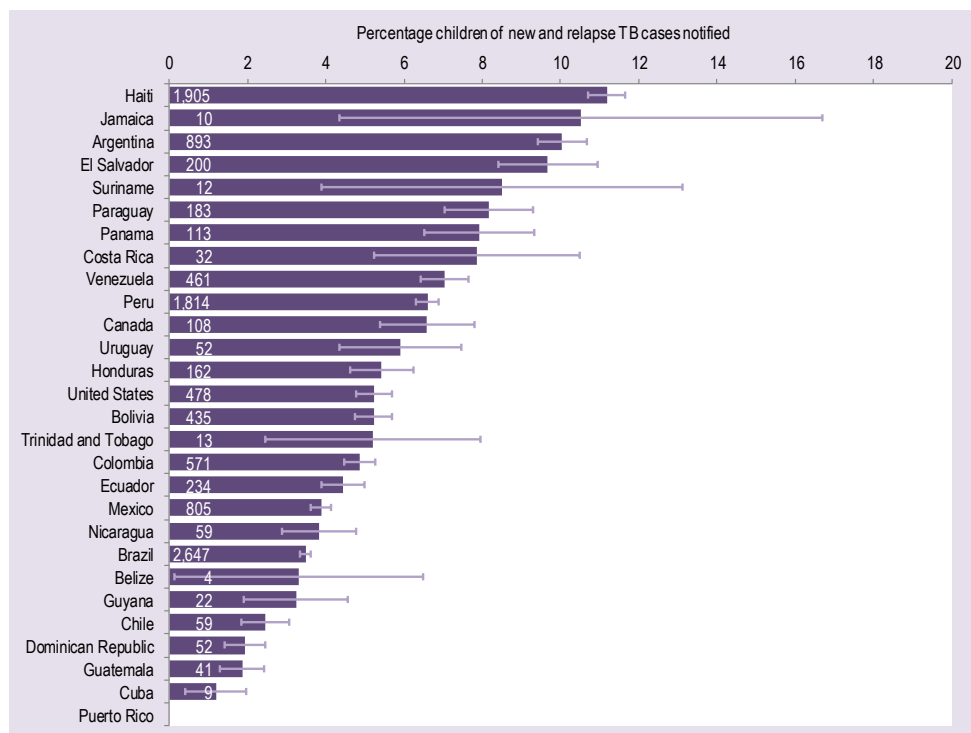
²⁵ The rate-ratio is a relative measure of the TB rate in children under 5 years old compared to children 5–14 years old. It is expected to be greater than 1 in countries with adequate case detection of childhood TB, given the known higher risk of disease progression in children under 5 years old compared to schoolchildren (5–14 years old).

Table 12. TB cases notification among children, Americas region, 2013

		Notified cases of childhood TB			Notified TB cases 0-14 years per 100,000 children	Notified TB cases 0-14 years, percentage of all TB cases	
Region	Population (0-14 years)	0-14 years	0-4 years	5-14 years			
Americas	233,745,471	11,379	4,552	6,727	4.9	5.3	
Subregions							
North America	68,315,209	586	346	240	0.9	5.5	
Caribbean	10,619,694	1,994	914	1,080	19	9.5	
Mexico & Central America	50,185,929	1,416	516	800	2.8	4.5	
South America (Andean)	39,220,937	3,515	1,161	2,354	9.0	5.9	
South America (Other)	65,403,702	3,868	1,615	2,253	5.9	4.2	
Countries							
North America	Canada	5,765,505	108	49	59	1.9	6.6
	United States of America	62,549,704	478	297	181	0.8	5.2
Caribbean	Antigua and Barbuda	22,444	1	1	0	4.5	10
	Bahamas	80,311	3	0	3	3.7	9.1
	Barbados	53,717	0	0	0	0	0
	Cuba	1,828,797	9	2	7	0.5	1.2
	Dominica	18,471	0	0	0	0	0
	Dominican Republic	3,144,553	52	7	45	1.7	1.9
	Grenada						
	Haiti	3,606,052	1,905	892	1,013	53	11
	Jamaica	755,005	10	5	5	1.3	11
	Puerto Rico	718,272	0	0	0	0	0
	Saint Kitts and Nevis	13,900	0	0	0	0	0
	Saint Lucia	43,553	1	0	1	2.3	11
	Saint Vincent and the Grenadines						
	Trinidad and Tobago	278,609	13	7	6	4.7	5.2
Mexico & Central America	Belize	112,414	4	2	2	3.6	3.3
	Costa Rica	1,144,961	32	14	18	2.8	7.9
	El Salvador	1,898,290	200	71	129	11	9.7
	Guatemala	6,253,602	41			0.7	1.9
	Honduras	2,851,991	162	61	101	5.7	5.4
	Mexico	34,834,170	805	297	508	2.3	3.9
	Nicaragua	1,997,131	59			3.0	3.8
	Panama	1,093,370	113	71	42	10	7.9
South America (Andean)	Bolivia (Plurinational State of)	3,719,869	435	102	333	12	5.2
	Colombia	13,372,440	571	252	319	4.3	4.9
	Ecuador	4,714,014	234	82	152	5.0	4.4
	Peru	8,740,176	1,814	515	1,299	21	6.6
	Venezuela (Bolivarian Republic of)	8,674,438	461	210	251	5.3	7.0
South America (Other)	Argentina	10,034,741	893	369	524	8.9	10
	Brazil	48,269,219	2,647	1,097	1,550	5.5	3.5
	Chile	3,713,467	59	15	44	1.6	2.5
	Guyana	288,816	22	4	18	7.6	3.2
	Paraguay	2,205,784	183	95	88	8.3	8.2
	Suriname	147,625	12	6	6	8.1	8.5
	Uruguay	744,050	52	29	23	7.0	5.9
Blank cells indicate no data available.							

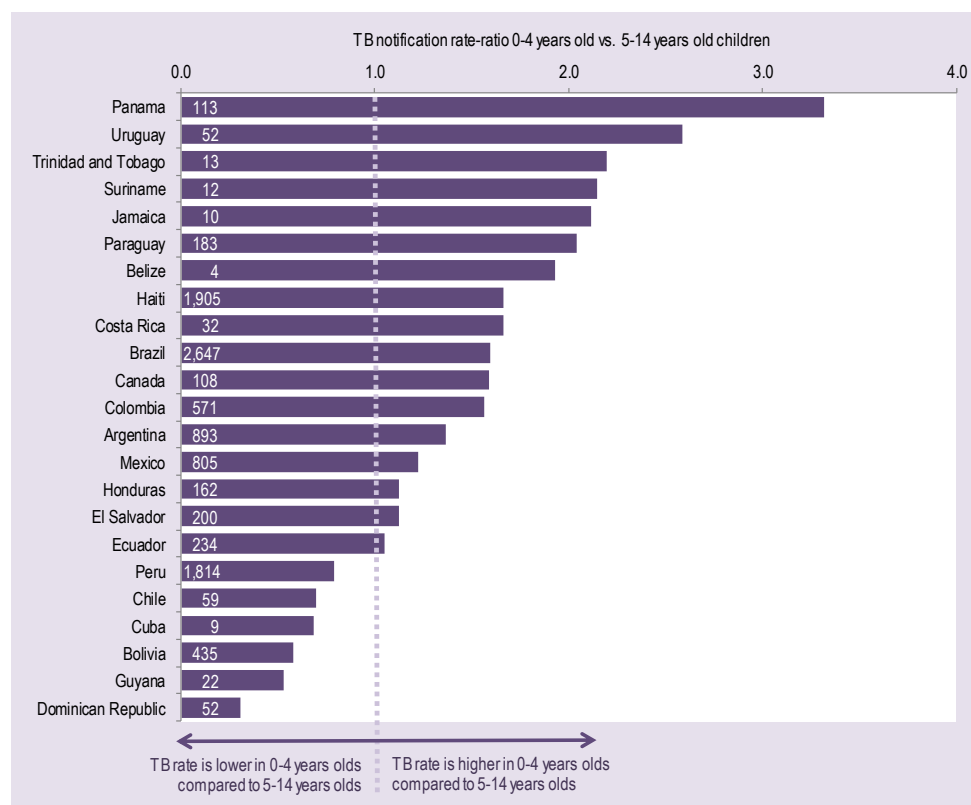
Blank cells indicate no data available.

Figure 29. Proportion of childhood TB among all TB cases notified, Americas region, 2013^a



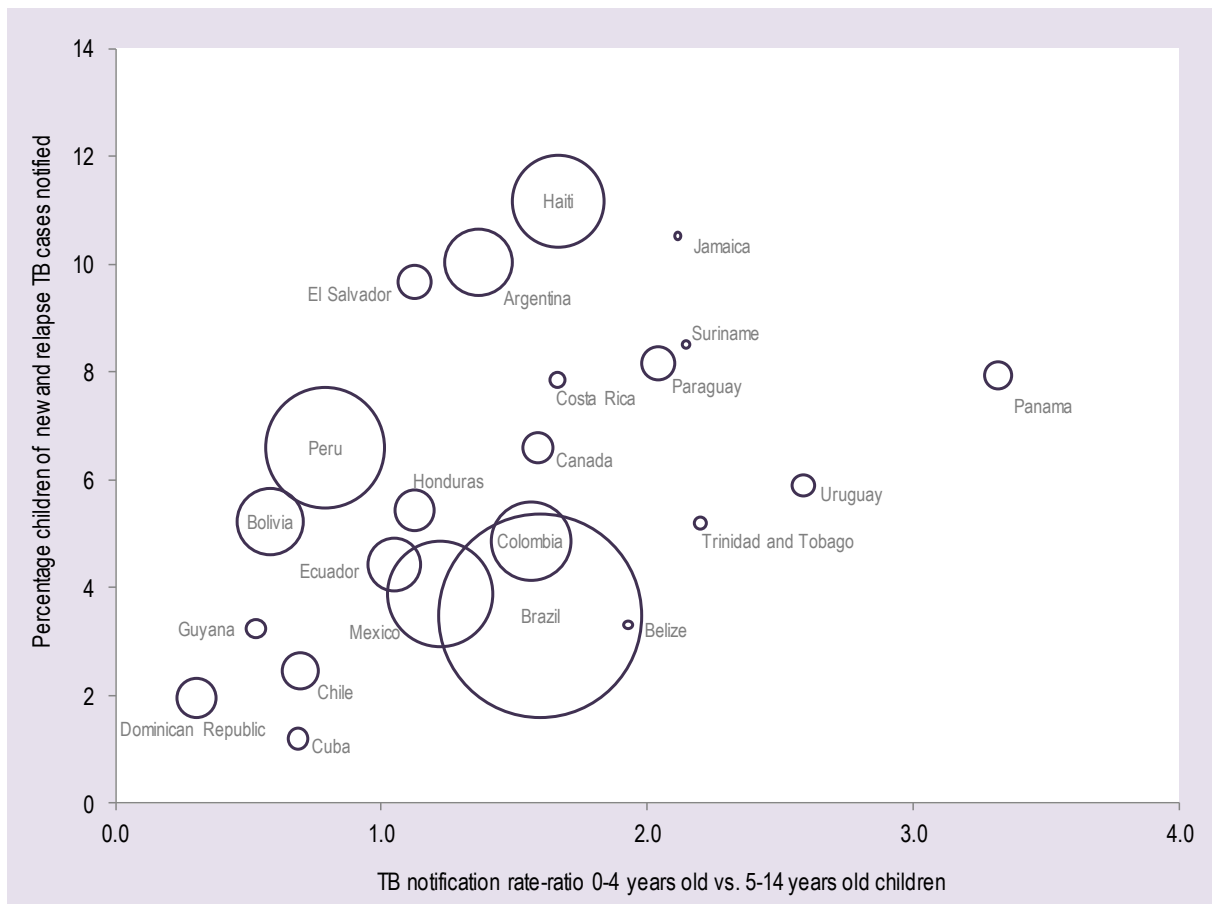
^a Countries with at least 50 TB cases notified; white numbers show total number of children notified with TB; error bars show 95% confidence intervals.

Figure 30. Case notification rate-ratios for TB in children 0–4 years old versus children 5–14 years old, Americas region, 2013^a



^a Countries with at least 50 TB cases notified; white numbers show total number of TB cases notified in children.

Figure 31. Comparison of case notification rate-ratios for TB in children 0–4 years old versus children 5–14 years old and proportion of children among notified TB cases, Americas region, 2013^a



^a Countries with at least 50 TB cases; circle areas are proportional to the total number of TB cases notified.

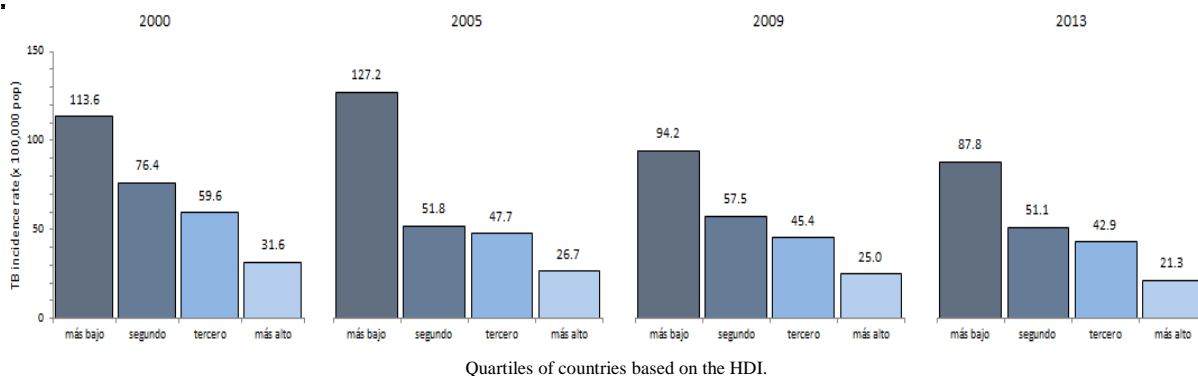
Chapter 8

Social inequalities in TB and
trends over time

Tuberculosis continues to be a vivid example of the profound socioeconomic inequalities in health in the Americas. This chapter focuses exclusively on this topic to highlight its importance. Socioeconomic inequalities can be documented, synoptically and intuitively, by analyzing the distribution of TB incidence in the countries of Latin America and the Caribbean (LAC) according to their HDI, a summary measurement that combines indices of income, education, and life expectancy.

Figure 32a illustrates the levels and trends of social inequalities in TB in LAC. When countries of the region are ranked according to their level of development, measured by the HDI, a pronounced gradient is observed in the incidence of TB. The risk of TB is concentrated (and persists) in the most socially disadvantaged extreme of the population (i.e., the lowest-HDI quartile). As human development rises, TB decreases systematically. One metric used to summarize the magnitude of inequality is the difference in TB distribution between the extreme quartiles (the so-called absolute Kuznets index). In 2000, the difference in this distribution (i.e., the excess incidence between the least and most developed countries) was 82.0 TB cases per 100 000 population, whereas in 2013 the difference was 66.6. In other words, in the year 2000, in LAC countries, TB incidence in the lowest human development quartile versus the highest quartile (i.e., the relative Kuznets index) was 3.6 times higher, and in 2013 the incidence was 4.1 times higher.

Figure 32a. Inequality gradients in TB incidence rate, by country and quartile, Latin America and the Caribbean, 2000, 2005, 2009, and 2013

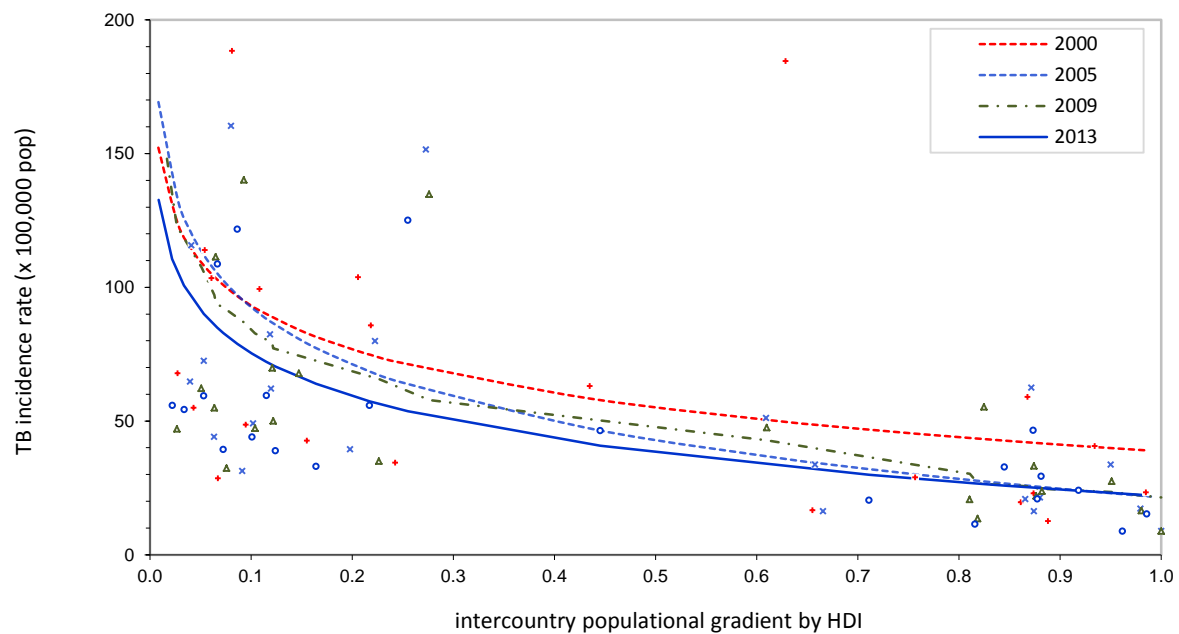


A more complete analysis of the TB situation and its trends in the region demands focusing not only on changes in the average regional incidence rate but also—and simultaneously—on changes in its population distribution (i.e., the social inequality of TB incidence). The ultimate goal, naturally, is the gradual reduction of the average TB incidence rate at the regional and national level along with the concomitant reduction in inequality in TB incidence in the population. In the group of countries included in this analysis, the regional average rate of TB incidence was systematically reduced from 62.0 per 100 000 population in 2000, to 51.9 in 2005, to 47.3 in 2009, and to 44.8 in 2013. Thus, between 2000 and 2013, the regional incidence rate of TB was reduced, on average, by 28%. Judging by the change in the Kuznets index shown above, absolute inequality in the incidence of TB between extreme human development quartiles was reduced by only 19% (and relative inequality increased by 14%).

A more precise assessment of the magnitude of and change in absolute inequality in the incidence of TB between countries in the period evaluated is shown by the inequality regression lines (Figure 32b), which take into account the entire social gradient defined by the countries' HDI, as well as their population size. The more horizontal the line, the more

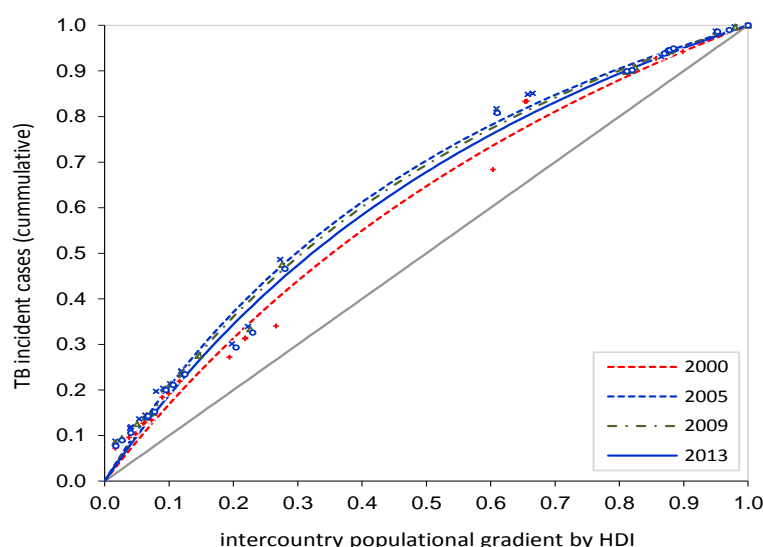
equitable the distribution of TB incidence; this effect is measured with the slope index of inequality (SII). The analysis shows that the SII was reduced, but not significantly (dropping from 54.6 to 53.5 per 100 000), between 2000 and 2013. In fact, absolute inequality in the incidence of TB between countries remained higher in the intermediate years evaluated (71.2 in 2005 and 61.1 in 2009).

Figure 32b. Regression lines of absolute inequality in the TB incidence rate, according to the HDI, Latin America and the Caribbean, 2000, 2005, 2009, and 2013



Relative inequality in the incidence of TB, measured by the health inequality concentration curves and indices (Figure 32c), according to country HDI rankings, increased, but not significantly (rising from 0.20 in 2000 to 0.24 in 2013), with even higher indices in the intermediate years evaluated (0.28 in 2005 and 0.27 in 2009), reproducing the pattern of change observed in absolute inequality. In 2000, the population of the 20% of countries with the lowest HDI had 31% of all LAC TB incident cases; in 2013, that percentage rose to 35% of all incident cases. Half (50%) of all reported new cases of TB in LAC in 2013 were found in the 30% of the regional populations living in countries with the lowest level of human development.

Figure 32c. Concentration curves showing the relative inequality in the incidence rate of TB, according to the HDI, Latin America and the Caribbean, 2000, 2005, 2009, and 2013



These findings (which are exploratory, because of their ecological nature) suggest that although the incidence of TB in LAC has been declining systematically since the year 2000, inequality in the risk of ill-health has not changed substantially, either absolutely or relatively (Table 13). This finding, in turn, can provide evidence of the need to improve the effectiveness of targeting strategies directed toward the most disadvantaged segments of the population in both social programs and TB prevention and control programs in the region.

Table 13. Summary of the metrics used to measure the (a) gaps and (b) gradients of social inequality in the incidence rate of TB, according to the HDI, Latin America and the Caribbean, 2000, 2005, 2009, and 2013

(a)

equity stratifier	inequality metrics	year	point value	95% CI	
				lower	upper
human development index (HDI)	KI _{absolute}	2000	82.0	81.0	83.0 *
		2005	100.5	99.5	101.4 *
		2009	69.2	68.4	69.9 *
		2013	66.6	65.8	67.3 *
	KI _{relative}	2000	3.6	3.5	3.7 *
		2005	4.8	4.7	4.8 *
		2009	3.8	3.7	3.8 *
		2013	4.1	4.1	4.2 *

KI = Kuznets index

* statistically significantly different from zero at the 95% confidence level ($p < 0.05$)

(b)

equity stratifier	inequality metrics	year	point value	95% CI	
				lower	upper
human development index (HDI)	SII	2000	-54.6	-100.4	-8.7 *
		2005	-71.2	-105.8	-36.6 *
		2009	-61.1	-91.4	-30.9 *
		2013	-53.5	-80.3	-26.7 *
	HCI	2000	-0.20	-0.37	-0.03 *
		2005	-0.28	-0.45	-0.11 *
		2009	-0.27	-0.43	-0.10 *
		2013	-0.24	-0.41	-0.08 *

SII = Slope Index of Inequality HCI = Health Concentration Index

* statistically significantly different from zero at the 95% confidence level ($p < 0.05$)

The ecological evidence presented here highlights the fact that the more distal causes (e.g., the social and health-related exclusion of the most vulnerable populations) favor the transmission and development of TB, illustrating the social determination of this disease. Addressing these determinants of the disease will require the simultaneous promotion and stimulation of both 1) research on the social inequalities in TB risk within each country and community and 2) systematic monitoring of these inequalities, through the national health surveillance systems. It is imperative to act resolutely on the social determinants of TB in order to reduce the unjust and avoidable inequalities that exist across various populations within and across the countries of the region in terms of both the risk of contracting the disease and the opportunities to prevent and cure it.

Chapter 9

Financing TB control

Tuberculosis prevention, care, and control requires adequate funding in order to achieve progress in fighting the disease. Since 2002, WHO has monitored funding for TB for all countries and published the findings in its annual global TB reports. The WHO global TB database²⁶ includes financial data reported from 2002 through 2014 for the world's 22 high TB-burden countries (of which Brazil is the only one in the region) and from 2006 through 2014 for all other countries. The data includes information on 1) NTP budgets and the use of general health services (through 2014) and 2) NTP expenditures (through 2013). A comprehensive analysis of long-term trends in TB funding in low- and middle-income countries for the decade 2002–2011 was conducted by WHO in 2012. Results from these analyses were published in an article in the August 2013 issue of *The Lancet Global Health*.²⁷ Fifteen²⁸ of the 16 priority countries in the Americas (all but Peru²⁹) were included in the analysis. The article's Technical Appendix³⁰ provided details about 1) the methods used by WHO for validating each year's data, 2) estimating inpatient/outpatient costs, and 3) the imputation model used for missing values. It should be noted that because validation and imputation methods improve each year, the financial data shown for the years 2006–2013 in this year's report might not match the data reported in previous reports.

The aim of this chapter is to describe funding trends for the period 2006–2014 for TB control in the Americas for the 15 priority countries, which together account for about 73% of the region's TB cases. Main topics are covered, including total funding received through 2013 in relation to the number of patients successfully treated through 2012 and those treated through 2013 (the most recent data reported by the countries); the cost per patient successfully treated; available funding by intervention area, and source (domestic and international)(2006–2014); and funding gaps reported to WHO by the NTPs, with breakdowns by intervention area.

9.1 Total funding received for treatment of drug-susceptible TB and number of patients

In the 15 low- and middle-income countries included in the analyses, total funding received for treatment of drug-susceptible TB grew from US\$ 109 million in 2006 to US\$ 230 million in 2013 (**Figure 33**).³¹ The increases in funding received from 2006 to 2013 ranged from a 4% (in Bolivia) to 126% (in Haiti, which received US\$ 3.7 million in 2006 and US\$ 8.5 million in 2013) to more than five times the 2006 value (in Colombia). Increases in funding were accompanied by increases in the number of patients successfully treated (which grew from 105 000 in 2006 to 117 000 in 2012, for a total of about 1.3 million people treated between 2006 and 2013).

²⁶ Available at: www.who.int/tb/data

²⁷ Floyd K, Fitzpatrick C, Pantoja A, Raviglione M. Domestic and donor financing for tuberculosis care and control in low-income and middle-income countries: an analysis of trends, 2002–11, and requirements to meet 2015 targets. *Lancet Glob Health*. 2013;1(2):e105–15. Available at: [http://www.thelancet.com/journals/langlo/article/PIIS2214-109X\(13\)70032-9/fulltext#sec1](http://www.thelancet.com/journals/langlo/article/PIIS2214-109X(13)70032-9/fulltext#sec1)

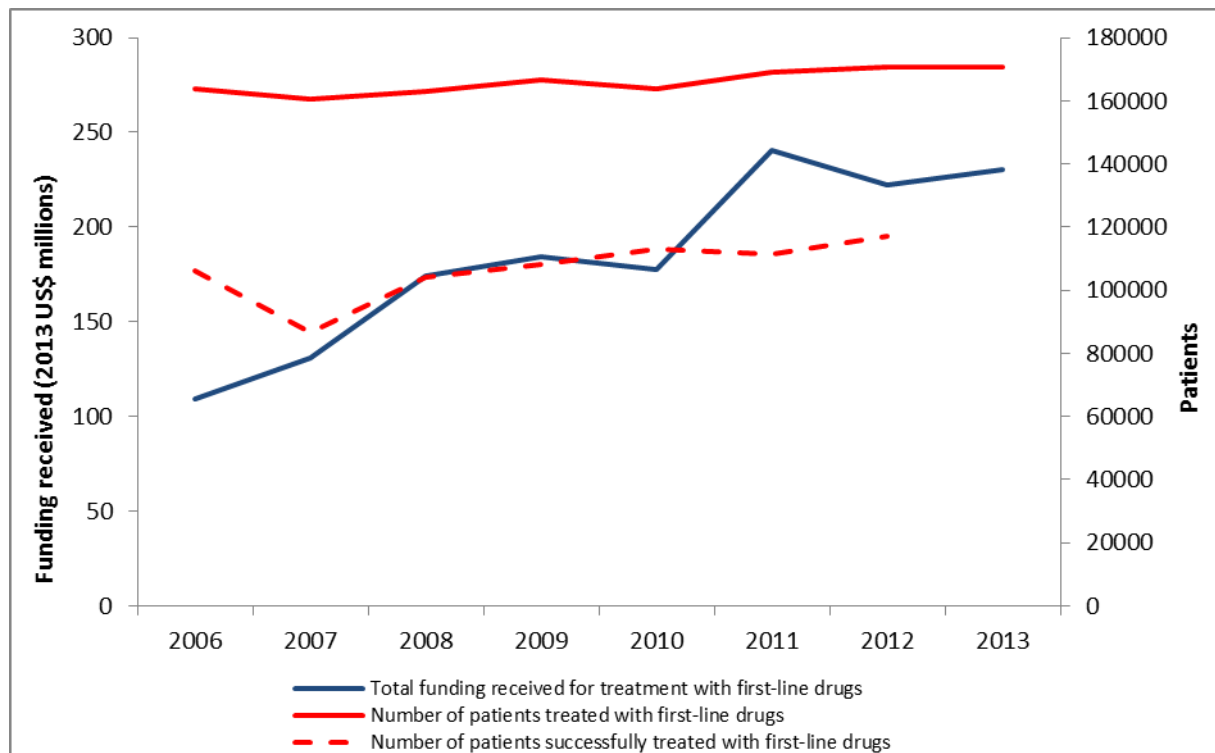
²⁸ Bolivia, Brazil, Chile, Colombia, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, and Paraguay.

²⁹ Although Peru is a priority country, and its finances will therefore affect any regional analysis, it was not included in the analysis because of the poor quality of the financial data reported by the NTP in the past few years.

³⁰ Available at: <http://www.thelancet.com/cms/attachment/2011057622/2033566099/mmc1.pdf>

³¹ Funding received is the total amount of funds received by the NTP in one year from all sources. This amount is reported by each country to WHO at year's end (e.g., funding received during 2013 was reported to WHO during the year 2014).

Figure 33. Total funding received for treatment of drug-susceptible TB^a and number of patients treated with first-line drugs in 15 selected countries,^b Americas region, 2006–2013



^aTotal funding received includes funding for drug and non-drug costs channeled through NTP and funding for hospital care and outpatient visits.

^bBolivia, Brazil, Chile, Colombia, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, and Paraguay.

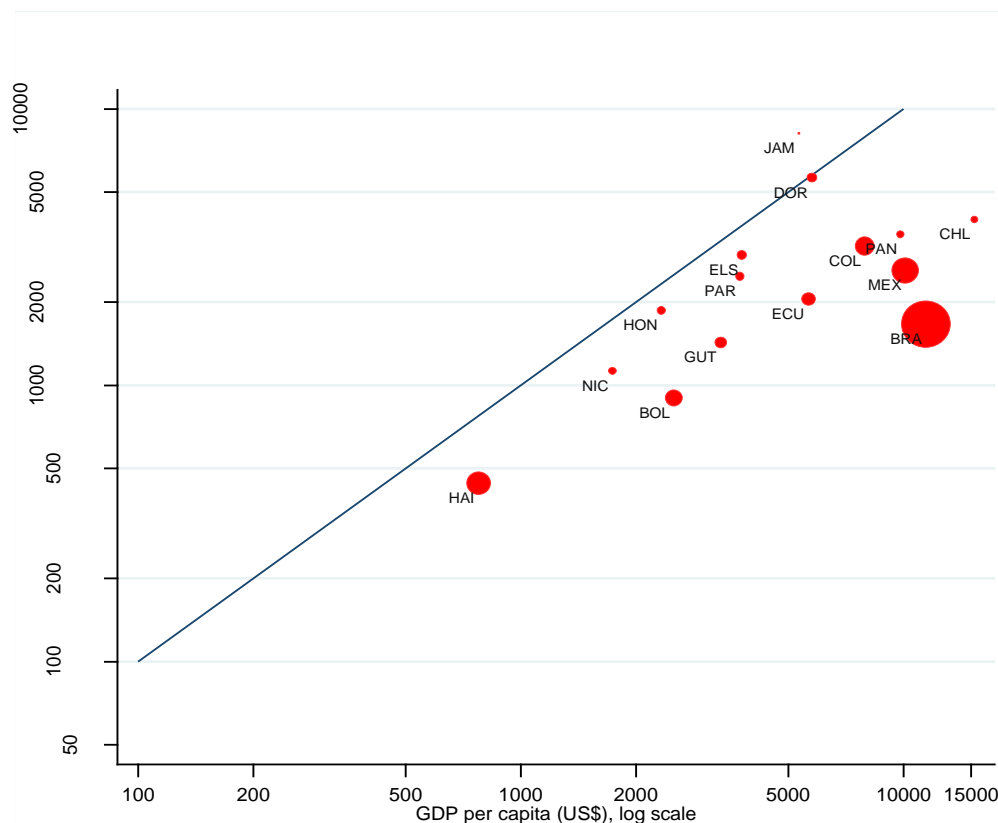
Cost per patient successfully treated was US\$ 441 for a low-income country like Haiti and between US\$ 896 (in Bolivia) and US\$ 5 621 (in Dominican Republic) for the other 12 countries in the analysis (middle-income countries). Globally, low-income countries spent an average of US\$ 458, so Haiti's expenditures are about equal to the world average. Per patient treated, Dominican Republic spends about the world average for upper-middle-income countries. Jamaica is the exception, showing a very high cost per patient successfully treated (US\$ 8 170) (**Figure 34**). In the 15 selected countries included in this analysis, with the exception of Jamaica, the cost per patient treated is less than the GDP per capita³² (all values lie below the solid black line in **Figure 34**), indicating that TB treatment in appears to be cost-effective.³³ Although the cost per patient successfully treated tends to be higher in the higher-income countries, another explanation for variation in costs appears to be the number of patients treated. Some of the countries reporting relatively low costs for treating patients relative to their income level (e.g., Brazil) are countries where the total number of patients

³² WHO. Cost-effectiveness and strategic planning (WHO-CHOICE): cost effectiveness thresholds [Internet]. Geneva: WHO; c2015. Available at: <http://data.worldbank.org/indicator/NY.GNP.PCAP.CD>

³³ World Bank. Data: GNI per capita, Atlas method (current US\$) [Internet]. Washington: World Bank; c2015. Available at: http://www.who.int/choice/costs/CER_thresholds/en/ GDP per capita is used as the indicator for deriving threshold values for cost-effectiveness of health interventions; if the cost per patient is less than GDP per capita, the intervention is most likely cost-effective. The analysis reported here does not calculate cost-effectiveness ratios for TB treatment in these countries, but the cost per patient successfully treated (calculated as the funds received divided by the number of patients successfully treated, as reported by the countries) is compared with GDP per capita as a proxy.

treated each year is comparatively high (as shown by the size of the circles in **Figure 34**). For example, Brazil has the third-highest income level in the region, after Chile and Mexico, but also treated the largest number of patients in the region. Therefore, its average cost per patient is similar to/lower than the cost of lower-middle-income countries (e.g., Bolivia). On the other hand, Jamaica reported only 61 patients successfully treated but a high cost (about US\$ 400 000 per year), mainly attributable to choice of care for TB patients (all are hospitalized for the initial part of treatment).

Figure 34. Cost per TB patient successfully treated with first-line drugs in 15 selected countries,^a Americas region, 2012^{b-d}



^a BOL: Bolivia, BRA: Brazil, CHL: Chile, COL: Colombia, DOR: Dominican Republic, ECU: Ecuador, ELS: El Salvador, GUT: Guatemala, HAI: Haiti, HON: Honduras, JAM: Jamaica, MEX: Mexico, NIC: Nicaragua, PAN: Panama, PAR: Paraguay.

^b The black line marks where cost per patient treated equals GDP per capita. The area of the circle is proportional to the caseload.

^c Costs include DOTS (first-line drugs; NTP staff, program management and supervision, and laboratory equipment and supplies); collaborative TB/HIV activities, PPM, PAL, advocacy, communication and social mobilization (ACSM), community-based TB care (CTBC), operational research, and surveys; and hospital stays and clinic visits.

^d Costs per patient successfully treated are presented as case-weighted three-year means (2010–2012) to minimize distortions associated with non-annual expenses for items such as buildings, equipment, and buffer stocks of drugs.

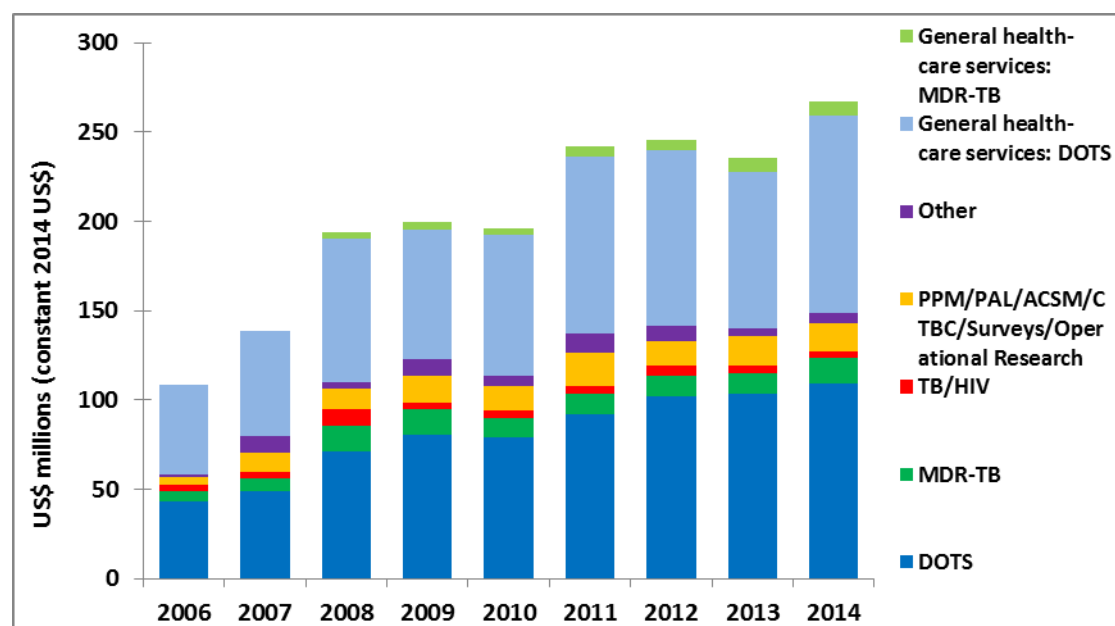
9.2 Total available funding for TB, by category of expenditure and sources of funding, 2006–2014

In the 15 selected countries, available funding for TB care and control³⁴ reached US\$ 267 million in 2014, double the US\$ 108 million available in 2006 (**Figure 35**). Most funding since 2006 has been used for diagnosis and treatment of drug-susceptible TB including the following expenditure categories: 1) DOTS, which comprises the cost of first-line drugs and NTP staff, program management and supervision, and laboratory equipment and supplies; 2) the category including PPM, PAL, ACSM, CTBC, operational research, and sporadic surveys; and 3) the use of general health services for DOTS. The DOTS expenditure category is not exclusively for drug-susceptible TB patients; it also covers diagnosis, treatment, and management of patients with MDR-TB and patients coinfecting with TB/HIV. A detailed breakdown of the estimated funding required for drug-susceptible TB, MDR-TB, and collaborative TB/HIV activities in the 15 selected countries for 2014, based on the NTPs' assessments of their needs, is shown in **Table 14**.

General health care services are used by TB and MDR-TB patients when they are hospitalized (inpatient care) or when they are visiting a health care center for DOT (directly observed treatment) and follow-up visits (outpatient care). The use of general health services has represented about 50% of the total funds used for diagnosis and treatment of drug-susceptible TB. Inpatient care accounts for the majority of the costs in general health care services. The percentage of TB patients hospitalized is low (3%–10%) in Chile, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, and Paraguay, but higher (30%–70%) in Argentina, Brazil, Colombia, and Panama, and as high as 100% in Jamaica.

Since 2008, the amount of funds available for diagnosing, treating, and caring for MDR-TB patients was about US\$ 18 million per year, with a peak of US\$ 22 million in 2014. The number of patients treated for MDR-TB region-wide has been about 1 300 per year, with a peak of 1 484 MDR-TB patients treated in 2014. As mentioned above Peru, which accounts for more than half of the MDR-TB cases in the region, is not included in this financial analysis, so it is likely that the available funding for MDR-TB in the region is higher than the numbers presented here.

³⁴ The total amount of funding the NTP expects to receive in one year. Available funding for 2014 was reported to WHO by each country.

Figure 35. Funding available for TB care and control, by intervention area, in 15 selected countries,^a Americas region, 2006–2014

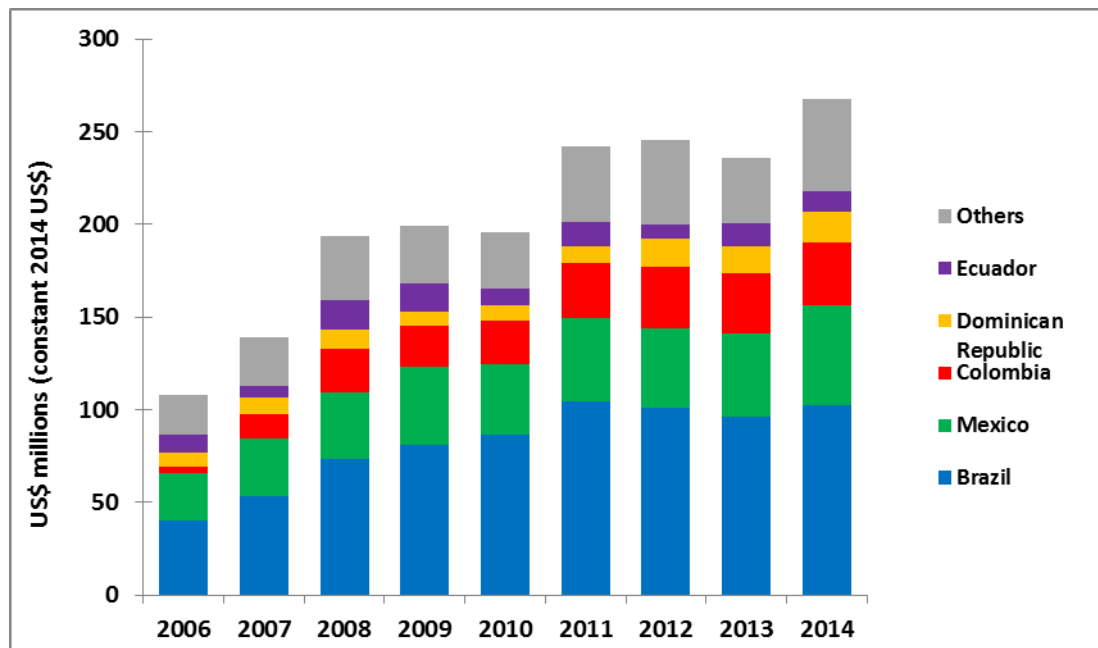
^a Bolivia, Brazil, Chile, Colombia, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, and Paraguay.

Table 14. NTP budget by intervention areas and costs of use of general health services for drug-susceptible TB and MDR-TB patients in 15 selected countries, Americas region, 2014

Country	NTP budget ^a			
	Total	Drug-susceptible TB	MDR-TB	TB/HIV
Brazil	79	68	8.6	2.3
Mexico	24	23	1.3	0
Dominican Republic	15	12	2.1	0.3
Honduras	13	12	0.6	0.5
Haiti	12	11	0.8	0.3
Colombia	11	9.4	1.0	0.8
El Salvador	6.4	4.2	0	2.1
Nicaragua	5.8	5.0	0.7	0.1
Ecuador	4.6	3.5	1.1	0
Paraguay	3.9	3.8	0.1	0
Bolivia (Plurinational State of)	3.1	2.8	0.3	0
Panama	3.0	2.2	0.7	0.1
Chile	0.4	0.4	0	0
Jamaica	0.2	0.1	0	0
Guatemala	— ^b	—	—	—
Total	181	157	17	6.5

^a In 2014 US\$ millions.

^b Data not available.

Figure 36. Available funding for TB care and control by country in 15 selected countries,^a Americas region, 2006–2014

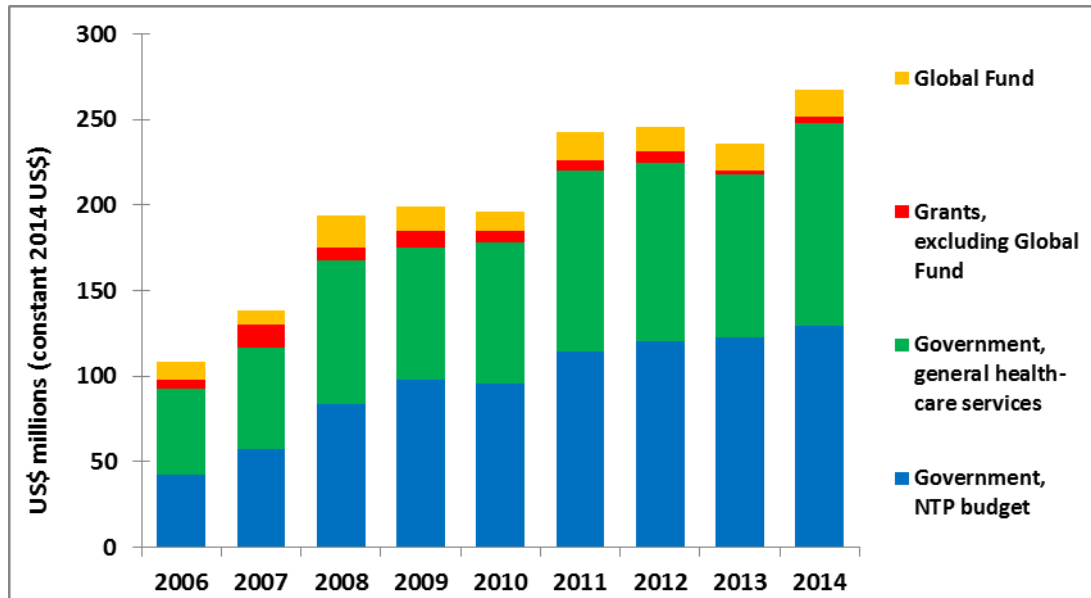
^a Bolivia, Brazil, Chile, Colombia, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, and Paraguay.

Brazil, Mexico, Colombia, Dominican Republic, and Ecuador are the five countries (in descending order) with the largest funding available for TB. Just three countries (Brazil, Mexico, and Colombia) account for 71% of total funding available in 2014 in the 15 selected countries, and 68% of the notified cases in 2013. For the last three years, total available funding for TB has remained stable, for the most part, at about US\$ 240 million, with a peak of US\$ 267 million in 2014.

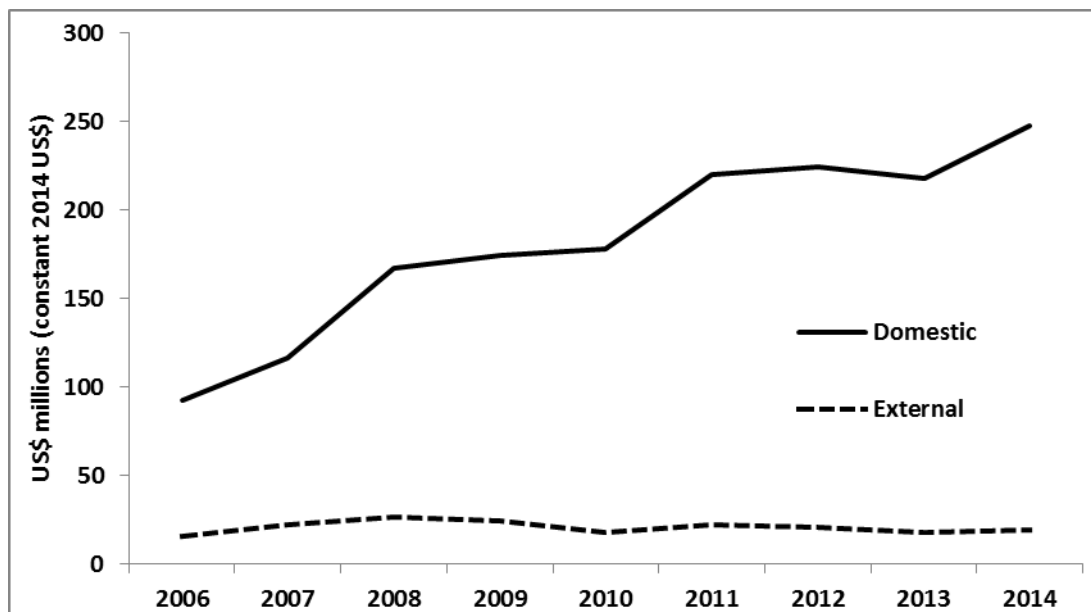
Domestic funding for TB can be channeled in two ways: 1) directly, via the NTPs (i.e., funds allocated specifically for TB care and control from governments, including loans taken by governments), and 2) indirectly, through the use of general health services (i.e., funds from domestic sources for TB patient inpatient and outpatient care). In 2014, domestic funding for NTP TB-specific budgets accounted for the largest single share of funding (**Figure 37a**). External funding is obtained via two channels: 1) The Global Fund and 2) other grants, such as funds received directly from DFID (Department for International Development, United Kingdom); WHO; and the Italian Development Cooperation.

Figure 37. Available domestic and external funding for TB care and control, by category (a) and overall trend (b), in 15 selected countries,^a Americas region, 2006–2014

(a)



(b)



^a Bolivia, Brazil, Chile, Colombia, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, and Paraguay.

In the Americas, domestic funding rose from US\$ 93 million in 2006 to US\$ 248 million in 2014 (**Figure 37b**). Domestic funding channeled through the NTP rose from 46% (2006) to 52% (2014) of total government funding. Overall, as a share of total funding for TB, domestic funding increased from 86% in 2006 to 93% in 2014. Most of the increase in domestic funding, channeled through the NTPs, occurred in Brazil, Colombia, and Mexico. In 2014, NTPs reported budgets ranging from US\$ 0.2 million to US\$ 79 million (**Table 15**).

Total donor funding remained stable at about US\$ 20 million per year (2006–2013). The Global Fund is the principal external source of funding for the region. Its contribution increased from US\$ 10 million in 2006 to US\$ 16 million in 2014 (83% of all donor funding for that year).

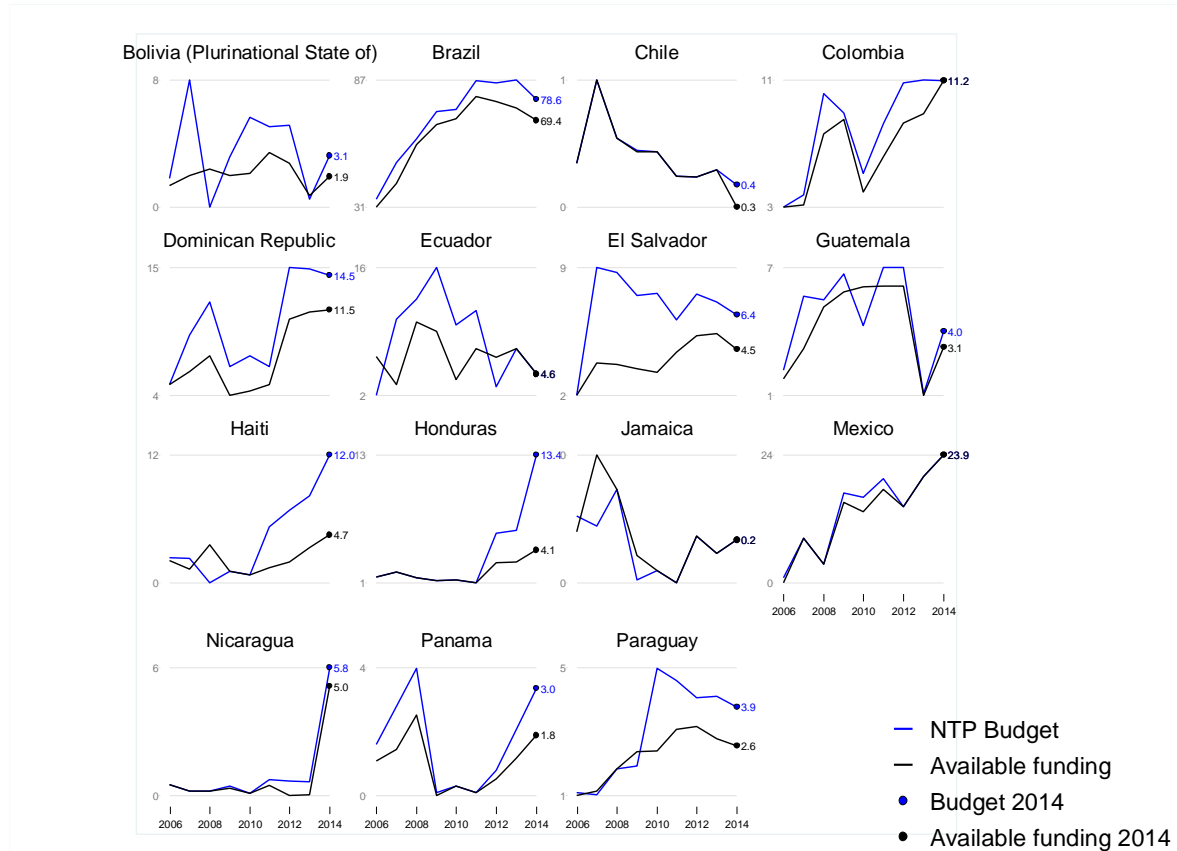
Table 15. Reported NTP budget, available funding from domestic and international donor sources, funding gap, and share of NTP budget provided by domestic and international donor funding in 15 selected countries, Americas region, 2014^a

	Total NTP budget	Domestic funding (b)	International donor funding (c)	Share of available NTP funding (b+c) provided from domestic sources (%)	Share of available NTP funding (b+c) provided by international donors (%)	Funding gap
Brazil	79	68	1.2	87%	1.5%	9.3
Mexico	24	24	0	100%	0%	0
Dominican Republic	15	9.0	2.6	62%	18%	3.0
Honduras	13	2.2	1.9	16%	14%	9.3
Haiti	12	0.7	4.1	6%	34%	7.3
Colombia	11	7.6	3.6	68%	32%	0
El Salvador	6.4	3.8	0.7	59%	11%	1.9
Nicaragua	5.8	2.5	2.5	43%	43%	0.8
Ecuador	4.6	4.4	0.1	96%	2.2%	0.0
Paraguay	3.9	1.4	1.2	36%	31%	1.3
Bolivia (Plurinational)	3.1	1.0	0.9	32%	29%	1.2
Panama	3.0	1.4	0.4	47%	13%	1.3
Chile	0.4	0.3	0	75%	0%	0.2
Jamaica	0.2	0.2	0	100%	0%	0
Guatemala	–	–	–	–	–	–
Total	181	127	19	70%	11%	36

^a In 2014 US\$ millions.

9.3 Funding gaps for TB treatment, 2008–2014

Trends in the total needs and resources mobilized by the NTPs in the 15 selected countries as a whole conceal important variations among them (**Figure 38**). Regional trends for funding for the period 2006–2014 (steadily growing; **Figure 37**) are dominated mainly by the trends in Brazil, and to a lesser extent by those in Mexico; most of the countries do not show a continuous growing trend for funding but rather sporadic highs and lows. The funding estimated to be required (equivalent to NTP budget) in Brazil has increased steadily since 2006, with a small decrease in 2014; however, in the past two years, the funding gap has grown. In the other 14 countries there is a great amount of variation from year to year in the budgets and available funding reported by NTPs (**Figure 38**).

Figure 38. NTP budgets and available funding in 15 selected countries, Americas region, 2006–2014^a

^a Guatemala did not report complete data in 2014; data shown are WHO estimates.

Despite the growth in resources available for TB, countries still report funding gaps (i.e., the difference between assessments by NTPs of funding needs for TB prevention, diagnosis and treatment and the actual amount of funds mobilized), which in 2014 amounted to US\$ 36 million. This is a considerable increase in reported funding gaps compared with previous years (2008–2012), when gaps totaled about US\$ 27 million. In descending order, Brazil, Honduras, and Haiti had the largest funding gaps in the region for 2014, collectively amounting to US\$ 26 million (**Table 15**). Funding gaps have persisted and increased over time. One plausible explanation may be that countries are developing more ambitious plans for scaling up interventions, resulting in increased funding needs, but many NTPs continue to be unable to mobilize all the funding that they estimate necessary to fully implement their national strategic plans.

Funding gaps were reported for all country income-level groups (**Table 16**) and for all of the different interventions of TB care and control (**Figure 39**). The DOTS expenditure category, excluding the first-line drug component (i.e., comprising only NTP staff, program management, and laboratory supplies/equipment) showed the largest funding gap in the region (**Figure 39**). Lower-middle-income countries account for the largest reported funding gaps, about US\$ 15 million in 2014, of which US\$ 9.3 million was reported by Honduras (**Table 16**). The NTP of Honduras reports that the funding gap is mainly for the NTP staff and

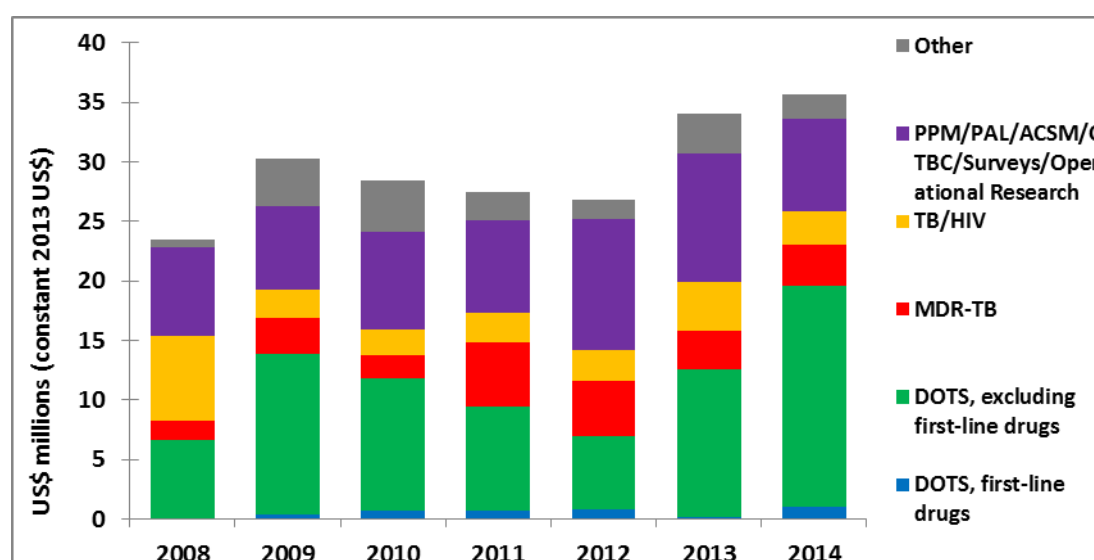
routine program management activities. The funding gap reported in the upper-middle-income country group is highly dominated by Brazil; most of it relates to routine program management activities (US\$ 4 million gap) and management of MDR-TB (US\$ 1.5 million gap).

Table 16. Total funding gaps, by country income-level group, for 15 selected countries, ^a Americas region, 2014

Country income-level group	Funding gap (US\$ millions), 2014	Proportion (%)
Low-income	7.3	21
Lower-middle-income	15	41
Upper-middle-income	14	38
Total	36	100

^a Bolivia, Brazil, Chile, Colombia, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, and Paraguay.

Figure 39. Funding gaps by category of expenditure in 15 selected countries, ^a Americas region, 2008–2014



^a Bolivia, Brazil, Chile, Colombia, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, and Paraguay.

9.3.1 Active grants from The Global Fund in the region

The Global Fund is the most important donor for TB prevention and control in the Americas and is providing the funds currently closing the funding gaps. Through the end of 2014 (with a cutoff date of 12 January 2015), The Global Fund had disbursed US\$ 93 million to 13 countries (including all selected countries analyzed elsewhere in this chapter except Brazil, Chile, Jamaica, and Mexico, and with the addition of Peru and Suriname) for 16 grants in progress in the region (Table 17). The countries lagging behind the most in the implementation of their grants are Bolivia, Ecuador, Guyana, and Peru (columns 8 and 9 of Table 17). These countries are almost at the end of the period of their grants, but the amounts of funds still to be disbursed are quite high. For example, Peru has only 1% of its grant

implementation time frame left, but 14% of its funds have not been disbursed. Nevertheless, the grant's ratings in the region are good (column 2 of **Table 17**); of the 16 active grants, eight are rated A1 or A2, and only one grant (in Ecuador) is rated as unacceptable.

Table 17. Active grants from The Global Fund and country performance as of the end of 2014, Americas region

General Information			Key grant data		Finance data - Looking backwards		Finance data - Looking forward		
Country		Latest Rating	Signed Amount (Cumulative to date) ¹	Disbursed Amount (Cumulative to date) ²	Funds that could theoretically have been disbursed at cut-off date 4 (= time elapsed x signed amount)	Difference between Funds that could theoretically have been disbursed at cut-off date and Disbursed	Funds remaining (=Signed - Disbursed amount)	Proportion of funds remaining of signed amount (%)	Time left until end of grant (%)
Peru	- grant 1	B1	\$ 11,359,670	\$ 9,776,626	\$ 11,239,763	\$ 1,463,136	\$ 1,583,044	14%	1%
	- grant 2	A1	\$ 8,653,606	\$ 8,064,769	\$ 8,562,263	\$ 497,494	\$ 588,838	7%	1%
Ecuador	- grant 1	C	\$ 3,304,845	\$ 1,726,476	\$ 2,664,072	\$ 937,596	\$ 1,578,369	48%	19%
	- grant 2	B1	\$ 5,434,603	\$ 3,899,961	\$ 4,380,894	\$ 480,933	\$ 1,534,642	28%	19%
Guyana		B2	\$ 3,282,857	\$ 1,875,285	\$ 2,812,053	\$ 936,767	\$ 1,407,572	43%	14%
Bolivia (Plurinational S		B1	\$ 3,653,921	\$ 1,782,371	\$ 2,700,724	\$ 918,353	\$ 1,871,550	51%	26%
Guatemala		A2	\$ 3,580,109	\$ 3,273,727	\$ 3,580,109	\$ 306,382	\$ 306,382	9%	0%
Nicaragua		B1	\$ 10,655,995	\$ 8,850,061	\$ 9,086,469	\$ 236,408	\$ 1,805,934	17%	15%
Honduras		B1	\$ 9,100,813	\$ 6,319,490	\$ 6,429,757	\$ 110,267	\$ 2,781,323	31%	29%
Suriname		A2	\$ 3,542,572	\$ 3,098,979	\$ 2,973,792	\$ (125,187)	\$ 443,593	13%	16%
Dominican Republic		A2	\$ 10,630,997	\$ 9,323,711	\$ 8,982,012	\$ (341,699)	\$ 1,307,287	12%	16%
Paraguay		A2	\$ 8,994,050	\$ 7,799,500	\$ 7,408,735	\$ (390,765)	\$ 1,194,550	13%	18%
Colombia	- grant 1	A2	\$ 4,879,739	\$ 3,353,157	\$ 2,957,664	\$ (395,493)	\$ 1,526,582	31%	39%
	- grant 2	B1	\$ 3,538,489	\$ 2,766,019	\$ 2,144,717	\$ (621,302)	\$ 772,470	22%	39%
El Salvador		A1	\$ 4,574,369	\$ 4,574,368	\$ 4,147,191	\$ (427,178)	\$ 1	0%	9%
Haiti		A2	\$ 21,661,161	\$ 17,157,345	\$ 16,378,245	\$ (779,101)	\$ 4,503,816	21%	24%
Grand Total, sum			\$ 116,847,797	\$ 93,641,846	\$ 96,448,459	\$ 2,806,614	\$ 23,205,951		

Source: The Global Fund database.

Notes:

1. Information source: Grant Agreement (i.e., the legally binding document signed between The Global Fund, the Principal Recipient, and the Country Coordinating Mechanism).
2. Total funds disbursed since the grant start date (as specified in the Grant Agreement) and the cutoff date (12 January 2015).
3. There are five possible ratings for the performance of each grant given by The Global Fund: A1, "exceeds expectations"; A2, "meets expectations"; B1, "adequate"; B2, "inadequate but potential demonstrated"; and C, "unacceptable."

Chapter 10

Conclusions

This chapter presents the main conclusions about TB epidemiology, control, and financing in the Americas, summarized below:

1. TB incidence, prevalence and mortality continue to decline in the Americas, and the region is on track to meet the 2015 global targets for reducing the disease burden. Control efforts and policies need targeting toward countries and areas with a high burden of TB. Despite considerable progress in the region as a whole, some countries are not on track to meet the control targets and may need strengthening of TB control.
2. Treatment success among new and relapse cases remains off-target in the Americas. The proportion of TB patients successfully treated is currently low in several countries, particularly in the Caribbean and in South America. High default rates and high death rates in some countries highlight the need for increased efforts to strengthen treatment programs. Adequate recording and reporting of treatment outcomes need to be ensured in countries with a high proportion of treatment outcomes not evaluated.
3. Considerable progress is made in the Americas in rolling out rapid diagnostic tools. Further strengthening of conventional laboratory capacity and performance is needed, especially in countries in which laboratory capacity remains below the regional targets. Strengthening of laboratories should include further rollout and implementation of rapid diagnostic tests, especially in countries with a high estimated burden of DR-TB.
4. Improving case detection and management of MDR-TB remains an urgent priority in the Americas. Currently, only about half of the MDR-TB cases estimated among notified PTB cases are being detected in the Americas. Scale-up of DST among new and re-treatment cases by means of conventional and rapid molecular methods is needed to improve detection. Better detection of MDR-TB requires higher capacity to treat MDR-TB. Efforts are needed in most countries to strengthen treatment programs in order to improve treatment outcomes in MDR-TB patients. Adequate counseling and (social) support are needed to reduce high rates of patients being lost to follow-up.
5. Considerable progress has been made in increasing the number of TB patients who were tested for HIV or who know their status. Efforts are needed to further increase test coverage and to scale up CPT and ART among HIV-positive TB patients. Continued action towards tackling the double burden of TB and HIV is needed, particularly in South America and in the Caribbean. Further, recording and reporting needs to be improved to allow for reliable assessment of the performance of TB/HIV collaborative activities, including the provision of CPT and ART to HIV-positive TB patients and the scale-up of intensified TB case-finding and IPT among people living with HIV in the Americas.
6. Improving case-finding (and diagnosis) of childhood TB is an important priority for TB control in the Americas. Very low TB notification rates for childhood TB in some countries, particular among children less than 5 years old, suggest considerable under-diagnosis/low case detection. Training activities may serve to increase knowledge and

awareness about the particular challenges of diagnosing pediatric TB as a means to increase case detection among children in the Americas.

7. Due to the social inequalities and TB, there is a need to improve the effectiveness of targeting strategies directed toward the most disadvantaged segments of the population, in both social programs and programs for TB prevention and control in the region.
8. Based on the information from the 15 countries that account for 73% of the notified TB cases in the region, funding in 2013 had doubled in comparison with 2006. Most of the resources were domestic, reaching 93% of the total. Donor funding has remained stable for the past eight years, mostly from The Global Fund. Funding gaps still remain mainly for program management and NTP staff.