

Tuberculosis in the Region of the Americas

Regional Report 2011
Epidemiology, Control and Financing



**Pan American
Health
Organization**



*Regional Office of the
World Health Organization*



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**This report has been produced thanks to financial support from
the Spanish Agency for International Cooperation and Development (AECID)
and the United States Agency for International Development (USAID)**

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Abbreviations

AIDS	Acquired immunodeficiency syndrome
ART	Antiretroviral therapy
CDR	Case detection rate
CNR	Case notification rate
CPT	Co-trimoxazole preventive therapy
DOT	Directly observed treatment
DOTS	The basic package that underpins the Stop TB Strategy
DRS	Drug resistance surveillance or survey
DST	Drug susceptibility testing
EQA	External quality assurance
GLC	Green Light Committee
GNI	Gross national income
HIV	Human immunodeficiency virus
IPT	Isoniazid preventive therapy
MDG	Millennium Development Goal
MDR-TB	Multidrug-resistant tuberculosis
NTP	National tuberculosis control programme or equivalent
TB	Tuberculosis
UNAIDS	Joint United Nations Programme on HIV/AIDS
WHO	World Health Organization
XDR-TB	Extensively drug-resistant TB

Acknowledgements

The Regional report on tuberculosis in the Americas 2011 was produced by Florian Marx and led by Mirtha del Granado, Regional Advisor for TB in PAHO/WHO.

The data used was the one collected, analyzed and presented in the Global Tuberculosis Control WHO Report 2011 from the Americas. Our WHO colleagues from the Stop TB Department, especially those in the TME team were fully involved in that process. At Regional level, the following PAHO staff was also involved: Rafael López, Yamil Silva, Raimond Armengol and Anna Volz. Likewise, all the TB focal points in the PAHO/WHO country offices supported the process, as well as Eldonna Boisson and Ward Schrooten from the Caribbean Epidemiology Centre - CAREC.

For the data collection, the following country staff from national TB programs were involved: Marta Isabel de Abrego, Christian Acosta, Sarita Aguirre, Shalauddin Ahmed, Xochil Aleman de Cruz, Raul Alvarez, Mirian Alvarez, Alister Antoine, Cecilia de Arango, Fabiola Arias, Wiedjaiprekash Balesar, Stefano Barbosa, Draurio Barreira, Maria del Carmen Bermudez, Jaime Bravo, Lynrod Brooks, Violet Brown, Marta Isabel Calona de Abrego, John Cann, Maria Lourdes Carrasco Flores, Martin Castellanos Joya, Kenneth Castro, Roxana Cespedes Robles, Gemma Chery, Jesse Chun, Sonia Copeland, Clara Cruz, Celia de Cuellar, Ofelia Cuevas, Dy-Juan De Roza, Richard D'Meza, Roger Duncan, Rachel Eersel, Mercedes España Cedeno, Clara Freile, Victor Gallant, Julio Garay Ramos, Christian Garcia Calavaro, Jennifer George, Izzy Gerstenbluth, Margarita Godoy, Franz Gonzalez, Yaskara Halabi, Yaskara Halabi, Dorothea Hazel, M. Henry, Alina Jaime, Ronal Jamanca Shuan, Hector Jave Castillo, Carla Jeffries, Sharline Koolman-Wever, Ashok Kumar, Athelene Linton, Maria Josefa Llanes Cordero, Marvin Maldonado, Francisco Maldonado Benavente, Andrea Y. Maldonado Saavedra, Raul Manjon Telleria, Belkys Marcelino, Ada Martinez Cruz, Maria de Lourdes Martinez Olivares, Zeidy Mata Azofeifa, Timothy McLaughlin-Munroe, Mery Mercedes, Leilawati Mohammed, Jeetendra Mohanlall, Ernesto Moreno, Francis Morey, Alice Neymour, Persaud Nordai, Gisele de Oliveira, M. Perry Gomez, Tomasa Portillo, Irad Potter, Bob Pratt, Edwin Quiñonez Villatoro, Dottin Ramoutar, Leonarda Reyes, Anna Esther Reyes Godoy, Paul Ricketts, Adalberto Rodriguez, Maria Rodriguez, David Rodriguez, Jorge Rodriguez De Marco, Myrian Roman, Katia Romero, Nilda de Romero, Joan Simon, R.A. Manohar Singh, Jackurlyn Sutton, Clarita Torres, Zulema Torres Gaete, Maribelle Tromp, Christopher Trujillo Garcia, William Turner, Melissa Valdez, Reina Valerio, Daniel Vazquez, Eva de Weever, Michael Williams, Thomas Wong, Oritta Zachariah, Nydia Zelaya and Elsa Zerbini.

Preface

Tuberculosis control in the Region of the Americas has made important progress in the past two decades, initially with the implementation of the DOTS Strategy and more recently with the execution of the Stop TB Strategy, enabling the Region to reach the targets of the Millennium Development Goals (MDGs). Despite this achievement, the subjacent factors of poverty, inequity, rapid urbanization, alcoholism, linkages with other diseases like HIV/AIDS and diabetes, and presence of drug resistance, among others, makes TB a persistent disease especially in vulnerable populations.

In 2010, WHO estimated 270,000 new TB cases in the Region, out of which approximately 23,000 died. A total of 226,100 TB cases were notified, of which 2,600 were resistant to both Isoniazid and Rifampicin (MDR-TB cases) and 18% of the 97,200 tested for HIV were positive. These Regional figures mask a wide spectrum among the different countries in the Americas that translates even within countries.

This Regional Report is the most recent of a series of annual Regional reports. It has been prepared using the data reported to PAHO/WHO by countries during 2011. The division of the information in five sub-regions: North America, Caribbean, Mexico and Central America, South America (Andean) and South America (Other) facilitates the analysis and presentation of the data, clearly revealing the differences in the Americas. The Report presents not only the current burden of disease and progress made in TB control and towards international targets, but also interesting financial aspects. Its concrete conclusions aimed at overcoming the challenges found, provide guidance to countries.

We hope this publication becomes a reference document for the national TB programs, partner organizations, implementers of the Stop TB strategy, academics, civil society working on TB, and affected communities; an example for similar reports at national and subnational level; and a source of information for TB decision makers at all levels.

Executive Summary

This report is intended to provide a comprehensive and up-to-date assessment of the current burden of tuberculosis (TB) and the situation of TB control in the Region of the Americas. It is based on TB surveillance and control data reported to WHO in 2011. The main findings of the report are as follows:

1. In 2010, an estimated 267,000 incident TB cases occurred in the Region of the Americas, 5,000 less than in 2009. Over the past 20 years, TB incidence decreased by 2.6% annually on average. More than two-thirds (69%) of incident TB cases occurred in South America: the Andean subregion (30%) and the other countries of South America (39%; Brazil 32%). The remaining cases occurred in the Caribbean (14%), Mexico and Central America (12%) and Northern America (5.5%). The number of incident TB cases per 100,000 of the population was 28.6 in the Region of the Americas. The rate varied considerably across the countries. It was highest in Haiti (230) and higher than 100 per 100,000 in Suriname (145), Bolivia (135), Guyana (111) and Peru (106). Incidence is now declining or constant in all countries except for Suriname (**Chapter 1.1**).
2. In 2010, there were an estimated 334,000 prevalent TB cases in the Region of the Americas, and an estimated 20,000 TB deaths occurred among HIV negative cases (**Chapter 1.2 & 1.3**).
3. A total of 6,200 MDR-TB cases were estimated among notified TB cases in the Region of the Americas in 2010. Seven countries (Peru, Brazil, Mexico, Ecuador, Haiti, Dominican Republic and Colombia) accounted for more than 80% of all estimated MDR-TB cases in the Region. The estimated proportion of MDR-TB was 2.1% of new and 12% of re-treatment TB cases (**Chapter 1.4**).
4. In 2010, there were an estimated 34,500 HIV positive incident TB cases in the Region of the Americas, 12.9% of all incident TB cases. More than half of all incident HIV positive TB cases occurred in Brazil. At country level, the proportion of incident TB cases with HIV-co-infection varied between 1.9% and 30.4% (**Chapter 1.5**).
5. A total of 226,100 TB cases were notified in the Americas of whom 169,200 were new Pulmonary TB (PTB) cases. Of these, 132,000 (78%) were confirmed by any laboratory method and 117,000 (69%) were new sputum smear-positive PTB cases. The proportion of new PTB cases confirmed by smear microscopy varied at country level between 43% and 91% (**Chapter 2.1**).
6. A total of 9,300 new TB cases notified in 2010 were children (age 0-14 years), 5.0% of all new TB cases notified. One-fourth of all childhood TB cases were sputum smear-positive (**Chapter 2.1.5**).
7. The Case Detection Rate (all forms of TB) in the Americas was 80% in 2010. It has been increasing in the Region over the past years (**Chapter 2.2**).
8. Of all new smear-positive TB cases treated in the 2009 cohort, 76% were successfully treated. The rate of unfavorable treatment outcomes (i.e. death, failure or default) was highest in Trinidad and Tobago (29%), and in Guyana (28%), where almost one fifth of all new smear-positive TB cases defaulted from treatment. The treatment success rate was lower in TB cases who were HIV-positive (57%) and in MDR-TB cases (47%) (**Chapter 2.3**).
9. A total of 21 countries reported data on laboratory capacity and external quality assurance (EQA) of laboratories in 2010. All reporting countries except for Jamaica and Uruguay had at least one or more laboratories providing smear microscopy available per 100,000 population. Capacity for culture testing and DST was below regional targets in 11 and 15 countries, respectively. Laboratory inclusion in EQA varied considerably across countries. Performance of included laboratories in most of the countries was acceptable (**Chapter 2.4**).
10. Drug-susceptibility test (DST) results in 2010 were available for 6.2% of notified new TB cases and 22% of re-treatment cases (30 out of 35 countries reporting data). There is considerable variation in the coverage of DST among re-treatment cases across the countries. DST resulted in the detection of 2,600 MDR-TB cases in the

Americas in 2010, 43% of all MDR-TB cases estimated among notified cases. A total of 3,235 MDR-TB cases were provided with second-line treatment, nearly a quarter more than detected (**Chapter 2.5**).

11. Of all TB cases notified in the Americas in 2010, 43% had an HIV test result recorded. The proportion varied across the countries between 13% and 100% of all notified TB cases. It was below average in South America (Andean: 39%; Other: 43%). A total of 18,200 notified TB cases were HIV positive, 18% of TB cases with an HIV test result recorded. The proportion of HIV positive TB cases was highest in the South America – Other subregion (24%) and in the Caribbean (20%). Among countries reporting data, the proportion of HIV-positive TB cases who were provided with co-trimoxazole preventive therapy (CPT) and antiretroviral therapy (ART) was 47% and 65% (**Chapter 2.6**).
12. Overall, the Region of the Americas is making good progress towards the global targets for TB control. At the regional level, the 2015 targets have been met for TB incidence, prevalence and mortality. Considerable progress was made towards the target for case detection (2010: 80% vs. 2015 target: $\geq 90\%$). However, only limited progress was made for treatment success of new smear-positive TB cases (2010: 76% vs. 2015 target: $\geq 90\%$). The report provides a detailed assessment of progress at regional, subregional and country level (**Chapter 3**).
13. The number of countries reporting financial data has reached 100% in 2011. However the quality of the data could be improved (**Chapter 4.1**).
14. The funding available for TB control in 15 selected countries with complete information has increased since 2006 and is expected to reach USD 279 million in 2012. 90% of the expected funding is from national governments and the largest source of donor funding is the Global Fund. Despite these available sources funding gaps continue to be reported by the NTPs, reaching USD 40 million for 2012. (**Chapter 4.2**).
15. The estimated cost per patient treated with first line drugs in the 15 selected countries ranged between USD 88 for Haiti to USD 4719 for Jamaica. Although these costs tends to be higher in the higher income countries, other variables such as the number of patients treated or the model of care influence the cost (**Chapter 4.3**).

Introduction

This report was produced and published by the Regional Tuberculosis (TB) Program of the Pan American Health Organization (PAHO). It aims to provide a most recent, comprehensive and up-to-date assessment of the burden of tuberculosis (TB) and the situation of TB control in the Region of the Americas.

The analysis for this report is based on TB surveillance and control data submitted by countries of the Americas to PAHO and WHO during the 2011 TB data collection for the Global TB Control Report. The financial analysis was conducted on the basis of data reported by 16 countries since 2006. These countries represent 85% of the TB burden in the Region (by numbers of incident cases.)

Data, figures and trends in this report are presented for the Region of the Americas, as a whole, five subregions and 35 countries. Subregions were defined on the basis of standard UN subregions. For reasons of comparability, South America was divided into two subregions, the Andean countries of South America (“South America – Andean”) and the other countries of South America (“South America – Other”). A total of 35 countries were considered for this report. Non-independent territories are not considered. An overview of the Region of the Americas and the five subregions used in this report is shown in the **Figure 1** and **Table 1** on the following page (9).

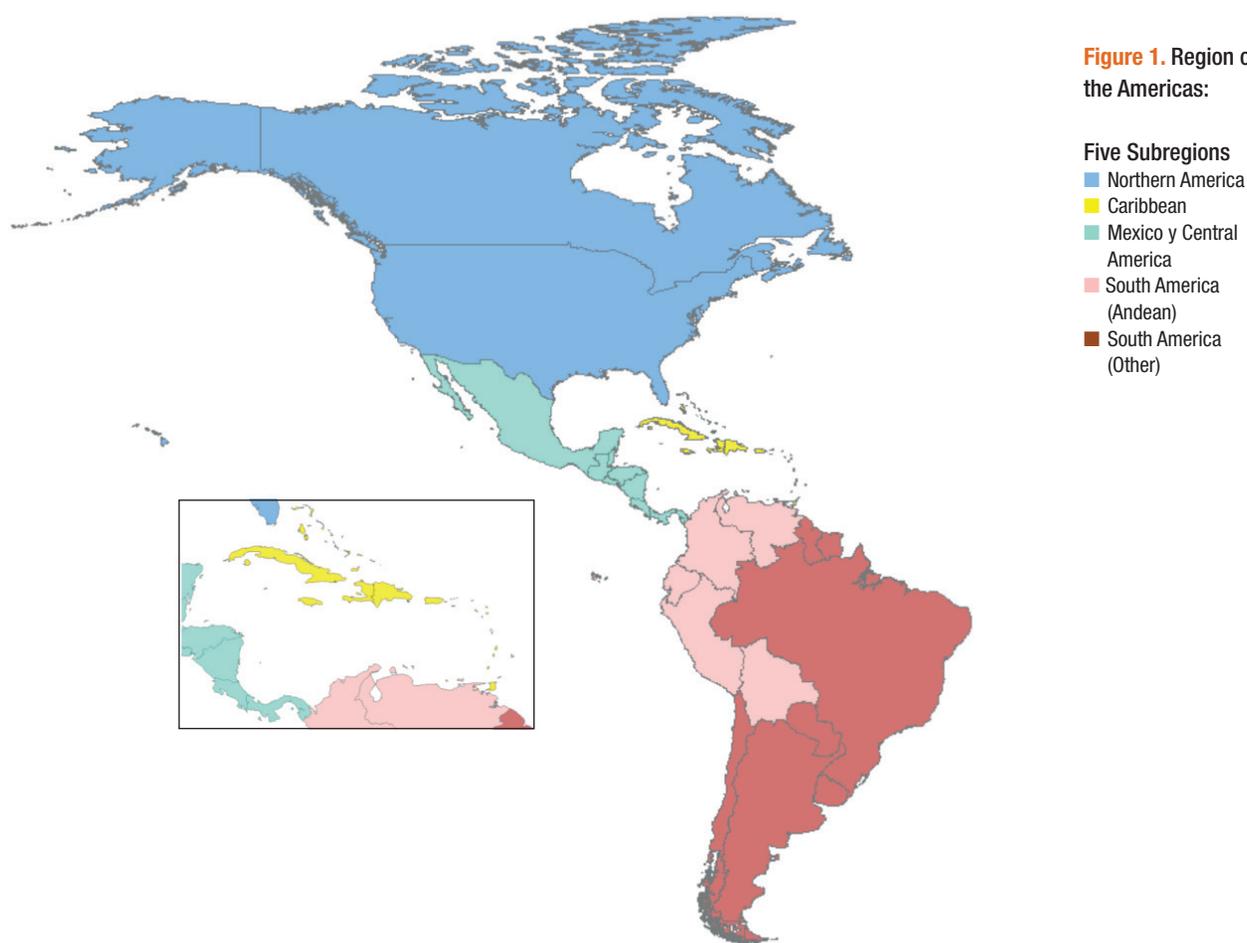


Table 1. Region of the Americas, country division into five subregions for this report*(Total population of the Region: 932,757,000)*

SUB-REGION	COUNTRY	POPULATION
Northern America	(2 countries)	344,401,000
	Canada	34,017,000
	United States of America	310,384,000
Caribbean	(13 countries)	40,155,000
	Antigua and Barbuda	89,000
	Bahamas	343,000
	Barbados	273,000
	Cuba	11,258,000
	Dominican Republic	9,927,000
	Grenada	104,000
	Haiti	9,993,000
	Jamaica	2,741,000
	Puerto Rico	3,749,000
	Saint Kitts and Nevis	52,000
	Saint Lucia	174,000
	Saint Vincent and the Grenadines	109,000
Trinidad and Tobago	1,341,000	
Mexico & Central America	(8 countries)	155,881,000
	Belize	312,000
	Costa Rica	4,659,000
	El Salvador	6,193,000
	Guatemala	14,389,000
	Honduras	7,601,000
	Mexico	113,423,000
	Nicaragua	5,788,000
Panama	3,517,000	
South America (Andean)	(5 countries)	128,746,000
	Bolivia (Plurinational State of)	9,930,000
	Colombia	46,295,000
	Ecuador	14,465,000
	Peru	29,077,000
	Venezuela (Bolivarian Republic of)	28,980,000
South America (Other)	(7 countries)	263,575,000
	Argentina	40,412,000
	Brazil	194,946,000
	Chile	17,114,000
	Guyana	754,000
	Paraguay	6,455,000
	Suriname	525,000
	Uruguay	3,369,000

CHAPTER 1
The Regional Burden
of Tuberculosis

The burden of TB in the Region of the Americas and elsewhere is measured in terms of estimated TB incidence (1.1), prevalence (1.2) and mortality (1.3). The chapter further presents the burden of MDR-TB measured as the number of MDR-TB cases estimated among notified TB cases (1.4). The section on TB/HIV includes estimate of the number of incident TB cases who are HIV co-infected (1.5).

1.1. Incidence

In the year 2010, an estimated 267,000 incident TB cases occurred in the Region of the Americas, equivalent to 29 per 100,000 of the population (low/high estimate*: 24-34).

The number of incident TB cases was nearly 5,000 TB cases lower compared to 2009. This reflects a continuation of the trend in regional TB incidence observed in the past 20 years, during which incidence rates decreased annually by 2.6% on average (**Figure 2**). Both, absolute number of estimated incident cases and incidence rate are currently lowest compared to all other WHO Regions (**Table 2, page 23**).

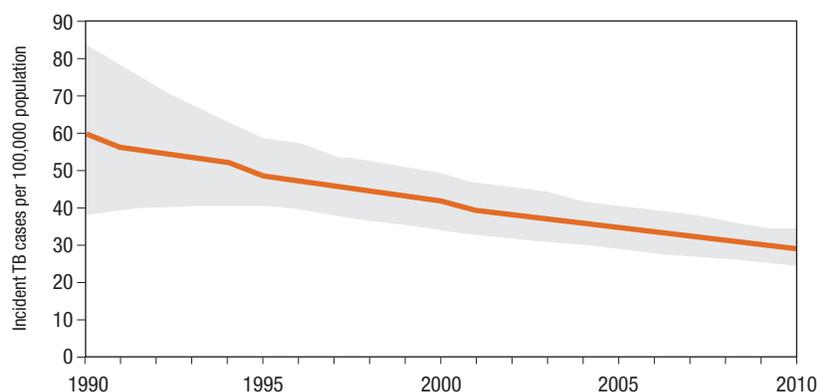
More than two-thirds (69%) of all estimated incident TB cases occurred in South America (Andean: 30%; other countries: 39%); 14% in the Caribbean, 12% in Mexico and Central America and 5.5% in Northern America.

The TB burden relative to the population was highest in the Caribbean, where 78 estimated incident TB cases occurred per 100,000 of the population, followed by South America (Andean: 61; Other: 40), Mexico & Central America (24), and Northern America (4.2 per 100,000).

In the past 20 years, estimated incidence rates have been declining continuously in all subregions except for the Caribbean, where a decline in incidence was observed only in recent years (**Figure 3a-d**).

Figure 2. Trend in estimated TB incidence in the Region of the Americas 1990 - 2010

(Shaded area represents uncertainty bands. *)



* Lower and upper bounds of uncertainty are defined as the 2.5th and 97.5th centiles of outcome distributions produced in WHO simulations. For detailed methods on the estimates and modeling of data uncertainty, please see: WHO Global Tuberculosis Report 2011.

Table 2. Estimated epidemiological burden of TB, 2010**A) Per absolute numbers in thousands**

	Incidence		Prevalence	Mortality	MDR-TB*
	MDR	HIV-positive	All forms	HIV-negative	
Northern America	15	1.2	17	0.6	0.1
Caribbean	31	6.3	42	3.8	0.6
Mexico and Central America	37	3.1	49	2.5	0.8
South America (Andean)	79	4.3	106	6.8	3.1
South America (Other)	105	20	119	6.5	1.5
Americas	267	35	334	20	6.2
AFR	2,317	816	2,770	247	32
EMR	651	12	1,029	95	14
EUR	418	20	557	60	53
SEAR	3,508	182	4,978	493	88
WPR	1,638	35	2,548	134	77
World	8,798	1,100	12,215	1,050	270

B) Per 100,000 population

	Incidence		Prevalence	Mortality	MDR-TB*
	All forms	HIV-positive	All forms	HIV-negative	
Northern America	4,2	0,4	4,9	0,2	1,2
Caribbean	78,0	15,8	104,6	9,5	3,5
Mexico and Central America	24,0	2,0	31,7	1,6	2,8
South America (Andean)	61,4	3,4	82,3	5,3	5,9
South America (Other)	39,7	7,4	45,3	2,5	1,8
Americas	28,6	3,7	35,8	2,2	2,2
AFR	277	98	331	30	2,7
EMR	109	2,1	172	16	4,0
EUR	47	2,3	62	6,7	21
SEAR	194	10	275	27	4,8
WPR	91	1,9	142	7,5	6,3
Mundo	128	16	178	15	5,3

AFR = African Region

EMR = Eastern Mediterranean Region

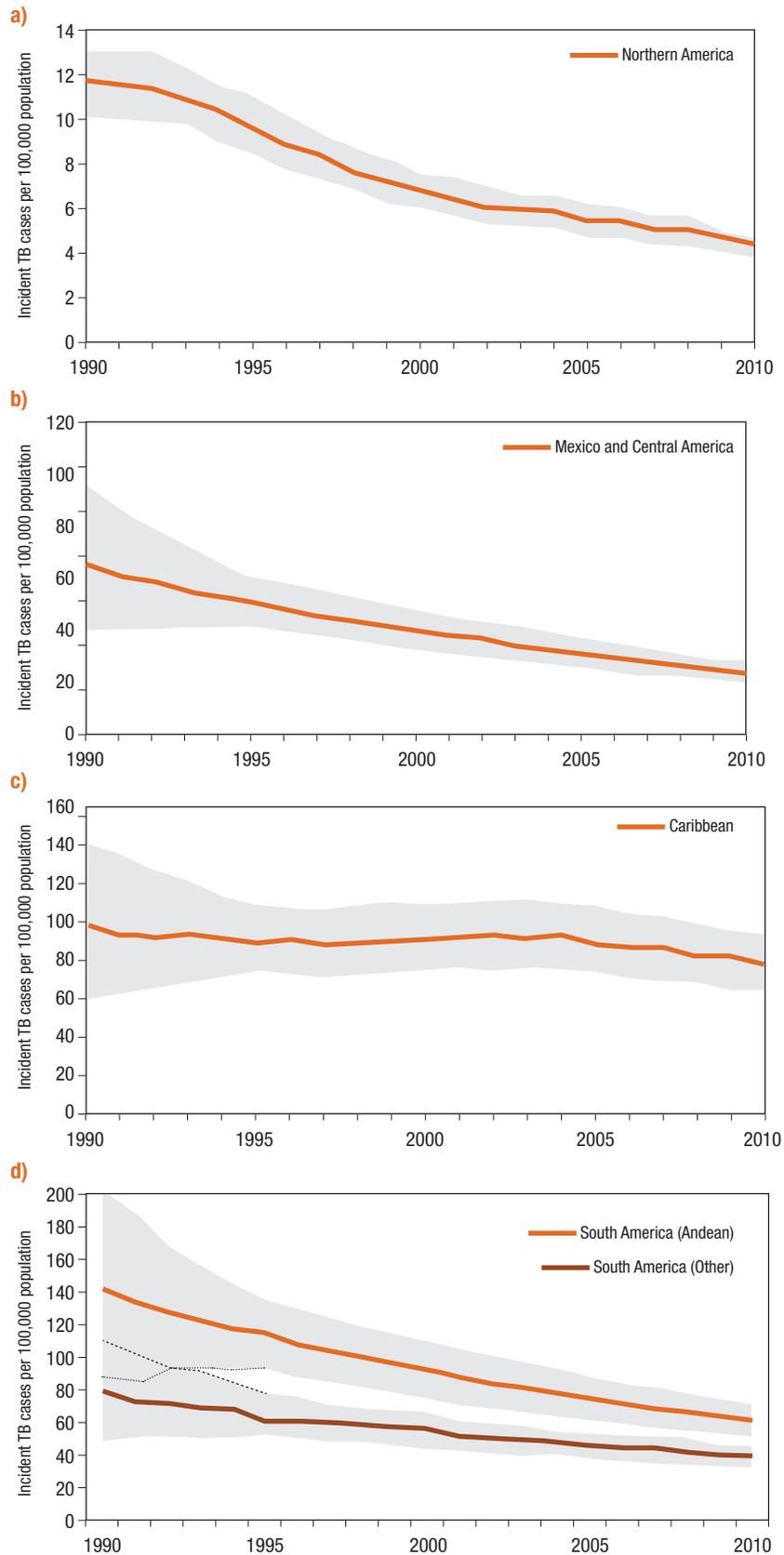
EUR = European Region

SEAR = South East Asian Region

WPR = Western Pacific Region

*MDR-TB cases estimated among notified TB cases

Figure 3a-d. Trends in estimated TB incidence in 5 Subregions of the Americas 1990 - 2010
 (Note different scales! Shaded area represents uncertainty bands.)



Countries in Northern America

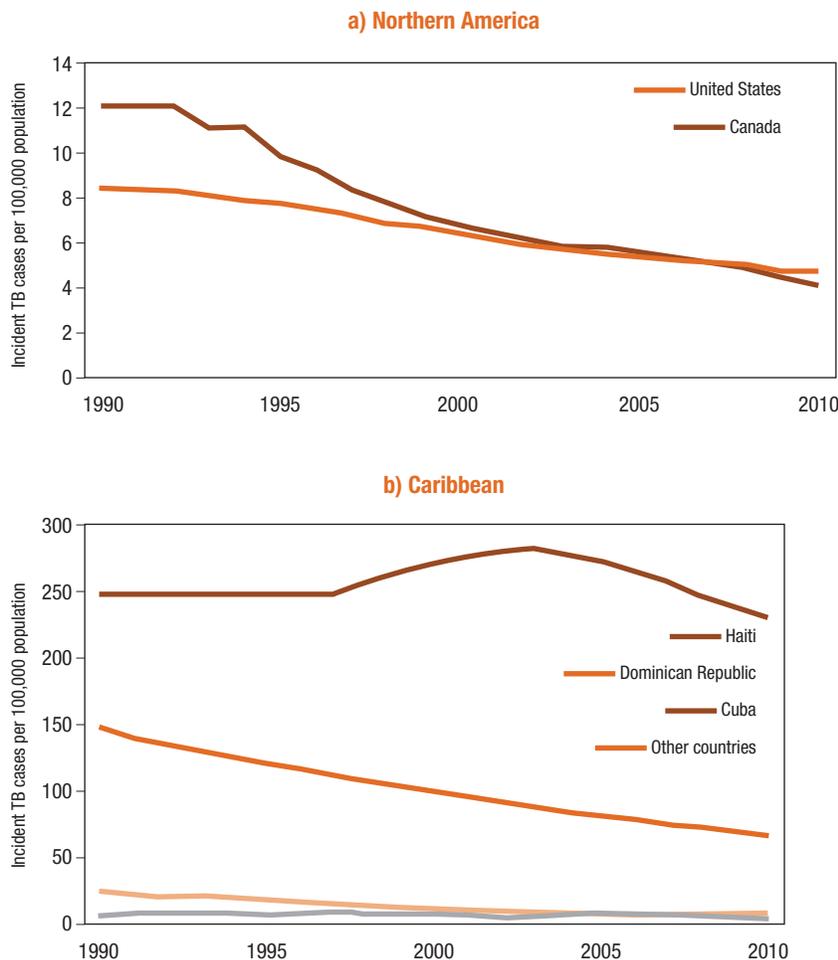
In 2010, 13,000 estimated incident TB cases occurred in the United States, 89% of all cases in the subregion. The remaining 1,600 incident TB cases occurred in Canada. TB incidence in both, Canada and the United States, were among the lowest in the Americas and continued to decrease in recent years (**Figure 4a**).

Countries in the Caribbean

Of the 31,300 incident TB cases estimated in the Caribbean in 2010, 98% occurred in three countries: Haiti (23,000; 74%), Dominican Republic (6,700; 21%) and Cuba (1000; 3.2%). The remaining 600 (1.9%) cases occurred in the 10 countries with smaller population. Estimated TB incidence in Haiti was 230 per 100,000 – highest in the Region of the Americas. It was lower in the Dominican Republic (67) and much lower in Cuba (9.3) and the remaining countries (overall: 6.8).

Trends in the estimated TB incidence over the past 20 years suggest that TB incidence was rising in Haiti until 2003 but is now declining. It has been declining in the Dominican Republic and Cuba and is constant at low level in the other countries (**Figure 4b**).

Figure 4a-b. Trends in estimated TB incidence in countries by subregion 1990 – 2010
(Note different scales!)



Mexico & Countries in Central America

In Mexico, 18,000 incident TB cases were estimated in 2010 – nearly half (48%) of the 37,500 incident TB cases estimated for the whole subregion. The other half were in the countries of Central America: Guatemala (8,900; 24%), Honduras (3,900; 10%), Nicaragua (2,400; 6.4%), and the following: El Salvador, Panama, Costa Rica and Belize (together: 4,250; 11%).

Estimated TB incidence was highest in Guatemala (62 per 100,000) and Honduras (51) and lowest in Mexico (16) and Costa Rica (13). Trends over the past 20 years indicate that TB incidence was declining in most of the countries since 1990 with the exception of Belize and Panama, where it has not been declining since 1990 (Figure 4c).

Countries in South America (Andean)

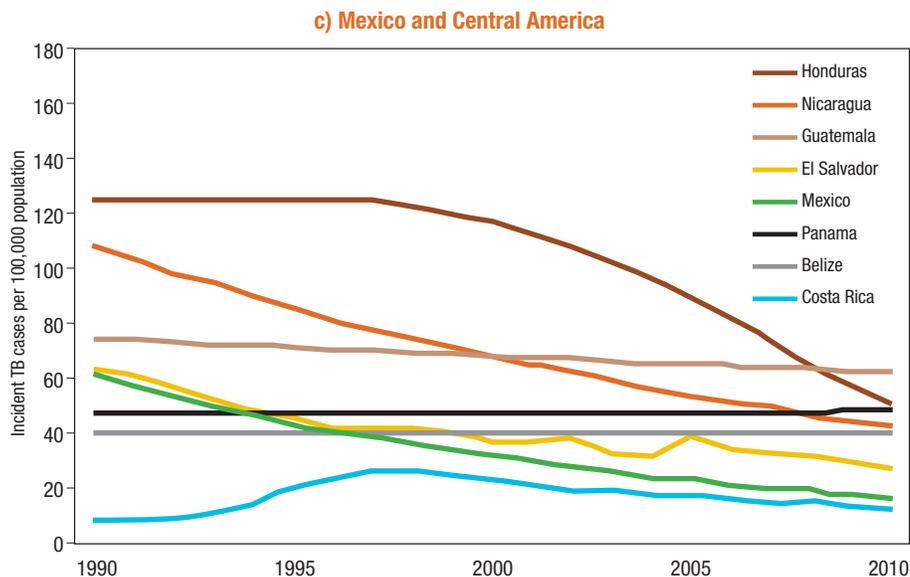
Around one third of the subregion’s 79,000 incident TB cases occurred in Peru (31,000; 34%), ranking 2nd in the Region of the Americas. Peru is followed by Colombia (16,000; 20%). Estimated TB incidence per 100,000 population was highest in Bolivia (131) and Peru (107) where it had declined substantially over the past 20 years. Incidence was further declining in Ecuador and Colombia, and it was constant at a lower level in Venezuela (Figure 4d).

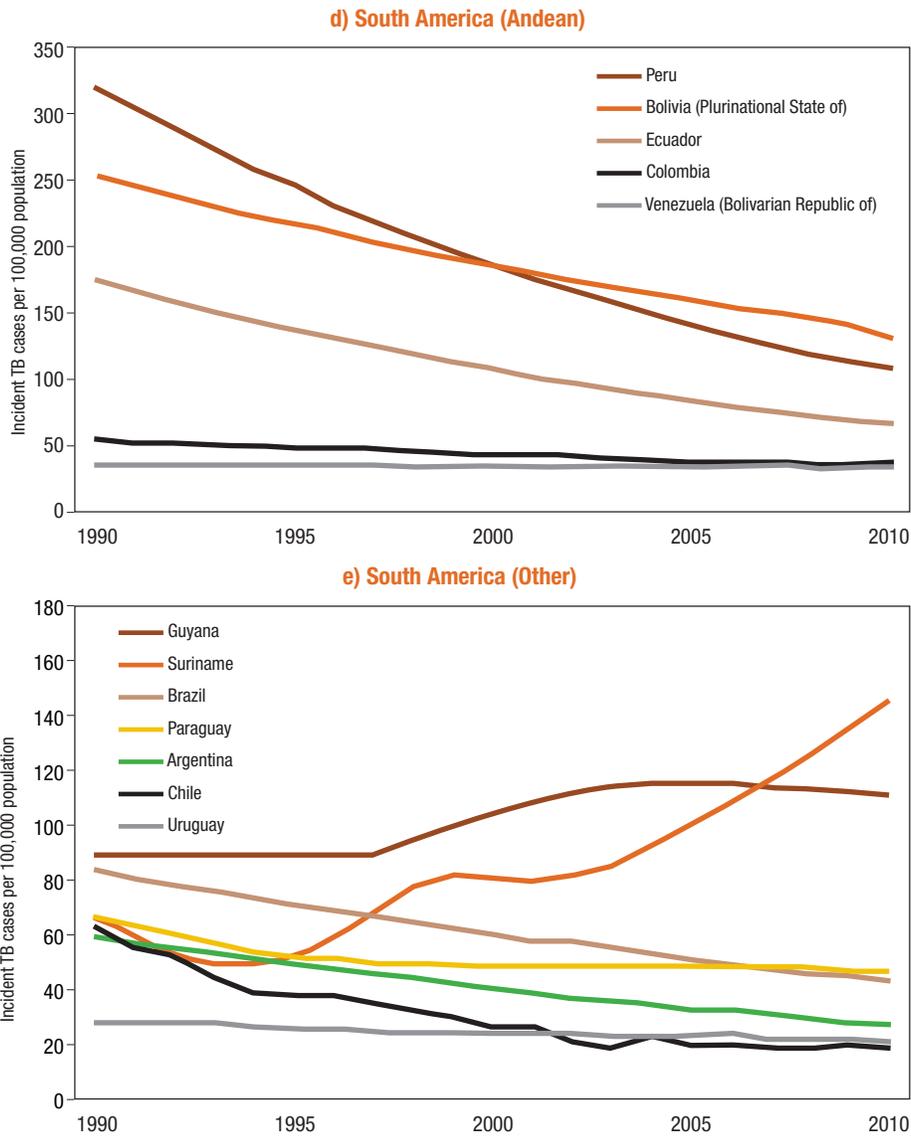
Countries in South America (Other)

Of the 104,500 estimated incident TB cases occurring in the other countries of South America in 2010, 81% (85,000) occurred in Brazil. – The country currently ranks 1st in the Americas and 17th worldwide by estimated numbers of incident TB cases. It accounted for almost one third of all incident TB cases in the Region. In South America, Brazil was followed by Argentina with 11,000 cases (11%).

Estimated TB incidence per 100,000 population was highest in Suriname (145) following a substantial increase over the past 10 years (2001: 78). It was declining in all other countries in the past years, in Guyana only since 2005 (Figure 4e).

Figure 4c-e. Trends in estimated TB incidence in countries by subregion 1990 – 2010
(Note different scales!)





The geographical 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 Region by estimated numbers and rates of incident TB cases.

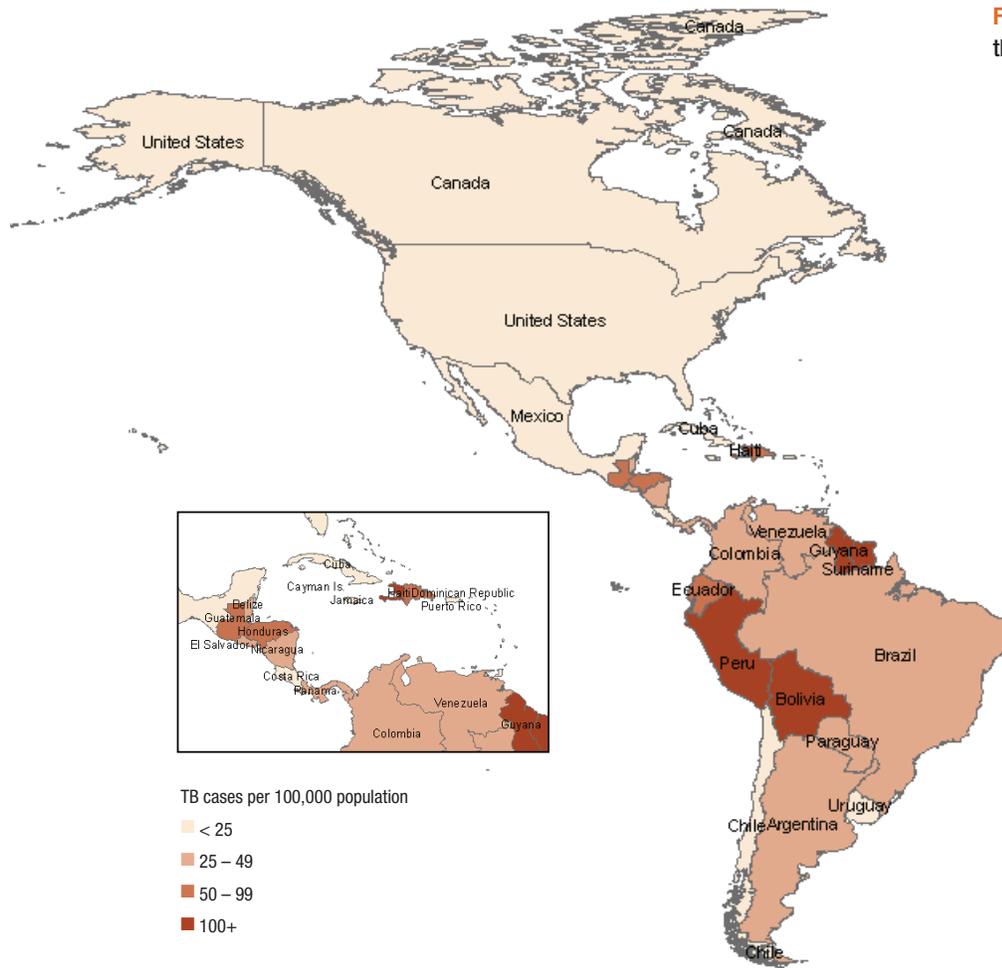


Figure 5. Estimated TB incidence in the Region of the Americas, 2010

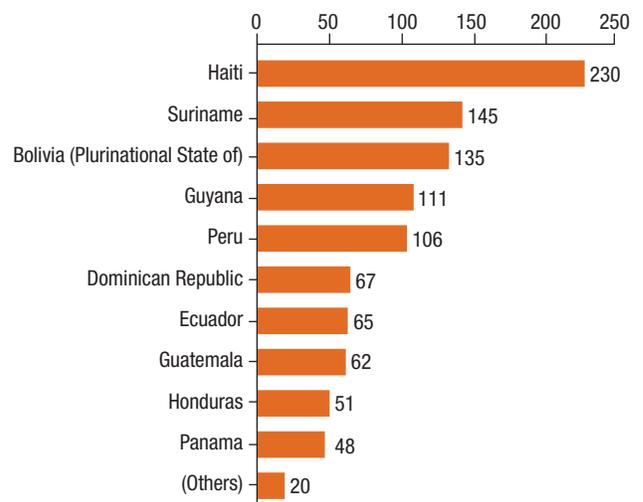
Box 1. Region of the Americas: Top 10 countries by estimated numbers of incident TB cases

(Highlighted in red: >80% of the regional burden)

N.º	Country	Incident TB cases	%	Cumulative %
1	Brazil	85,000	32%	32%
2	Peru	31,000	12%	43%
3	Haiti	23,000	8,6%	52%
4	Mexico	18,000	6,7%	59%
5	Colombia	16,000	6,0%	65%
6	Bolivia (Plurinational State of)	13,000	4,9%	70%
7	United States	13,000	4,9%	75%
8	Argentina	11,000	4,1%	79%
9	Venezuela	9,700	3,6%	82%
10	Ecuador	9,400	3,5%	86%
	Others	37,880	14%	100%

Figure 6. Region of the Americas: Top 10 countries by estimated TB incidence

(Per 100,000 population)



1.2. Prevalence

In 2010, there were an estimated 334,000 prevalent TB cases in the Americas, equivalent to 35.8 per 100,000 population.

The estimated number of prevalent TB cases was 119,000 (35.6% of the total regional estimate) in the South America Other subregion, 106,000 (31.7%) in the South America Andean subregion, 49,000 (14.7%) in Mexico & Central America, 42,000 (12.6%) in the Caribbean and 17,000 (5.0%) in Northern America.

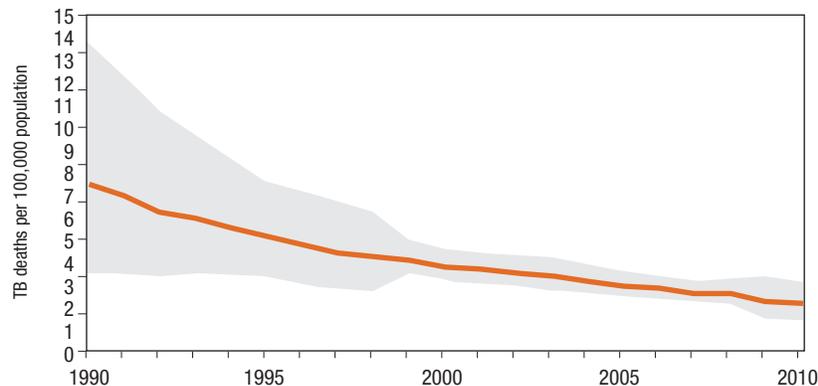
1.3. Mortality

In 2010, an estimated 20,000 deaths occurred among HIV negative TB cases in the Region of the Americas, equivalent to 2.2 TB deaths per 100,000 population (low/high estimate: 1.5 - 3.1).

There has been a continuous decrease in TB mortality in the Americas over the past 20 years (**Figure 7**).

Figure 7. Trend in estimated TB deaths per 100,000 of the population in the Americas 1990 - 2010

(HIV-positive deaths not included. Shaded area represents uncertainty bands.)



Estimated TB mortality in 2010 was highest in the Caribbean (9.5 per 100,000), and lowest in Northern America (0.2). Estimated mortality rates have been decreasing in all subregions over the past years (**Figure 8**).

It is estimated that an additional 7,000 - 11,000 TB deaths occurred in 2010 among HIV-positive TB cases in the Region.

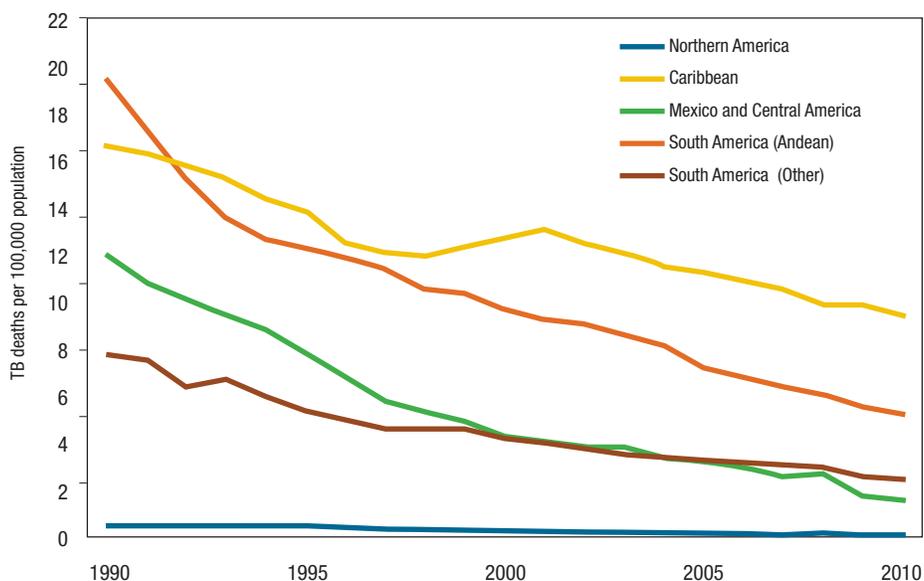
Data on estimated TB incidence, prevalence and mortality in the Region of the Americas are summarized in **Table 2**.

1.4. MDR-TB / XDR-TB

In 2010, there were an estimated 6,200 MDR-TB cases among notified TB cases in the Region of the Americas. The estimated proportion of MDR-TB among new cases was 2.1% (CI: 0.7%-3.4%) and among re-treatment cases 12% (3.8%-19%).

Figure 8. Trends in estimated TB mortality in five subregions of the Americas, 2010

(HIV-positive deaths not included)



Seven countries (Peru, Brazil, Mexico, Ecuador, Haiti, Dominican Republic and Colombia) accounted for more than 80% of all estimated MDR-TB cases in the region (Box 2). More than one third of all MDR-TB cases in the Region were estimated among cases notified in Peru.

At country level, the estimated prevalence of MDR-TB varied between 0% and 7% of new TB cases and between 0% and 27% of re-treatment cases (Figure 9).

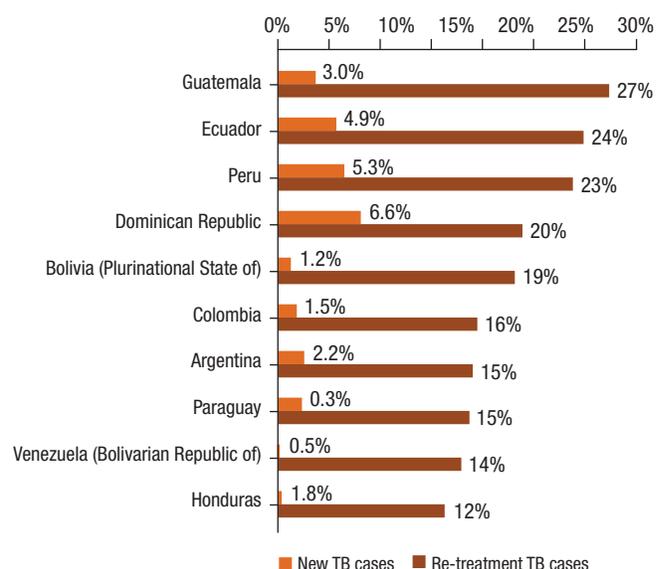
Box 2. Top 10 countries by estimated MDR-TB cases estimated among notified TB cases, 2010

(Highlighted in red: 80% of the regional burden)

N.º	Country	Estimated MDR-TB cases	%	Cumulative %
1	Peru	2,190	35%	35%
2	Brazil	1,140	18%	54%
3	Mexico	452	7.3%	61%
4	Ecuador	350	5.6%	67%
5	Haiti	304	4.9%	72%
6	Dominican Republic	300	4.8%	76%
7	Colombia	280	4.5%	81%
8	Argentina	250	4.0%	85%
9	Bolivia (Plurinational State of)	205	3.3%	88%
10	Guatemala	133	2.1%	90%
	Others	596	9.6%	100%

Figure 9. Top 10 countries by estimated prevalence of MDR-TB, 2010

(Per 100,000 population)



By January 2010, at least one case of extensively drug-resistant TB (XDR-TB) was reported in eight countries: Argentina, Brazil, Canada, Colombia, Ecuador, Mexico, Peru and the United States.

1.5. TB/HIV

In 2010, there were an estimated 34,500 HIV positive incident TB cases in the Region of the Americas, 13% of all incident TB cases. The incidence rate of HIV positive TB cases was 3.7 per 100,000 population (low/high estimate: 3.0 - 4.6).

More than half of all incident HIV positive TB cases occurred in Brazil (**Box 3**).

The estimated prevalence of HIV infection among incident TB cases was 20% in the Caribbean, 19% in the subregion of South America - Other, 8.5% in Northern America, 8.3% in Mexico & Central America, and 5.5% in the subregion South America - Andean.

At country level, HIV prevalence varied between 1.9% and 30% of estimated incident TB cases in 2010. It was 25% or higher in three countries: Trinidad and Tobago (30%), Jamaica and Suriname (both 25%) (**Figure 10**).

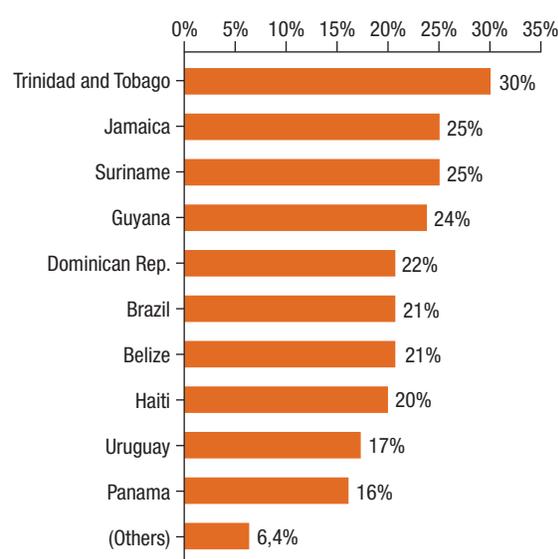
Box 3. Top 10 countries by estimated numbers of HIV positive incident TB cases, 2010

(Highlighted in red: 80% of the regional burden)

N.º	Country	Incident TB + HIV	%	Cumulative %
1	Brazil	18,000	52%	52%
2	Haiti	4,600	13%	65%
3	Dominican Rep.	1,500	4.3%	70%
4	Ecuador	1,200	3.5%	73%
5	United States	1,100	3.2%	76%
6	Colombia	1,100	3.2%	80%
7	Guatemala	1,000	2.9%	83%
8	Mexico	920	2.7%	85%
9	Venezuela (Bolivarian Republic of)	890	2.6%	88%
10	Argentina	760	2.2%	90%
	Others	3,477	10%	100%

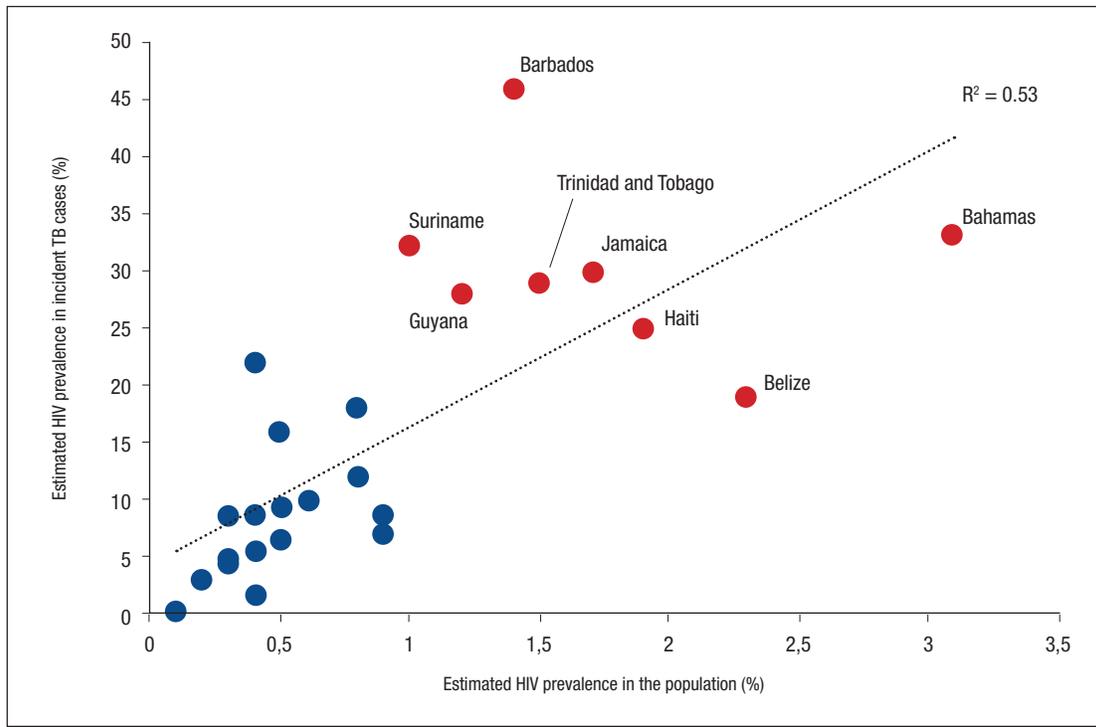
Figure 10. Top 10 countries by estimated prevalence of HIV among incident TB cases, 2010

(Countries with at least n=100 incident TB cases only)



The prevalence of HIV in the countries of the Americas correlated linearly with the estimated prevalence of HIV/AIDS in the overall population (**Figure 11**), suggesting that the burden of TB/HIV is closely related to the overall burden of HIV in the countries, and underlining the importance of TB and HIV inter-program collaboration (data from 2009).

Figura 11. Correlation between estimated HIV prevalence in the general population and estimated HIV prevalence in incident TB cases, 2009*
(Labeled and highlighted in red: countries with est. HIV prevalence >1% in the general population)



*This Figure had been published in the *Regional Report on Tuberculosis in the Region of the Americas 2009*.

CHAPTER 2

Progress in TB Control

This chapter presents data on the current situation and recent progress of TB control in the Region of the Americas. It is divided into six sections: Case notification (2.1), Case Detection (2.2), Treatment Outcomes (2.3), Laboratory strengthening (2.4), Diagnosis, detection and treatment of MDR- TB (2.5), and TB/HIV collaborative activities (2.6).

Trends in tuberculosis case notification are driven by various factors including changes in case finding efforts (e.g. increase in the number of health facilities that provide TB services), changes in recording and reporting systems (e.g. changes in case definitions, expanding reporting to the private sector) and underlying TB incidence (e.g. HIV-driven increase in TB case notifications).

If carefully collected and analyzed, notification data can provide valuable insights into the occurrence and the characteristics of TB in different groups of cases (i.e. by TB site, smear result, sex and age groups), which may have important implications for TB control. A particular sub-section is devoted to the notification of childhood TB in the Americas.

The case detection rate (CDR), defined as the ratio of notified TB cases and the number of estimated incident TB cases is used to estimate the proportion of incident TB cases with access to TB control under the DOTS strategy. It is one of the major target indicators for global TB control. The WHO has recently moved away from reporting CDR among sputum smear-positive TB cases. Instead, estimates of case detection rates for all forms of TB are used for reporting, and this report follows this change.

Monitoring of treatment outcomes of patients treated in the NTP is one of the major components of the Stop TB strategy. The corresponding section provides a detailed overview about trends in treatment outcomes of new smear-positive TB cases over time. Further, the most recent data on treatment outcomes at subregional level and across different groups of cases are presented. The Top-10 countries with the highest proportions of unfavorable treatment outcomes (i.e. failure, death, default) are presented.

The chapter ends with two sections representing the major challenges to TB control:

The section on management of MDR- TB focuses on the scale-up of MDR-TB control measures (trainings, guidelines) at country-level, the coverage of drug-susceptibility testing (DST), case detection of MDR-TB, and the provision of second-line treatment.

The section on collaborative TB/HIV activities focuses on the progress in the Region in terms of provision of HIV testing, co-trimoxazol preventive therapy (CPT) and antiretroviral treatment (ART) as well as activities for prevention of TB among people living with HIV.

2.1. Case notification

In 2010, around 226,100 TB cases were notified in the Region of the Americas, equivalent to 24.2 per 100,000 population. A breakdown of TB cases notified in 2010 is shown in **Figure 12**.

2.1.1. Cases by treatment history

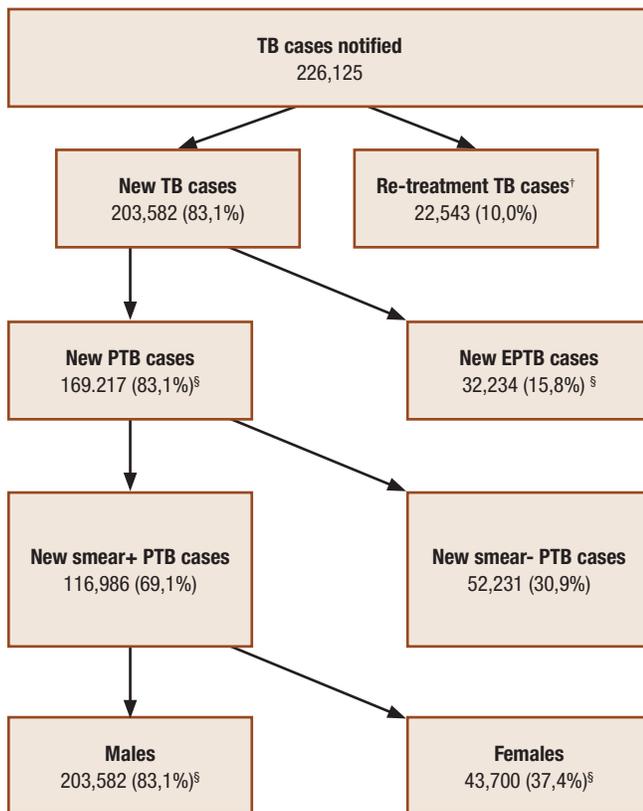
Of all TB cases notified in 2010, around 203,600 (90%) were new cases and 22,500 (10%) were re-treatment cases, classified as relapse cases (10,400), re-treatment after default (6,400), re-treatment after failure (900) or other types of re-treatment (4,800).

The proportion of notified re-treatment TB cases varied at country level* between 0.7% and 19% (Figure 13).

2.1.2. Cases by site of disease

Of the 203,600 new TB cases notified, 169,200 (83%) were new pulmonary TB (PTB) cases and 33,200 (16%) were new extra-pulmonary TB (EPTB) cases. For the remaining 2,100 TB cases, the site of disease was not reported.

Figure 12. Overview of TB cases notified in the Region of the Americas, 2010



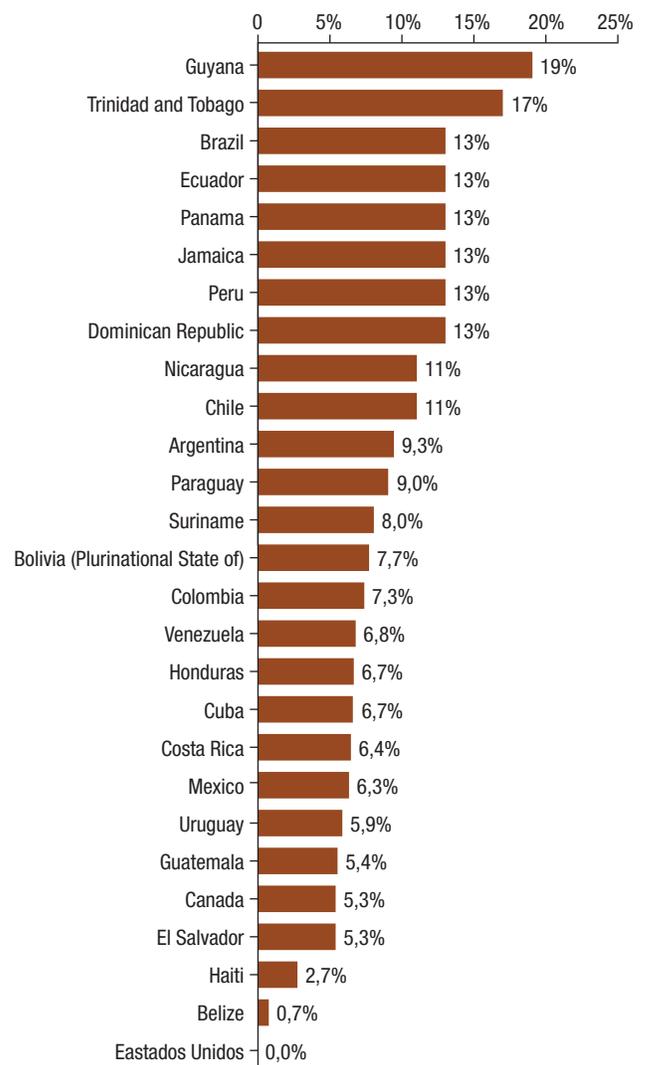
PTB = Pulmonary TB; EPTB = Extrapulmonary TB

[†] Including relapse, re-treatment after default, after failure and other re-treatment cases.

[§] Percentages do not add to 100% due to countries without data.

* Countries with at least 100 TB cases notified in 2010, the United States of America did not report new and re-treatment cases separately

Figure 13. Proportion of notified re-treatment TB cases by country*, 2010



The proportion of new EPTB cases was higher than average in Northern America (22%; Canada: 32%), whereas it was lower than average in the Caribbean (12%). The proportion of EPTB cases varied at country level between 4.7% and 35% (Figure 14).

The high variation in the proportion of EPTB cases across countries may be due to differences in case definitions or diagnostic capacity.

2.1.3. Cases by bacteriology

Of the 169,200 new PTB cases notified in 2010 in the Americas, 132,000 (78%) were bacteriologically confirmed by any laboratory method, and 117,000 (69%) were new smear-positive PTB cases, equivalent to a new smear-positive PTB case notification rate of 13 per 100,000 population.

At subregional level, the proportion of PTB cases with bacteriological confirmation was lowest in South America - Other (68%) and the Caribbean (69%). It was highest in the South American Andean subregion (94%) (Table 3).

Figure 14. Proportion of notified extrapulmonary TB cases of all TB cases by country, 2010

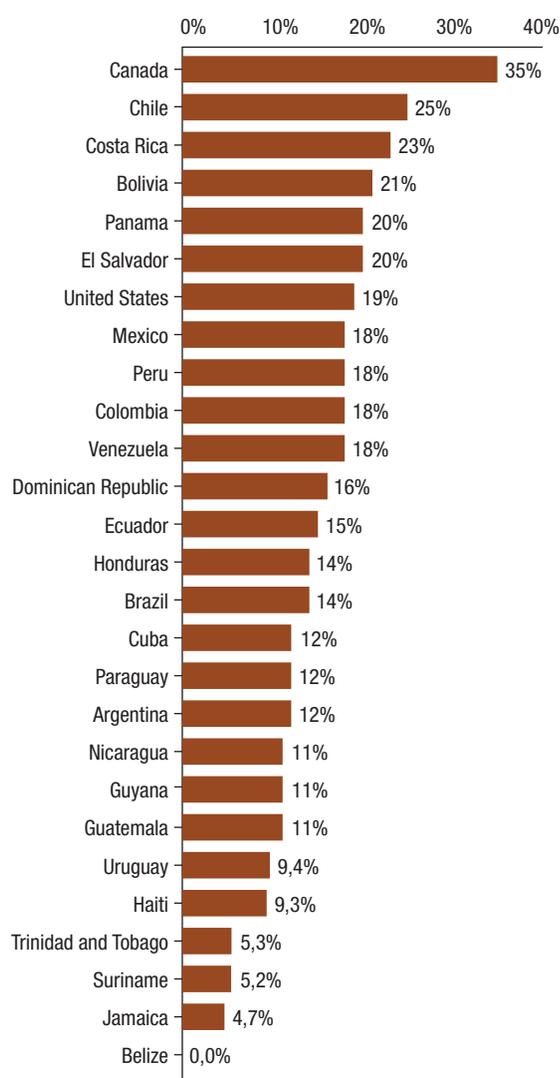


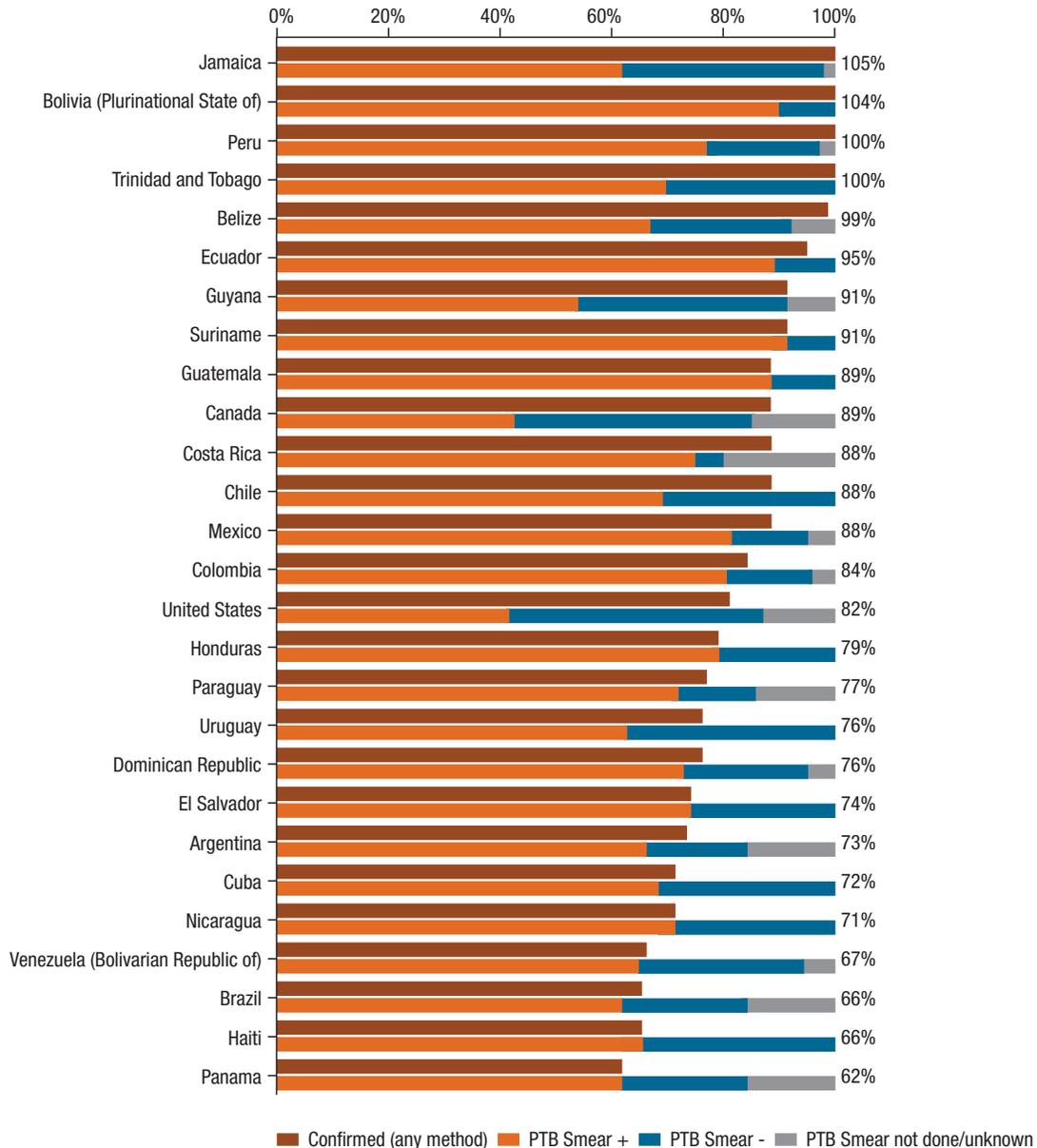
Table 3. New PTB Cases by bacteriology (subregions)

	New TB cases	
	% bact. confirmed	% smear-positive
Northern America	32%	43%
Caribbean	69%	67%
Mexico and Central America	84%	80%
South America (Andean)	94%	79%
South America (Other)	68%	63%
Americas	78%	69%

At country-level, the median proportion of new pulmonary TB cases for whom bacteriological confirmation by any laboratory method was achieved, was 84%. It varied across countries between 62% and 105% of all new PTB cases (Figure 15).* The median proportion of new pulmonary TB cases who were AFB-positive by smear-microscopy was 70%. It varied across countries between 43% and 91% of all new PTB cases.

Figure 15. New PTB Cases by bacteriology (countries), 2010

(Percentages indicate proportions of cases confirmed by any laboratory method*)

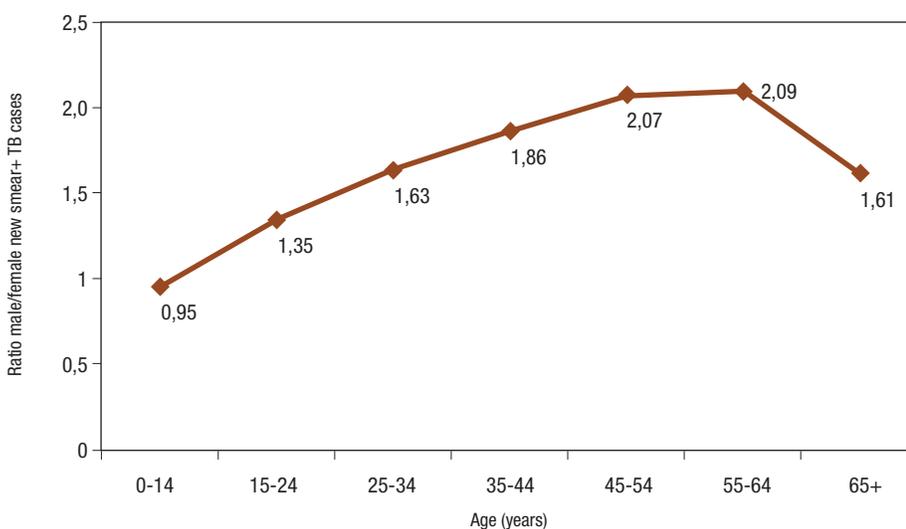


* Countries approaching or exceeding 100% may be subject to data error, probably due to inclusion of bacteriologically confirmed EPTB cases (instead of PTB cases only).

2.1.4. Cases by sex and age group

Of the 117,000 new smear-positive PTB cases notified in the Region of the Americas in 2010, around 73,200 (63%) were male and 43,700 (47%) were female.[§] The male/female ratio was 1.67. It varied across age groups (**Figure 16**).

Figure 16. Ratio of male vs. female new sputum smear-positive TB cases by age group in the Americas, 2010



Among males, the notification rate of new smear-positive TB cases was 15.6 per 100,000 men, and among females it was 9.0 cases per 100,000 women.

Case notification varied by sex and age group: The rate of new smear-positive TB cases per 100,000 was highest in young adolescent/adult age and declined in older age groups (**Figure 17a**, page 27).

The age and sex distribution of smear-positive TB case notification rates differed across the five subregions (**Figure 17b-f**, pages 26 and 27).

In Northern America notification rates increased towards senior male age. They were lower in females across all age groups (except in children) with a peak in young female age (Fig. 17b).

In the Caribbean smear-positive TB case notification rates in males and females were highest in young adults aged 25-34 years (**Figure 17c**).*

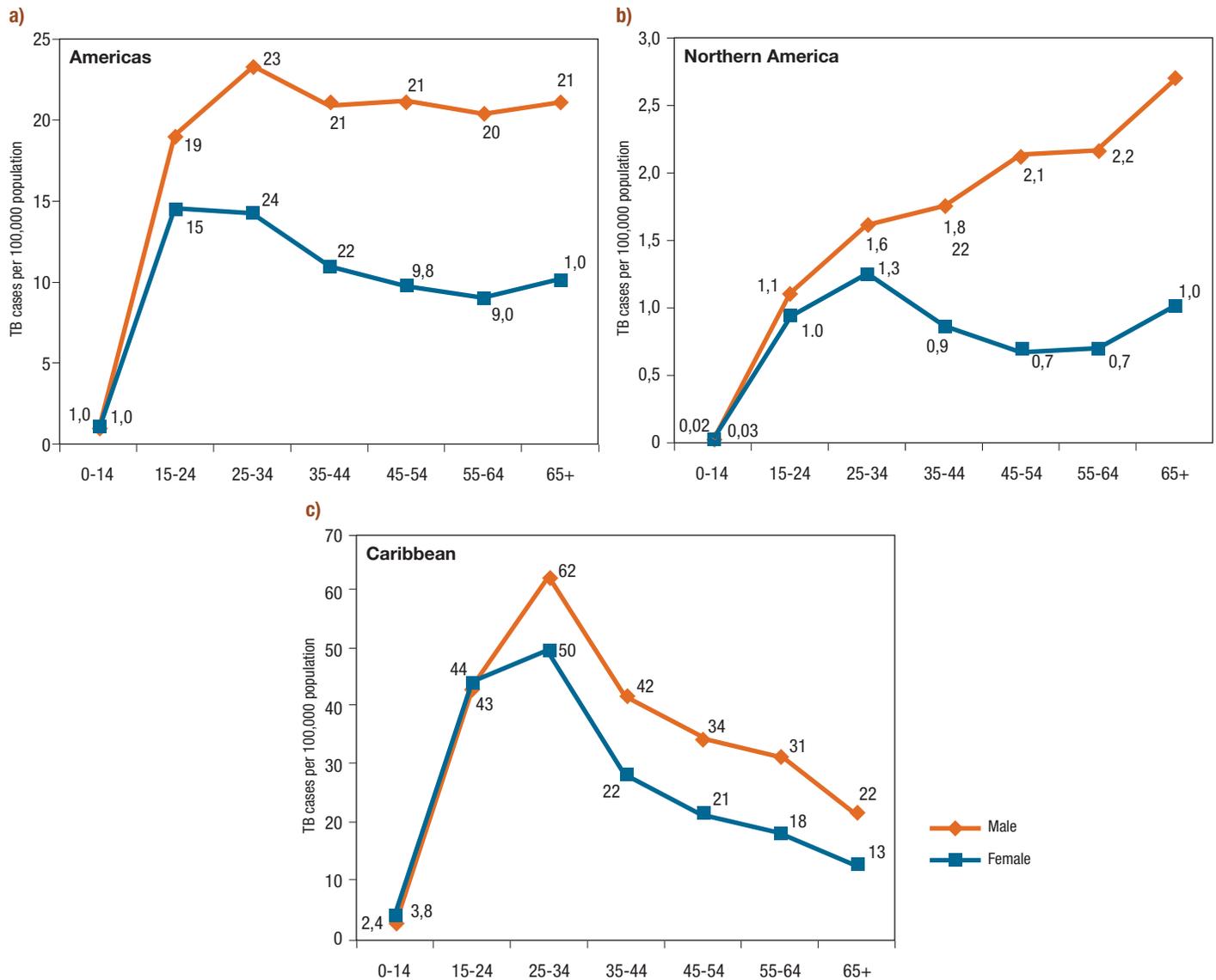
Trends in Mexico & Central America were similar with notification rates in males and females increasing towards senior age groups (**Figure 17d**).

[§] By the time this report was made, Peru had not provided data for smear-positive TB cases by sex & age-group combined. In order to estimate numbers and rates, the total number of smear-positive TB cases notified in 2010 were applied to relative proportions for sex & age of smear-positive TB cases notified in 2008 (last available data for sex & age group).

[†] In the Caribbean, case notification rates by sex and age-group were mainly determined by Haiti and Dominican Republic with around 93% of new smear-positive TB cases notified in these two countries.

Figure 17 a-c. New smear-positive TB case notification rate by sex and age group in the Region of the Americas and five subregions, 2010

(Note different scales)



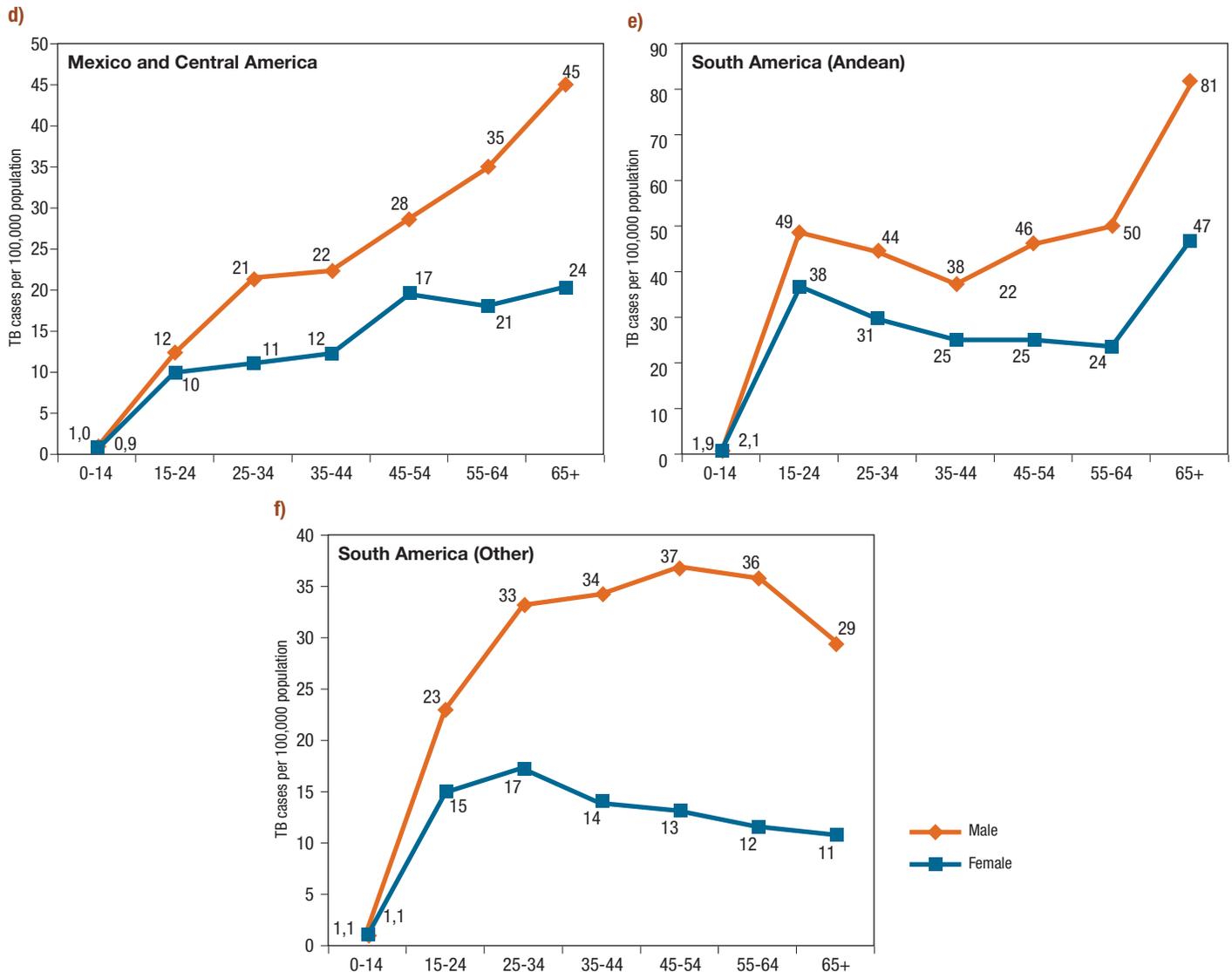
In the Andean countries of South America, TB case notification rates showed a double peak in the population aged 25-24 years and 65+ years (**Fig. 17e**). In the other countries of South America, notification rates in males were constantly high across adult age whereas they showed a peak in women aged 25-34 years (**Figure 17f**).

Interpretation of these differences should be made with caution, as they may relate to a variety of factors such as case detection, recording and reporting, trends in TB incidence and TB/HIV co-infection.

A shift of notification rates towards younger age groups, such as in the Caribbean, may indicate a more current TB epidemic with increased transmission coupled with the consequences of converging TB and HIV/AIDS epidemics.

Figure 17d-f (continuation). New smear-positive TB case notification rate by sex and age group in the Region of the Americas and five subregions, 2010

(Note different scales)



2.1.5. Childhood tuberculosis

A total of 9,300 children (age 0-14 years) were notified as new TB cases in the Region of the Americas, equivalent to 5.0% of all new TB cases notified.*

More than half of these childhood TB cases were notified in South America (Andean: 1,900/20%; Other: 3,300/35%).

Each, the Caribbean and Mexico & Central America subregion notified 1,700 (18%) childhood TB cases, and in Northern America 600 (6.5%) childhood TB cases were notified.

* New cases with age-related data available only, 186,500 (91.6%) of the 203,600 new TB cases notified in 2010, respectively; availability was lower for smear-negative and extrapulmonary TB cases.

One fourth, 25%, of the child TB cases reported were smear-positive, 53% were smear-negative, and 22% were extra-pulmonary TB cases.[†]

The notification rate of childhood TB in the Region of the Americas was 4.0 per 100,000 children. In the Caribbean, the notification rate of childhood TB was highest compared to all other subregions in the Americas and four times higher than the regional rate (Figure 18).

The proportion of notified childhood TB cases varied at the country level between 0.8 and 18% of all new cases (Figure 19).

Figure 18. Childhood TB case notification rates in the Region of the Americas and five subregions, 2010

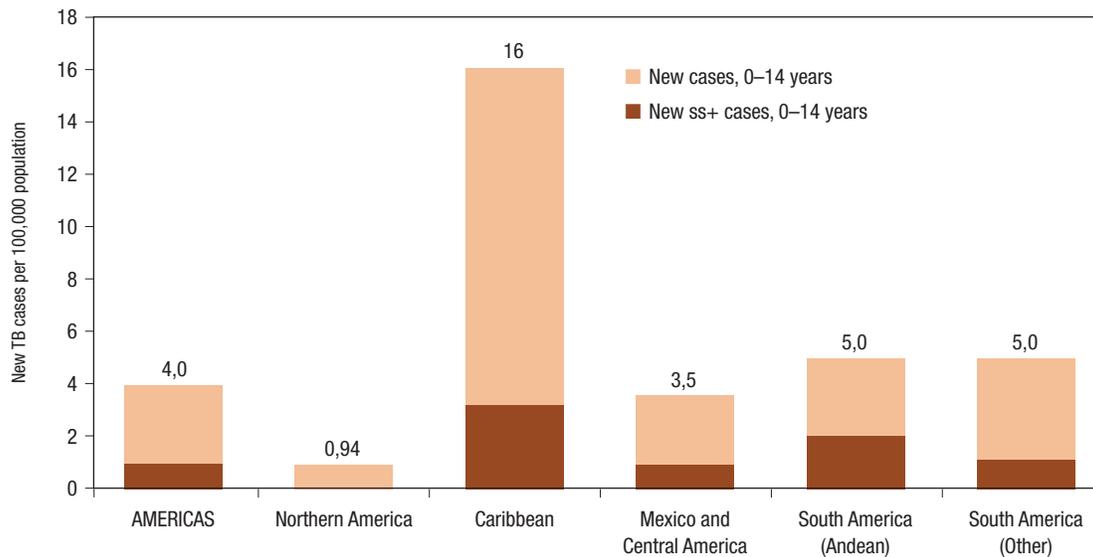
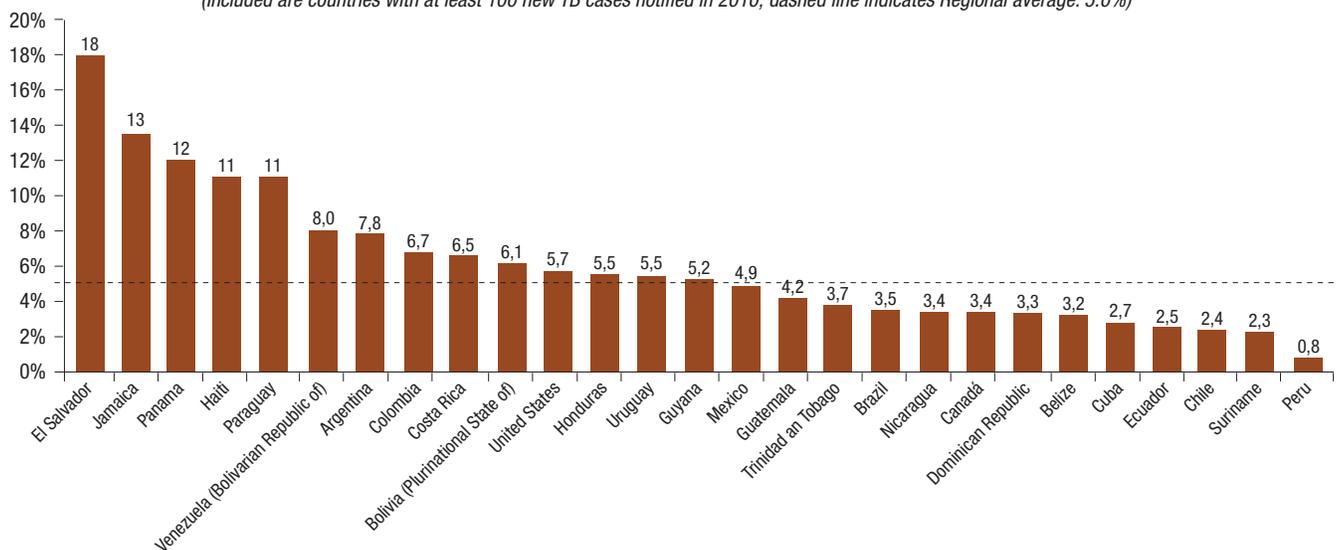


Figure 19. Notified new cases of TB in children (0-14 years) as percentage of all new TB cases notified, 2010

(Included are countries with at least 100 new TB cases notified in 2010; dashed line indicates Regional average: 5.0%)



[†] Under-reporting of age-related cases among smear-negative and extrapulmonary TB cases may have led to over-estimation of smear-positive TB cases.

Variable proportions of childhood TB cases across the countries may reflect differences in case finding practice (e.g. contact tracing) as well as under-/over-diagnosis or -reporting of childhood TB.

2.1.6. Case notification in overseas territories and island nations

Eleven overseas territories and island nations with a total population of 670,800 people are situated in the Region of the Americas – in the Caribbean Sea and the Northern Atlantic (Bermuda).

In 2010, a total of 36 TB cases were reported from nine of these territories, 27 of those TB cases were new sputum smear-positive cases (**Box 4**).

Box 4. Tuberculosis notification in 11 Territories, Region of the Americas

Territory	Population	TB cases notified	Rate per 100.000
Anguilla (British)	15,358	1	6.5
Aruba (Dutch)	107,488	6	5.6
Bermuda (British)	64,941	1	1.5
British Virgin Islands (British)	23,245	1	4.3
Cayman Islands (British)	56,230	4	7.1
Curaçao (Dutch)	144,387	5	3.5
Dominica	67,757	8	12
Montserrat (British)	5,934	–	–
Saint Martin (Dutch)	38,010	3	7.9
Turks and Caicos Islands (British)	38,354	7	18.3
US Virgin Islands (US)	105,056	–	–
Total	670,760	36	5.4

The overall case notification rate (all forms of TB) for all 11 territories together was 5.4 per 100,000 population.

2.2. Case detection

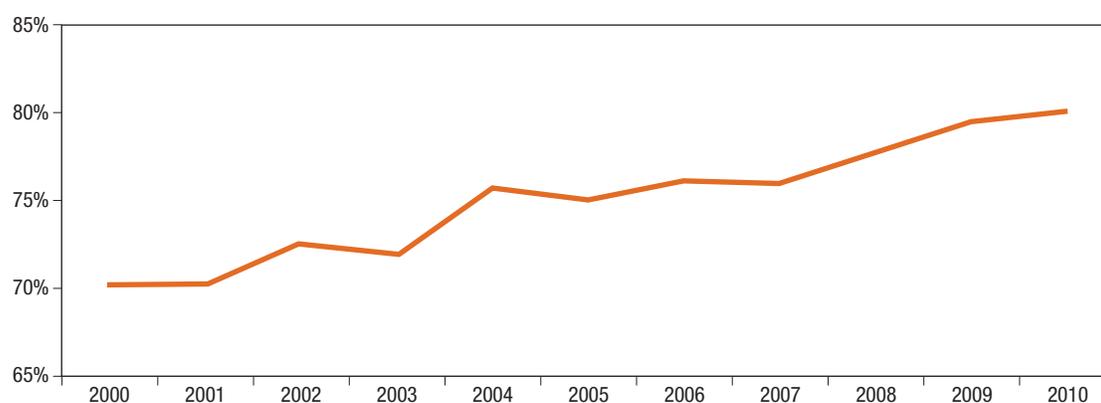
The case detection rate (CDR) for all TB cases is defined as the number of new and relapse TB cases that were diagnosed and notified by National TB Programs, divided by the estimated incident TB cases of that year. It has been steadily increasing in the Region of the Americas over the past years, i.e. from 70% in the year 2000 to 80% in the year 2010 (Table 4 & Figure 20). The estimate for the CDR in 2010 was highest in Northern America and Mexico & Central America (both 86%) and lowest in the Caribbean* (62%; **Table 4**).

Case detection varied considerably at country level (**Figure 21**).

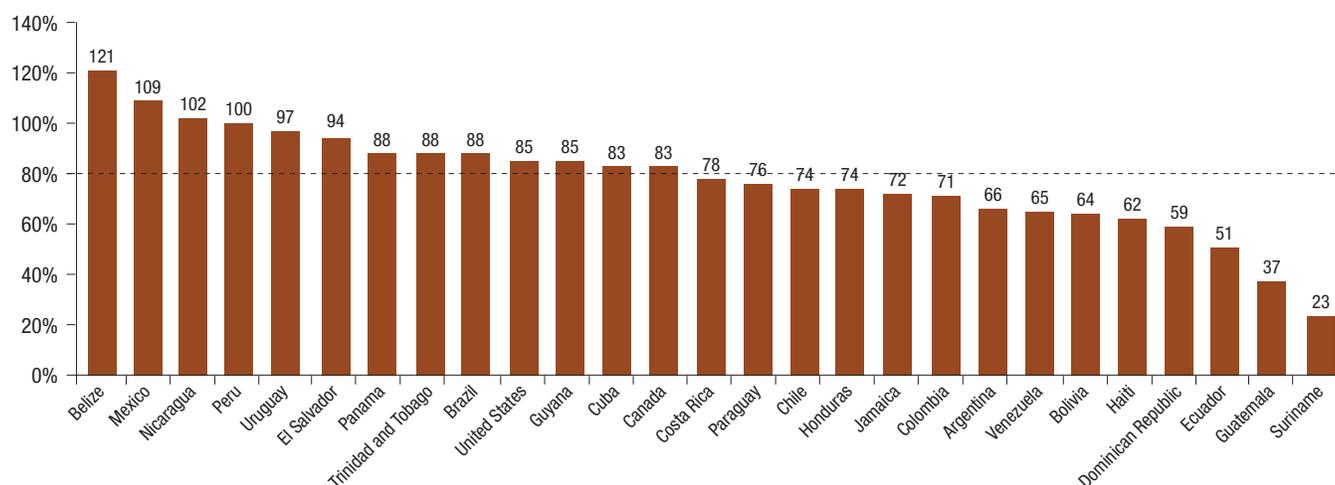
* Low case detection rate in the Caribbean was due mainly to the low case detection rate in Haiti and in the Dominican Republic (see: **Figure 21**)

Table 4. Case Detection Rates for all TB cases (%), 1995-2010

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Northern America	86	88	89	87	85	88	86	88	86	89	86
Caribbean	52	48	50	57	57	58	58	58	62	62	62
Mexico and Central America	62	63	62	60	60	68	69	73	77	80	86
South America (Andean)	73	73	73	70	72	71	76	74	77	77	78
South America (Other)	72	74	77	76	81	78	80	79	80	82	84
AMERICAS	70	70	72	72	76	75	76	76	78	79	80
AFR	38	38	40	41	43	42	44	45	47	48	60
EMR	25	28	32	34	38	47	51	59	60	62	63
EUR	76	77	79	76	79	79	81	80	79	78	73
MAR	50	48	50	53	55	58	62	63	64	66	61
WPR	41	42	42	51	60	66	69	71	71	70	79
World	45	45	47	49	53	56	59	60	61	62	65

Figure 20. Case Detection Rate (all TB cases) in the Region of the Americas, 2000 – 2010**Figure 21.** Case Detection Rate (all TB cases) in countries of the Americas, 2009

(Countries with at least n=100 notified new and relapse TB cases only; dashed line indicates Regional CDR: 80%)



Very high CDRs, especially those exceeding 100% (Belize, Mexico, Nicaragua), may indicate a scale-up in case finding efforts to find prevalent cases or under-estimation (and the need for revision) of TB incidence.

Public-public and public-private mix initiatives (PPM) contribute to case detection in the Region of the Americas. Data submitted by 18 countries suggest that in 2010 a total of 9,200 TB cases were diagnosed according to NTP guidelines by non-NTP public providers in the Region. A total of 5,600 TB cases were diagnosed by private providers collaborating with NTP (**Box 5**).

Box 5. New TB case notification by public non-NTP and private health care providers, 2010

(Countries with more than 10% of TB new cases notified in 2010 by public non-NTP or private providers)

Country	New cases notified		% of total new TB cases notification
	Public non-PNT	Private	
Dominican Republic	1.201	181	38%
Haiti	30	5.000	36%
El Salvador	375	85	28%
Peru	5.993	–	21%
Paraguay	315	58	17%
Honduras	297	–	11%
Nicaragua	225	–	10%

2.3. Treatment outcomes

In the Region of the Americas, a total of 122,372 new sputum smear-positive TB cases were included in the 2009 treatment cohort. Of these, 76% were successfully treated (i.e. either cured or treatment completed). Over time, the treatment success rate was stable or decreased slightly since 2002 (**Figure 24**).

In 2010, treatment success was highest in Mexico & Central America (85%) and lowest in Northern America (62%).* (**Table 5**).

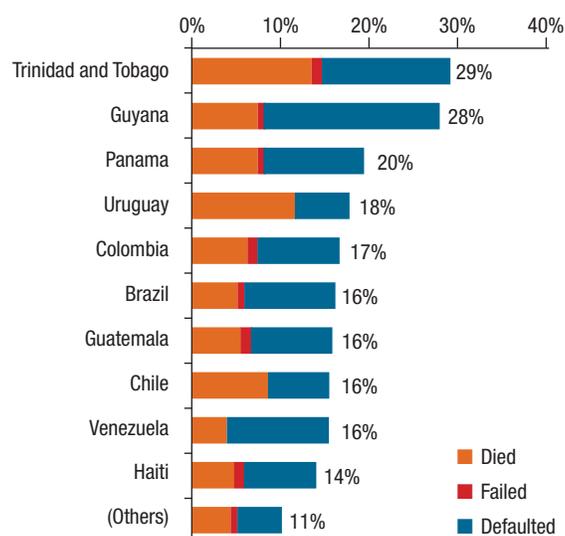
The rate of unfavorable treatment outcomes (i.e. death, failure or default) was highest in Trinidad and Tobago (29%), and in Guyana (28%), where almost one fifth of all new smear-positive TB cases defaulted from treatment (**Figure 22**).

In the Region of the Americas, the treatment success rate was lower in the subgroup of new smear-positive TB cases who were HIV-positive (57%), mainly due to higher death rates (18%) in this subgroup (**Figure 23**).

* The low treatment success rate among smear-positive TB cases in Northern America (2009 cohort) is mainly due to a high proportion of treatment outcomes not evaluated or reported for the United States of America by the time this report was produced (see **Table 5**, p. 27).

Table 5. New smear-positive treatment outcomes in the Region of the Americas, 2009 cohort

	N notified	N registered	% registered	Cured	Completed	Died	Failed	Defaulted	Not evaluated
Northern America	4,476	8,310	186%	1,0%	61%	6.5%	0.04%	1.2%	30%
Caribbean	11,602	11,606	100%	70%	11%	5.0%	1.2%	7.9%	5.4%
Mexico and Central America	18,719	19,239	103%	79%	5.7%	5.8%	1.4%	5.5%	2.4%
South America (Andean)	37,400	33,771	90%	74%	7.1%	3.9%	1.2%	7.0%	7.1%
South America (Other)	46,847	49,446	106%	32%	38%	5.4%	0.7%	9.7%	14%
AMERICAS	119,044	122,372	103%	53%	23%	5.1%	0.9%	7.5%	11%
AFR	607,257	605,932	100%	70%	10%	5.3%	1.3%	6.3%	6.8%
EMR	168,013	167,317	100%	74%	14%	2.5%	1.0%	4.9%	3.3%
EUR	100,468	105,441	105%	56%	13%	8.4%	12%	6.4%	4.9%
MAR	1,028,656	1,022,380	99%	85%	3.5%	3.9%	1.7%	4.7%	1.2%
WPR	645,998	639,544	99%	90%	3.0%	1.9%	0.8%	1.3%	3.1%
World	2,661,005	2,663,005	100%	80%	6.7%	3.9%	1.7%	4.4%	3.6%

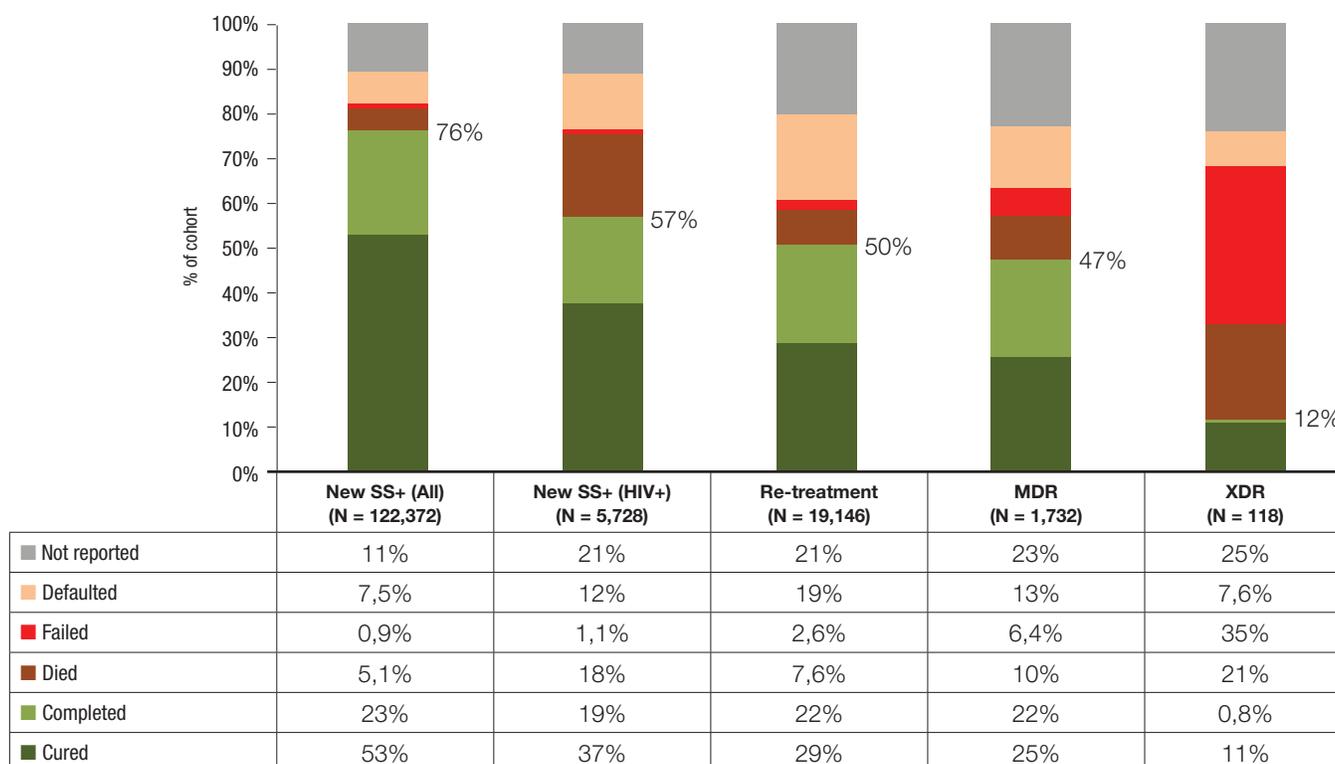
Figure 22. Top 10 countries by unfavorable treatment outcomes (%), 2008 cohort of new SS+ cases
(Countries with cohort size less than 100 cases excluded)

The treatment success rate was lower in re-treatment TB cases (50%) compared to new smear-positive TB cases (76%), mainly due to higher default rates among re-treatment cases (19 vs. 7.5%) (Figure 23).

In the 2008 cohort, a total of 1,732 MDR- and 118 XDR-TB cases were treated. The treatment success rate was 47% in MDR-TB cases. It was only 12% in XDR-TB cases, in whom treatment failure (35%) and death (21%) were frequent (Figure 23).

Figure 23. Region of the Americas: Comparison of treatment outcomes in different groups (subgroups) of TB cases, 2009 cohort

(Percentages beside the bars show treatment success rates.)



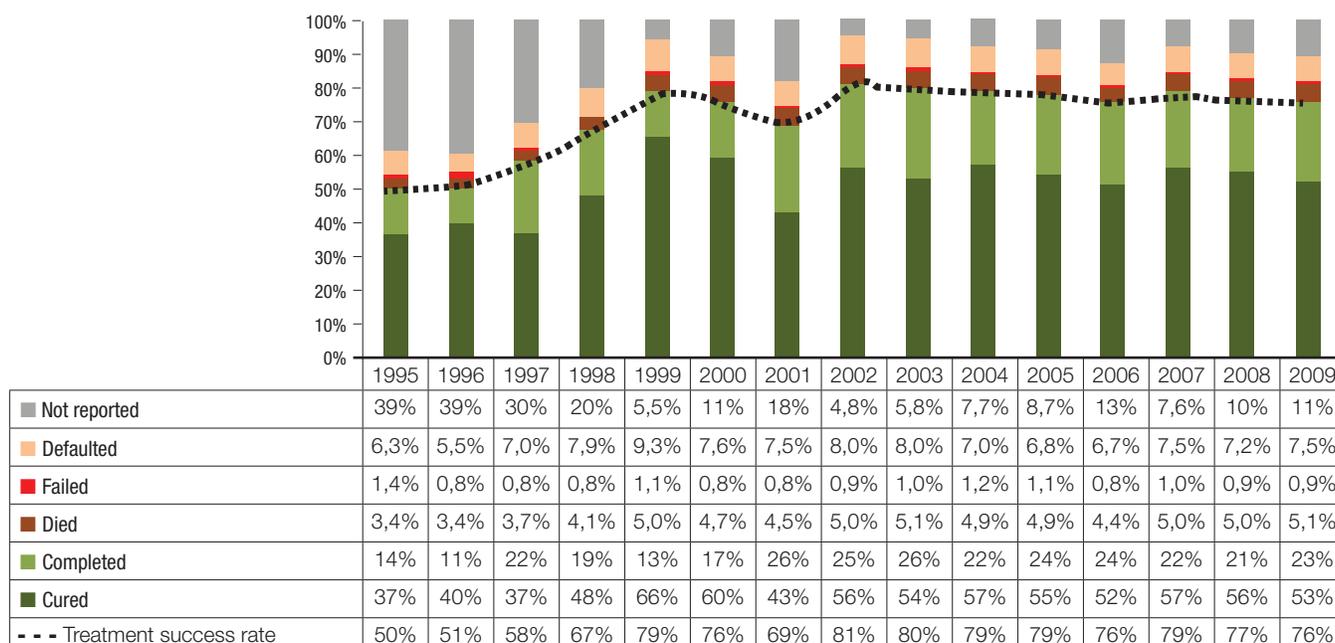
New SS+ (All): New sputum-smear positive TB cases regardless of HIV status

New SS+ (HIV+): New sputum-smear positive TB cases regardless, HIV positive

MDR: Multidrug-resistant TB cases (2008 cohort)

XDR: Extensively drug-resistant TB cases (2008 cohort)

Figura 24. Trends in new smear-positive treatment outcomes, Region of the Americas 1995 – 2009



2.4. Laboratory strengthening

Strengthening of laboratory capacity and performance remains a priority for TB control in the Region of the Americas.

Regional targets for the coverage of laboratories for smear-microscopy, culture and DST exist (**Box 6**). External quality assurance of existing laboratories is intended to ensure high quality of laboratory diagnostics.

Box 6. Region of the Americas: Targets for TB laboratory capacity in the countries

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

At least **1** laboratory providing **culture** testing per **100,000** population

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

In 2010, a total of 21 countries reported data on laboratory capacity and external quality assurance (EQA), four more than in 2009. These 21 countries account for 74% of all estimated incident TB cases in the region.

Smear microscopy

Of the 21 countries reporting data for 2010, all except Jamaica and Uruguay had at least one laboratory providing smear microscopy or more available per 100,000 population (**Table 6**, page 28). The proportion of smear microscopy laboratories with external quality assurance (EQA) varied between none and 100%. In all countries, more than 90% of laboratories included in EQA demonstrated acceptable performance, except for Venezuela and Argentina (each 87%) (**Table 6**).

Culture testing

Capacity for culture testing was below target in 11 out of 21 reporting countries. No laboratory for culture testing was available in Belize. EQA was fully implemented in six countries and partially in 10 countries. No EQA was implemented in Brazil, Guyana and El Salvador. Laboratories demonstrated acceptable performance in more than 90% of laboratories in most countries, except for Jamaica (0%), Paraguay (0%), Mexico (75%) and Argentina (85%). (**Table 6**)

DST

In 2010, drug-susceptibility testing (DST) was available in all countries reporting, except for Belize and Jamaica. However, capacity was still below target in most of the countries. DST laboratory performance was acceptable in most of the countries. Performance was suboptimal in Brazil (75% of **laboratories demonstrated acceptable performance**), **Colombia (81%) and Guatemala (0%)** (**Table 6**).

National Reference Laboratories

By the end of 2010, National TB Reference laboratories were established in 29 (83%) of the 35 countries in the Americas.

New Diagnostics

New diagnostic tools including the WHO endorsed Line Probe Assay and Xpert MTB/RIF for diagnosis of drug-resistant TB are being rolled-out in the Region of the Americas. In 2010, Line Probe Assay was available in laboratories in Argentina, Canada, Chile, Cuba, Mexico, Guyana, Haiti, United States and Peru. Xpert MTB/RIF is now available or was ordered for Brazil, Peru, Haiti and Guatemala.

Table 6. Laboratory capacity for smear microscopy, culture and DST in the Americas, 2010

Notes: no data available for countries in Northern America

highlighted in red: estimates for laboratory below the criteria set for the Region (see: box 5)
percentage of labs with acceptable performance refers to all labs that were included in EQA

Country	Top 10 est. inc. TB cases	Top 10 est. MDR-TB cases	Smear microscopy			Culture			DST		
			Number of laboratories per 100,000 population	Percentage of laboratories with EQA	Percentage of laboratories with acceptable performance	Number of laboratories per 1 million population	Percentage of laboratories with EQA	Percentage of laboratories with acceptable performance	Number of laboratories per 5 million population	Percentage of laboratories with EQA	Percentage of laboratories with acceptable performance
Caribbean	Dominican Rep.		2.3	0.9	0.9	0.8	–	–	0.5	1.0	1.0
	Haiti	YES	2.3	0.3	1.0	0.1	1.0	1.0	0.5	1.0	1.0
	Jamaica		0.1	0.3	0	0.4	1.0	0	0	–	–
Mexico and Central America	Belize		1.3	–	–	0	–	–	0	–	–
	El Salvador		3.2	1.0	1.0	1.6	0	–	0.8	1.0	1.0
	Guatemala	YES	1.9	0.7	0.9	0.8	0.09	1.0	0.3	1.0	0
	Honduras		2.0	0.4	1.0	0.7	0.4	1.0	0.7	1.0	1.0
	Mexico	YES	1.1	0.5	0.9	0.6	0.5	0.7	0.7	0.3	1.0
	Nicaragua		3.2	0.9	1.0	0.5	1.0	1.0	0.9	1.0	1.0
Panama		1.7	1.0	1.0	2.3	0.1	1.0	1.4	1.0	1.0	
South America (Andean)	Bolivia	YES	5.0	1.0	1.0	4.1	0.2	1.0	0.5	1.0	1.0
	Colombia	YES	7.9	1.0	1.0	27	1.0	1.0	0.8	1.0	0.7
	Ecuador	YES	2.2	1.0	1.0	1.2	1.0	1.0	0.3	1.0	1.0
	Peru	YES	4.9	0.7	1.0	2.3	0.9	1.0	1.0	1.0	1.0
	Venezuela	YES	2.0	0.4	0.9	0.7	0.6	0.9	0.2	1.0	1.0
South America (Others)	Argentina	YES	1.7	0.2	0.9	2.8	0.6	0.8	2.1	0.9	0.9
	Brazil	YES	2.0	0.4	0.9	1.3	0	–	1.0	0.7	0.8
	Chile		1.5	0.8	1.0	3.9	0.7	1.0	0.3	1.0	1.0
	Guyana		2.7	0.8	1.0	1.3	0	–	6.6	0	–
	Paraguay		1.6	0.8	1.0	0.8	0.4	0	0.8	1.0	1.0
	Uruguay		0.03	1.0	1.0	0.3	1.0	1.0	1.5	1.0	1.0
TOTAL			2.5	0.7	1.0	3.5	0.8	1.0	0.9	0.7	0.9

2.5. Diagnosis, detection and treatment of MDR-TB

Diagnosis and treatment of MDR-TB are one of the top priorities, internationally and in the Region of the Americas. The Global Plan to Stop TB promotes drug susceptibility testing (DST) for all new TB cases considered at high risk of MDR-TB and for 100% of re-treatment cases by 2015. In the Americas, this target is supported by the Regional Strategic Plan for TB control, which aims to engage all countries in detecting and treating at least 85% of MDR-TB cases in integrated management within DOTS by the year 2015.

In order to achieve these aims, a variety of activities have been implemented in the countries of the Americas in the past years. These include strengthening of surveillance and conducting surveys of drug-resistant TB, implementing DST in NTP as well as provision of trainings and development of guidelines for the clinical management of MDR-TB.

Nationwide recent survey data, i.e. data from surveys conducted in the past 10 years, are available from Argentina, Canada, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, Paraguay, Peru, Uruguay and United States. Brazil and Mexico conducted surveys between 2009 and 2011 the results of which are being published soon.

During 2010/2011, drug-resistance surveys were or are currently being conducted in Bolivia and Venezuela (nationwide), and in Brazil (subregional).

Nationwide continuous surveillance data exist only from Canada and the United States.

By the end of 2010, conventional DST by solid or liquid culture methods had been implemented by public TB services in 20 of the 35 countries in the Region, and national TB control guidelines included DST for diagnosis in 23 countries. At least 23 countries had guidelines developed and 21 had trainings conducted for the diagnosis and treatment of MDR-TB (Table 7).

DST coverage

In 2010, 29 of 35 countries reported data on the number of TB cases with DST results available (Table 8).

Among these countries combined, DST test results were available for 6.2% of notified new TB cases and 22% of re-treatment cases. High coverage of DST among re-treatment cases was achieved in Bolivia, Chile and Ecuador.

DST coverage among re-treatment TB cases was higher among reporting countries of the South America - Andean subregion (72%) and in Northern America (71%) compared to lower coverage in all other subregions (Table 8).

MDR-TB case detection

In 2010, around 2,600 MDR-TB cases were detected among in the Americas, 43% of the 6,100 MDR-TB cases estimated among notified TB cases in the Region.

More than half (1,500; 56%) were detected in the Andean countries of South America, of which Peru detected most cases in the entire Region 1,000 (40%). The case detection rate, i.e. the number of MDR-TB cases detected divided by the number of MDR-TB cases estimated among notified TB cases, was high in Northern America (92%), medium in the Southern American subregions (47%; 48%) and low in the Caribbean (25%) and in Mexico and Central America (26%).

Figure 24 and Table 9 provide an overview of MDR-TB case detection at all levels in the Region of the Americas.

Argentina (12), Mexico (9) Brazil (7), Dominican Republic (3), Canada (1) and the United States (1) reported

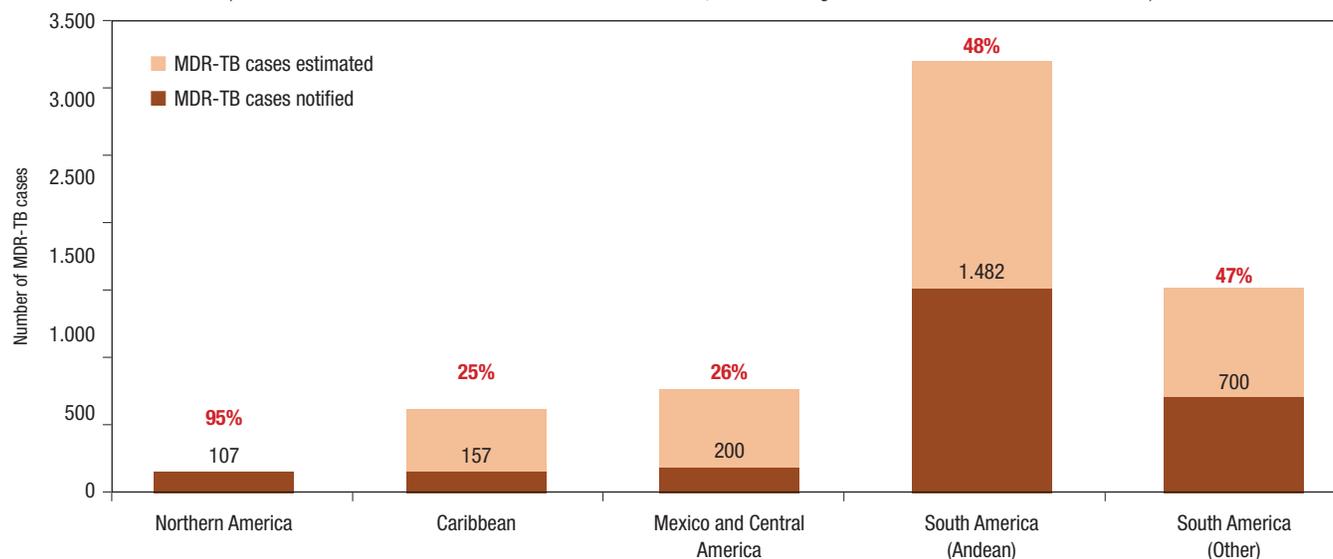
Table 7. Management of MDR-TB & Drug Susceptibility Testing in the Countries of the Americas, 2010*("-" indicates no data provided)*

Country	MDR-TB Management		DST	
	Guidelines exist	Trainings conducted	Included in NTP guidelines	Implemented
Antigua and Barbuda	-	-	-	-
Argentina	✓		✓	✓
Bahamas	-	-	-	-
Barbados	-	-	-	-
Belize	✗	✗	✗	✗
Bolivia	✓	✓	✓	✓
Brazil	✓	✓	✓	✓
Canada	✓	✓	✓	✓
Chile	✓	✓	✓	✓
Colombia	✓	✓	✓	✓
Costa Rica	✓	✓	✓	✓
Cuba	-	-	-	-
Ecuador	✓	✓	✓	✓
El Salvador	✓	✓	✓	✓
United States	✓	✓	✓	✓
Grenada	-	-	-	-
Guatemala	✓	✓	✓	✗
Guyana	✗	✗	✓	✓
Haiti	✓	✓	✓	✗
Honduras	✓	✓	✓	✓
Jamaica	✓	✗	✓	✓
Mexico	✓	✓	✓	✓
Nicaragua	✓	✓	✓	✓
Panama	✓	✓	✓	✓
Paraguay	✓	✓	✓	✗
Peru	✓	✓	✓	✓
Puerto Rico	-	-	-	-
Dominican Republic	✓	✓	✓	✓
Saint Kitts and Nevis	-	-	-	-
Santa Lucía	-	-	-	-
Saint Vincent and the Grenadines	-	-	-	-
Suriname	-	-	-	-
Trinidad and Tobago	-	-	-	-
Uruguay	✓	✓	✓	✓
Venezuela	✓	✓	✓	✓

✓ Yes ✗ No

Table 8. Coverage of Drug Susceptibility Testing (DST) among notified new and re-treatment TB cases in the Region of the Americas, 2010*(Countries without DST data are excluded from summary statistics.)*

Country	New Cases			Re-treatment Cases			All Cases		
	Notificados	DST available	% notified	Notificados	DST available	% notified	Notificados	DST available	% notified
Antigua and Barbuda	6	0	0	0	–	–	6	0	0
Argentina	6,997	(no data)	–	716	(no data)	–	7,713	(no data)	–
Bahamas	30	21	70	2	2	100	32	23	72
Barbados	6	0	0	0	–	–	6	0	0
Belize	144	(no data)	–	1	(no data)	–	145	(no data)	–
Bolivia	7,937	0	0	665	664	100	8,602	664	7.7
Brazil	70,997	22	0.03	10,949	643	5.9	81,946	665	0.8
Canada	1,247	987	77	72	51	71	1,346	1,062	79
Chile	2,209	65	2.9	263	276	105	2,472	353	14
Colombia	11,020	1,240	11	869	495	57	11,889	2,001	17
Costa Rica	465	203	44	32	(no data)	–	497	203	41
Cuba	782	174	22	56	31	55	838	244	29
Dominican Republic	3,640	32	0.9	520	106	20	4,160	138	3.3
Ecuador	4,432	363	8.2	663	584	88	5,095	947	19
El Salvador	1,638	0	0	92	2	2.2	1,730	2	0.1
Grenada	4	(no data)	–	0	–	–	4	(no data)	–
Guatemala	3,170	(no data)	–	181	18	9.9	3,351	18	0.5
Guyana	674	0	0	162	0	0	836	39	4.7
Haiti	13,884	2	0.01	381	39	10	14,265	41	0.3
Honduras	2,706	57	2.1	195	62	32	2,901	131	4.5
Jamaica	128	40	31	19	5	26	147	45	31
Mexico	18,848	21	0.1	1,266	505	40	20,114	600	3.0
Nicaragua	2,289	50	2.2	286	150	52	2,575	200	7.8
Panama	1,419	58	4.1	211	17	8.1	1,630	75	4.6
Paraguay	2,172	115	5.3	214	52	24	2,386	171	7.2
Peru	28,297	(no data)	–	4,180	(no data)	–	32,477	(no data)	–
Puerto Rico	76	69	91	4	4	100	80	73	91
Saint Kitts and Nevis	2	0	0	0	–	–	2	0	0
Santa Lucía	9	0	0	0	–	–	9	0	0
San Vicente y las Granadinas	15	2	13	2	(no data)	–	17	2	12
Suriname	172	1	0.6	15	0	0	187	1	0.5
Trinidad and Tobago	214	(no data)	–	44	(no data)	–	258	(no data)	–
United States de América	11,181	6,514	58	0	–	–	11,181	7,051	63
Uruguay	658	160	24	41	22	54	699	182	26
Venezuela	6,087	26	0.4	442	160	36	6,529	188	2.9
América del Norte	12,455	7,501	60	72	51	71	12,527	8,113	65
Caribbean	18,578	340	1.8	982	187	19	19,562	566	2.9
Mexico and Central America	27,365	389	1.4	2,231	754	34	32,798	1,229	3.7
América del Sur (países andinos)	29,476	1,629	5.5	2,639	1,903	72	32,115	3,800	12
América del Sur (otros países)	76,882	363	0.5	11,644	993	8.5	88,526	1,411	1.6
AMERICAS	164,756	10,222	6.2	17,568	3,888	22	185,528	15,119	8.1

Figure 24. MDR-TB cases estimated and notified in five subregions of the Americas, 2010*(Black numbers indicate numbers of detected MDR-TB cases; Red Percentages indicate MDR-TB Case Detection Rate)*

Second-line treatment

By the end of 2010, around 3,200 MDR-TB cases received second-line treatment in the Region of the Americas (Table 9).

The number of MDR-TB cases treated was higher than the number of detected MDR-TB cases, due to the fact that second-line treatment in some countries was newly introduced and offered to cases notified in previous years, and possibly a delay in the provision of second-line treatment for detected MDR-TB cases.

Case detection and/or the number of MDR-cases on second-line treatment are still low in some countries with high estimated numbers of MDR-TB cases, highlighting the need to further strengthen MDR-TB case detection and treatment in the Region of the Americas.

2.6. Collaborative TB/HIV activities

HIV remains a major challenge to TB control programs in the Region of the Americas. The Regional Strategic Plan aims at strengthening TB and HIV/AIDS collaborative activities: NTPs are responsible for HIV testing of TB patients and provision of co-trimoxazole preventive therapy (CPT) and antiretroviral therapy (ART) to TB patients living with HIV. Where ART cannot be provided within the NTPs, patients should be referred to ART services. National HIV programs are responsible for intensified case finding for TB in people living with HIV and providing Isoniazid preventive therapy (IPT) to those without active TB.

Tabla 9. MDR-TB cases estimated, notified and enrolled in second-line treatment, 2010*(Countries are sorted by the number of MDR-TB cases estimated among notified TB cases)*

Country	MDR-TB cases estimated among notified TB cases	MDR-TB Case Detection		Second-Line Treatment	
		MDR-TB cases detected	% of estimated	MDR-TB cases treated with second-line drugs	% of detected
Peru	2,190	1,048	48	1,702	162
Brazil	1,140	573	50	573	100
Mexico	452	140	31	224	160
Ecuador	350	176	50	228	130
Haití	304	41	13	46	112
Dominican Republic	300	108	36	114	106
Colombia	280	131	47	152	116
Argentina	250	109	44	0	0
Bolivia	205	106	52	14	13
Guatemala	133	18	14	15	83
United States de América	100	92	92	92	100
Venezuela	85	21	25	21	100
Honduras	66	9	14	14	156
Panama	48	10	21	10	100
Nicaragua	44	18	41	10	56
Paraguay	37	1	2.7	5	500
Guyana	32	5	16	0	0
Chile	20	10	51	9	90
Canada	12	15	120	0	0
Costa Rica	7	3	44	0	0
Trinidad and Tobago	6	0	0	0	–
Suriname	5	1	19	1	100
El Salvador	5	2	40	2	100
Jamaica	5	1	21	1	100
Belize	3	0	0	0	–
Cuba	3	7	236	1	14
Uruguay	3	1	40	1	100
San Vicente & the Grenadines	1	0	0	0	–
Bahamas	0	0	–	0	–
Saint Lucia	0	0	–	0	–
Antigua and Barbuda	0	0	–	0	–
Barbados	0	0	–	0	–
Grenada	0	0	–	0	–
Saint Kitts and Nevis	0	0	–	0	–
Puerto Rico	0	0	–	0	–
América del Norte	112	107	95	92	86
Caribbean	620	157	25	162	103
Mexico and Central America	757	200	26	275	138
South America (Andean)	3,110	1,482	48	2,117	143
South America (Other)	1,486	700	47	589	84
AMERICAS	6,086	2,646	43	3,235	122

HIV testing of TB cases

In the Region of the Americas, 103,700 TB cases had an HIV test result recorded in the TB register in 2010, 43% of all notified TB cases for whom data were available. The proportion of cases tested increased between 2005 and 2009 but decreased in 2010 (Figure 25a). Test coverage was higher in Northern America and the Caribbean and lower in South America, where the majority of TB cases were notified in 2010 (Figure 25b).

HIV positive TB cases

In 2010, a total of 18,200 notified TB cases were recorded HIV positive, 18% of those with a test result recorded. The proportion of HIV positive TB cases was highest in the South America – Other subregion (24%) and in the Caribbean (20%). It was lower in Northern, Mexico & Central America and South America - Andean (Figure 25b).

Table 10 provides an overview of HIV testing and test results in the countries of the Americas in 2010.

CPT and ART for HIV positive TB cases

In 2010, 22 countries reported data on provision of CPT among TB cases living with HIV. Of all HIV-positive TB cases treated in these countries, 47% received CPT (Table 10). However, countries reporting on CPT accounted for only 30% of all HIV-positive TB cases.

Reporting was more complete for provision of ART for TB cases living with HIV: data were available for 27 countries accounting for 93% of all HIV-positive TB cases (Table 10). In these countries, 65% of the HIV-positive TB cases received ART. While some countries have reported a high coverage of ART in 2010, including Brazil (93%), Ecuador (100%) and Guatemala (100%), ART in most other countries is only available for parts or none of the TB cases living with HIV.

Figure 25. HIV testing and test results among notified TB cases

a) Region of the Americas, annual trend 2005-2010 (left). b) Five subregions of the Americas, 2010 (right).

(Bars represent absolute numbers of notified TB cases; orange percentages: proportion of cases with test result recorded of notified; red percentages: proportion of HIV positive of cases with test result recorded. Numbers under each year (left) show the number of countries reporting data on HIV testing followed by the percentage of total estimated HIV-positive TB cases accounted for by reporting countries.)

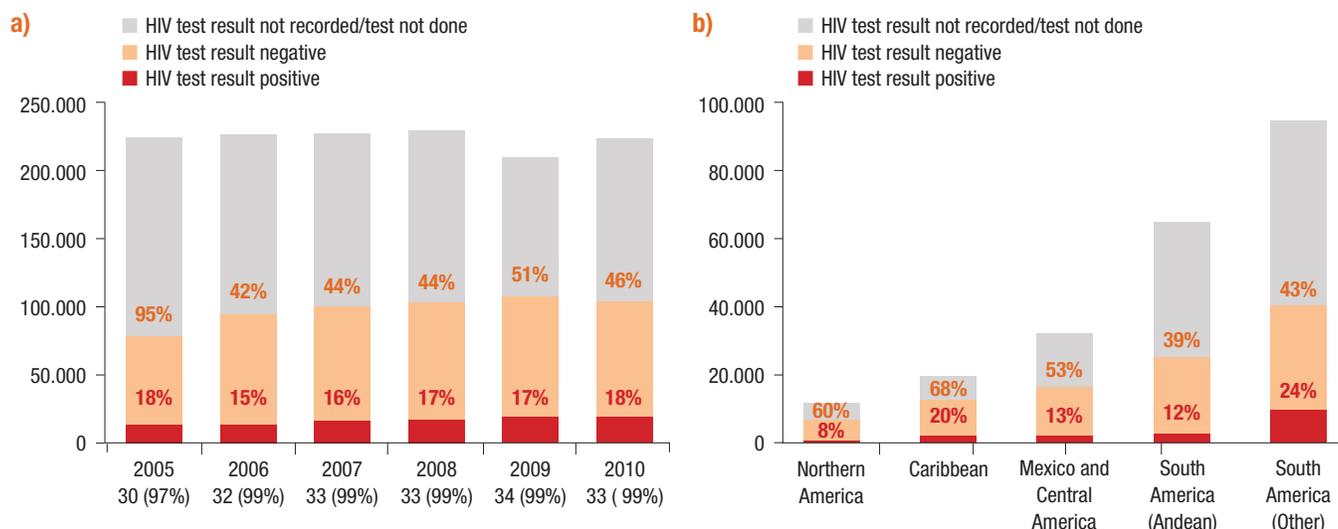


Table 10. HIV testing and treatment for HIV-positive TB cases in the Region of the Americas, 2010*(Countries are sorted by the number of HIV-positive TB cases)*

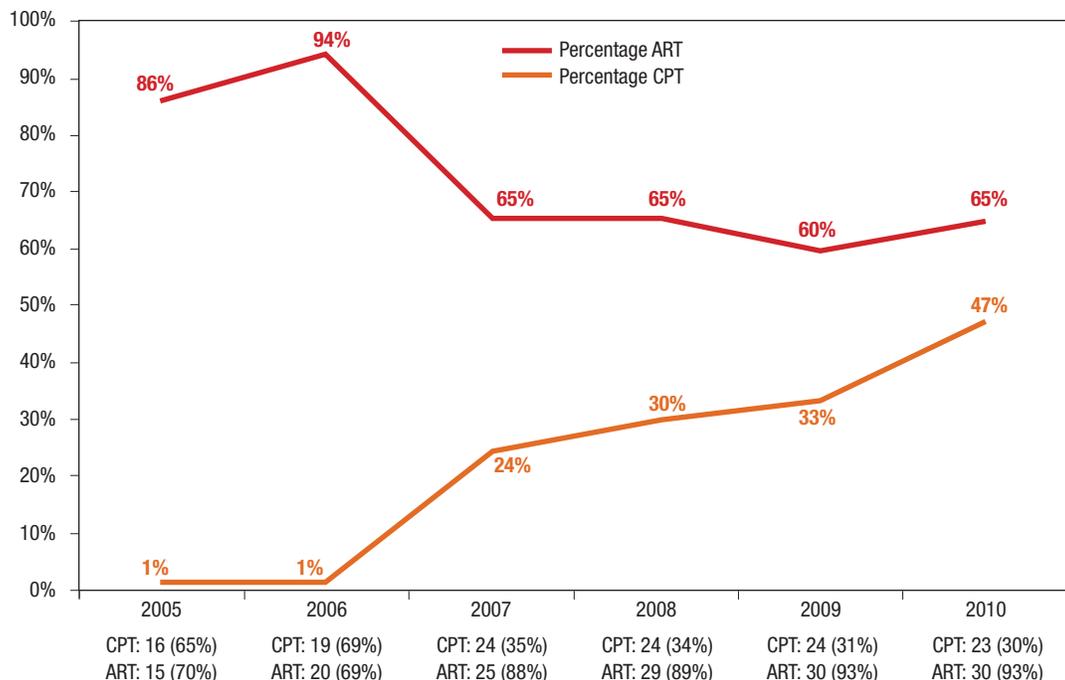
Country	Notified TB cases	HIV Testing		TB-HIV		% of HIV positive TB cases started or continued on CPT	% of HIV positive TB cases started on ART
		TB cases with an HIV test result recorded	% of notified	TB cases recorded as HIV positive	% of tested		
Brazil	81,946	37,210	45	8,558	23	(no data)	93
Haiti	14,265	9,518	67	1,892	20	13	9.8
Colombia	11,889	5,079	43	1,231	24	(no data)	35
Mexico	20,114	8,842	44	1,189	13	100	36
Peru	32,477	9,539	29	853	8.9	(no data)	10
United States of America	11,181	7,107	64	612	8.6	(no data)	(no data)
Argentina	7,713	1,008	13	566	56	(no data)	(no data)
Dominican Republic	4,160	2,489	60	547	22	7.9	3.8
Venezuela	6,529	5,213	80	479	9.2	(no data)	33
Ecuador	5,095	3,379	66	427	13	(no data)	100
Guatemala	3,351	2,103	63	325	15	100	100
Panama	1,630	1,337	82	213	16	64	66
Guyana	836	734	88	209	28	77	59
Honduras	2,901	1,557	54	201	13	90	90
El Salvador	1,730	1,667	96	180	11	82	63
Bolivia	8,602	2,003	23	140	7.0	0	81
Paraguay	2,386	777	33	138	18	0	70
Uruguay	699	620	89	103	17	0	31
Nicaragua	2,575	1,445	56	60	4.2	67	67
Trinidad and Tobago	258	254	98	58	23	19	12
Cuba	838	862	103	53	6.1	0	66
Suriname	187	154	82	49	32	12	51
Belize	145	143	99	29	20	100	100
Jamaica	147	128	87	29	23	(no data)	100
Canada	1,346	382	28	23	6.0	(no data)	(no data)
Bahamas	32	32	100	15	47	27	67
Puerto Rico	80	76	95	14	18	43	50
Antigua and Barbuda	6	6	100	5	83	20	100
Saint Vincent and the Grenadines	17	10	59	3	30	(no data)	100
Barbados	6	6	100	5	83	20	100
Grenada	6	6	100	2	33	0	100
Saint Kitts and Nevis	2	2	100	0	0	–	–
Saint Lucia	9	9	100	0	0	–	–
Chile	2,472	(no data)	–	(no data)	–	–	–
Costa Rica	497	(no data)	–	(no data)	–	–	–
Northern America	12,527	7,489	60	635	8.5	(no data)	(no data)
Caribbean	19,824	13,396	68	2,619	20	12	12
Mexico and Central America	32,446	17,094	53	2,197	13	93	57
South America (Andean)	64,592	25,213	39	3,130	12	0	39
South America (Other)	93,767	40,503	43	9,623	24	33	91
AMERICAS	223,156	103,695	46	18,204	18	47	65

Overall in the Region, the proportion of HIV positive patients provided with CPT seems to be increasing over the past years, whereas the proportion of cases provided with ART seems constant (Figure 26).

Scale-up of CPT and ART provision remains a priority for TB-HIV collaborative activities in the forthcoming years.

Figure 26. Provision of CPT and ART among HIV-positive TB cases

The number under each year shows, separately for CPT and HIV, the number of countries reporting data followed by a percentage of total number of HIV positive TB cases accounted for by reporting countries.



Screening for TB and IPT among people living with HIV

Implementation of intensified TB case finding, IPT and infection control, also known as the “Three I’s for HIV/TB”, is recommended to reduce the burden of TB among people living with HIV.

Data from HIV care and ART registers in 19 countries show that between 2008 and 2010, at least 29,900 people living with HIV were provided with IPT and 107,800 were screened for TB (Table 11).

However, data were irregularly reported, and interpretations therefore need to be made with caution. Reliable assessment of figures and trends for the situation and scale-up IPT and intensified TB case finding among people living with HIV will require better data completeness and improved reporting by countries in the forthcoming years.

Table 11. IPT and intensified TB case finding in countries of the Americas, 2008-2010*(Note: Numbers represent totals for the years 2008-2010. Not all countries reported for each of the three years.)*

Country	2008-2010 (combined)	
	HIV-positive people provided with IPT	HIV-positive people screened
Bahamas	2	
Barbados	0	160
Brazil	0	11,455
Cuba	2,927	1,249
Dominican Republic	6,306	5,441
Ecuador	3	790
El Salvador	552	359
Guatemala	270	684
Guyana	438	1,845
Haiti	11,362	24,483
Honduras	276	1,154
Mexico	2,166	3,800
Nicaragua	525	839
Panama	212	0
Paraguay	0	348
Peru	4,681	2,698
Santa Lucía	0	90
Trinidad and Tobago	21	2,061
Venezuela	178	50,183
Total	29,920	107,776

2.7. Strengthening of TB control: training & capacity building

During 2011 PAHO conducted several activities aimed at developing or strengthening capacity on TB control in the Region. Some of these activities were conducted directly by PAHO and others in collaboration with partner organizations. Most were funded with WHO, USAID and the Spanish Cooperation funding.

Among specific training activities, the following courses and workshops were conducted during 2011:

- XX International Course on TB Epidemiology and Control - San Salvador, El Salvador - 28 March to 5 April (32 participants from 9 countries).
- Regional Workshop on Ethical Aspects in the Prevention, Care and Control of Tuberculosis - Ciudad de Guatemala, Guatemala – 11 & 12 April (18 participants from 8 countries).
- VIII International Course on the Clinical and Operational Management of Drug Resistant Tuberculosis - Santo Domingo, Dominican Republic – 16 to 20 May (20 participants from 7 countries).
- Regional Workshop on MDR-TB Recording and Reporting for Priority Countries of the Americas - Niteroi, Rio de Janeiro, Brazil – 24 to 26 August (24 participants from 10 countries).

- Course: The Laboratory as Support to the Programmatic Management of Multidrug Resistant Tuberculosis and Drug Susceptibility Testing for Second Line Drugs - Santiago de Chile, Chile – 12 to 16 September (25 participants from 16 countries).
- II Regional Course on TB Infection Control - Mexico City, Mexico - 17 to 21 October (24 participants from 9 countries).

Among other activities conducted during the year that contributed to capacity building in the Region were:

- II Workshop on the Practical Approach to Lung Health in the Americas (28 February to 2nd March) and V Meeting of Low TB Prevalence Countries of the Americas (3 & 4 March) – San Juan, Puerto Rico.
- Meeting of the TB Laboratory Working Group of the Americas (11 April), Meeting of the National TB Laboratories of the Americas (12 April) and Workshop for Strengthening and Innovation in the Response to Resistant TB (13 to 16 April) - Ciudad de Guatemala, Guatemala.
- VII Regional Meeting of TB/HIV Collaborative Activities (6 July) and TB/HIV subgroup of the Stop TB Partnership meeting: Scaling-up the Implementation of Collaborative TB/HIV Activities in the Region of the Americas (7 & 8 July) - Panama City, Panama.
- Regional Meeting on TB Control in Big Cities: Challenges and Approaches – Buenos Aires, Argentina (14 to 16 September)

Several participants to these trainings, workshops and meetings have replicated some of these activities upon return to their countries, increasing the capacity building on TB control in the Region.

CHAPTER 3
Progress towards Global
Targets for Reductions in
Disease Burden

The purpose of this chapter is to provide a recent update on the regional, subregional and country progress towards the international targets for TB control in the Americas, specified in the Millennium Development Goal (MDG) 6 and the Stop TB Partnership (Table 12).

Table 12. International Targets for TB control (Source: Stop TB Partnership) (Source: Alianza Alto a la TB)

Millennium Development Goal (MDG) 6: relevant targets and indicators	Stop Tuberculosis Targets
<p>MDG 6: Combat HIV/AIDS, malaria and other diseases</p> <p>Target 6.c: To have halted by 2015 and begun to reverse the incidence of malaria and other major diseases</p> <p>Indicator 6.9: Prevalence and death rates associated with tuberculosis</p> <p>Indicator 6.10: Proportion of tuberculosis cases detected and cured under DOTS</p>	<p>By 2015: The global burden of TB (disease prevalence and deaths) will be reduced by 50% relative to their 1990 levels. DOTS: Case detection rate (CDR; for all cases) will be 90% and treatment success rate will be 90%.*</p> <p>By 2050: The global incidence of TB disease will be less than 1 case per million population per year.</p>

On the basis of pre-defined progress categories (Table 13), the chapter summarizes the current progress towards the global targets at country-, subregional- and regional level (Table 14).

Table 13. Overview of indicators and categories used for assessing the progress towards the global targets for TB control

	Having met the target	Considerable progress	Limited or uncertain progress	No progress
Incidence MDG 6, target 6.c	Statistically significant decline in TB incidence between 2006 and 2010	N.D.	Constant or statistically not significant decline/increase in TB incidence between 2006 and 2010	Statistically significant increase in TB incidence between 2006 and 2010
Prevalence Stop TB target for 2015 MDG 6, indicator 6.9	TB prevalence in 2010 is half (50%) or less than in 1990	TB prevalence in 2010 is greater than 50% but lower than 75% of that in 1990	TB prevalence in 2010 is between 75% and 99% of that in 1990	TB prevalence in 2010 is equal to (100%) or greater than that in 1990
Mortality Stop TB target for 2015 MDG 6, indicator 6.9	TB mortality in 2010 is half (50%) or less than that in 1990	TB mortality in 2010 is greater than 50% but lower than 75% of that in 1990	TB mortality in 2010 is between 75% and 99% of that in 1990	TB mortality in 2010 is equal to (100%) or greater than that in 1990
Case detection Stop TB target for 2015 MDG 6, indicator 6.10	The case detection rate for all cases in 2010 is equal to or greater than 90%	The case detection rate for all cases in 2010 is between 70% (2005 target) and 89%	The case detection rate for all cases in 2010 is between 50% and 69%	The case detection rate for all cases is below 50%
treatment success Stop TB target for 2015 MDG 6, indicator 6.10	The treatment success rate for new smear-positive TB cases in 2010 is equal or greater than 90% (2009 cohort)	The treatment success rate for new smear-positive TB cases in 2010 is between 80% and 89% (2009 cohort)	The treatment success rate for new smear-positive TB cases in 2010 is between 60% and 79% (2009 cohort)	The treatment success rate for new smear-positive TB cases in 2010 is below 60% (2009 cohort)

* For the updated Global plan to Stop TB 2011-2015, the target for treatment success has been updated from 87% to 90%. The case detection rate for all forms of TB is no longer used as a global target. (See: Global Plan to Stop TB; full text available at: http://www.stoptb.org/assets/documents/global/plan/TB_GlobalPlan-ToStopTB2011-2015.pdf/ last accessed: April 2012). The 2015 target for case detection rate of 90% is used specifically by PAHO for the Region of the Americas.

Table 14. Overview of regional, subregional and country progress towards the targets for TB control in 2010*Remarks:*

- Percent annual change in TB incidence: “-” denotes that annual change 2006-2010 was not statistically significant.
- Abbreviations: TSR=Treatment success rate; CDR=Case detection rate
- The progress in Antigua and Barbuda, Grenada, Saint Kitts and Nevis, Saint Lucia and Saint Vincent and the Grenadines was not classified due to very low numbers of cases.

Goal	Incidence			Prevalence			Mortality			Case Detection	Treatment Success
	Halt and reverse TB incidence by 2015			Halve TB prevalence rate. from 1990 to 2015			Halve TB mortality rate. from 1990 to 2015			Detect 90% of TB cases	Successfully treat ≥90% of new smear-positive TB cases
Country	Incidence 2006	Incidence 2010	% annual change	Prevalence 1990	Prevalence 2010	Percentage of 1990	Mortality 1990	Mortality 2010	Percentage of 1990	CPR (%) 2010	TSR (%) 2009
Antigua and Barbuda	5.4	4.9	–	5.3	3.1	58	5.3	0.4	8.1	140	67
Argentina	32	27	-4.4	94	40	43	4.8	1.9	40	66	46
Bahamas	18	11	-12	19	9.2	48	1.9	0.9	45	79	81
Barbados	4.3	1.7	-23	3.2	1.9	59	0.5	0.2	52	130	100
Belize	40	40	–	46	41	82	6.0	4.9	82	120	(no data)
Bolivia	153	135	-3.1	390	209	54	36	20	56	62	86
Brazil	50	43	-3.7	116	47	41	8.9	2.6	29	88	72
Canada	5.2	4.7	-2.6	11	5.6	51	0.4	0.2	53	83	75
Chile	20	19	–	94	25	27	6.4	1.6	25	75	72
Colombia	37	9.3	-2.8	80	48	60	4.8	2.8	58	72	77
Costa Rica	16	13	4.8			*			*	78	54
Cuba	9.1	9.3	–	55	13	24	1.8	0.3	16	79	90
Dominican Republic	79	67	-4.1	302	90	30	36	8.2	23	59	85
Ecuador	79	65	-5.0	307	103	34	21	6.7	32	51	75
El Salvador	34	28	-4.8	96	31	32	4.6	0.9	20	96	89
United States of America	5.3	4.1	-6.6	14	4.8	34	0.5	0.2	35	88	60
Granada	4.2	4.1	–	11	4.1	37	2.4	0.3	14	93	50
Guatemala	64	62	-0.8	134	11	83	4.4	3.9	89	37	83
Guyana	115	111	-0.9	110	115	105	23	13	57	85	70
Haiti	264	230	-3.5	376	314	84	37	29	78	62	79
Honduras	82	51	-12	180	65	36	16	5.2	33	74	86
Jamaica	6.5	6.6	–	7.1	7.6	107	0.5	0.6	118	72	70
Mexico	21	16	-7.1	123	18	15	13	0.8	6.5	110	86
Nicaragua	51	42	-5.0	172	47	27	16	2.6	16	100	85
Panama	47	48	–	68	52	76	15	8.6	57	89	80
Paraguay	49	46	1.5	92	64	70	5.9	4.2	71	77	80
Peru	133	106	-5.6	532	118	22	53	6.1	12	100	81
Puerto Rico	3.3	2.2	-10	6.9	3.0	43	0.4	0.2	36	96	81
Saint Kitts and Nevis	4.9	7.6	11	1.3	11	846	4.1	4.7	115	50	80
Saint Lucia	10	7.9	-5.9	28	12	43	4.0	1.8	45	65	57
Saint Vincent and the Grenadines	25	24	–	66	33	50	4.8	2.0	42	56	(no data)
Suriname	108	145	7.4	140	238	170	1.7	2.8	165	(no data)	(no data)
Trinidad and Tobago	20	19	–	14	21	150	2.0	2.8	140	87	69
Uruguay	23	21	-1.8	32	22	69	1.8	1.1	61	97	80
Venezuela	34	33	–	51	48	94	2.8	2.8	100	66	84
Northern America	5.3	4.2	-5.4	14	4.9	35	0.5	0.2	36	86	62
Caribbean	87	78	-2.8	169	105	62	17	9.5	57	62	80
Mexico and Central America	30	24	-5.6	119	32	27	12	1.6	13	86	85
South America (Andean)	72	61	-3.7	234	82	35	19	5.3	27	78	81
South America (Other)	45	40	-3.0	107	45	42	7.8	2.5	31	84	70
AMERICAS	33	29	-3.6	92	36	39	7.5	2.2	29	80	76

* Estimates for prevalence and mortality in Costa Rica are currently under revision.

3.1. TB incidence

MDG 6, target 6c

In the past five years, TB incidence has been constantly decreasing at an average annual rate of 3.6% in the Region of the Americas as a whole, and between 2.8% and 5.4% in the five subregions (**Table 14**). At country level, incidence has been declining between 2006 and 2010 in 22 of 30 countries evaluated and probably constant in seven countries. No progress was made in Suriname, where TB incidence increased between 2006 and 2010 by 7.4% annually (**Table 14**).

3.2. TB prevalence

MDG 6, Indicator 6.9 and Stop TB target for 2015

Overall, there is a continuous decline of TB prevalence in the Region of the Americas. In 2010, TB prevalence was half or less than the 1990 level in all subregions, except for the Caribbean, where at least considerable progress was made until 2010. At country level, limited or no progress towards the target was made in 10 of the 30 countries (**Table 14**).

3.3. TB mortality

MDG 6, Indicator 6.9 and Stop TB target for 2015

TB associated mortality in HIV negative TB cases continues to decline in the Americas (see also Figure 7, page 16). The Caribbean is the last subregion to meet the target for mortality in the next years. Limited or no progress was made in eight of the 30 countries (**Table 14**).

3.4. Case detection

MDG 6, Indicator 6.10 and Stop TB target for 2015

By 2010, most countries have met the target or made considerable progress in case detection. Limited or no progress was made in seven countries (**Table 14**).

3.5. Treatment success

MDG 6, Indicator 6.10 and Stop TB target for 2015

Only limited progress was made at regional level – mainly due to the low treatment success rate in the South America - Other subregion of which Argentina had the lowest rate (46%) Overall 12 countries had made only limited or no progress in 2010 (**Table 14**).

CHAPTER 4

Financing for TB control

Adequate funding is essential for progress in TB prevention, care and control. Since 2002, WHO monitors funding for TB in all countries. The global TB database holds the financial data reported from all countries in the world from 2002 up to 2012; it includes the NTP budget, NTP expenditures and the use of general health services. The data compiled to date allows assessment in trends of funding for TB control for 2002-2012 for the 22 global high-burden TB countries, to which Brazil belongs. For the other countries in the World, the quality of the data allows assessment of trends for the period 2006-2012. In this chapter we analyse and present the funding for TB control for the 36 countries in the Region of the Americas.

The first part of this chapter presents the quality of financial data for the 36 member states (35 and Puerto Rico) of the Region of the Americas and how it has changed since 2004. The second part of this chapter, summarizes trends in funding for TB in selected 15/36 countries of the Region and quantifies the funding gaps reported by these countries, which account for about 74% of the region's TB cases. The third part summarizes the estimates of the cost per patient in the selected 15 countries*. These 15 countries were selected based on two reasons: 1) they are part of the priority countries for the Region of the Americas given their higher burden of TB compared with other countries, and 2) their quality of the financing data over the period 2006-2012 allows assessment in trends. For example, we were forced to exclude Peru from this analysis because of the poor quality of financial data being reported by the NTP.

4.1 Data received and quality

The number of countries that have sent financial data has risen since 2004 from 21 (58% of the total) to 36 (100%) in 2011 (Table 15).

Thanks to the efforts of the National Tuberculosis Programs (NTPs), many of which have adopted the WHO TB *planning and budgeting* tool, the number of countries with complete budget reports has risen from 17 in 2004 to 28 in 2011. The number of countries with complete expenditure reports has also risen from 10 in 2004 to 24 in 2011; however, the quality of these data could still be improved. Most (27) countries continue to report the use of general health services.

Table 15. Budget data received, cost and use of general health-care services, AMR 2004-2011

Year of data collection	Number of countries	Financial reports received*	Budget				Expenditures				Use of general health care services
			Year	Complete	Partial	Nothing	Year	Complete	Partial	Nothing	
2004	36	21	2004	17	3	1	2003	10	4	7	1
2005	36	26	2005	16	5	5	2004	15	3	8	14
2006	36	29	2006	19	3	7	2005	16	2	11	23
2007	36	28	2007	20	3	5	2006	19	3	6	22
2008	36	30	2008	18	7	5	2007	13	9	8	20
2009	36	34	2009	22	2	10	2008	20	1	13	27
2010	36**	34***	2010	27	4	3	2009	24	3	7	27
2011	36**	36	2011	28	0	8	2010	24	2	10	29
			2012***	20	0	16					

Notas:

**Financial reports received" means any data reported in the financing sections of the electronic data collection form.

**35 member states and Puerto Rico

***Dominica and Haiti did not submit financial reports in 2010.

****preliminary budget

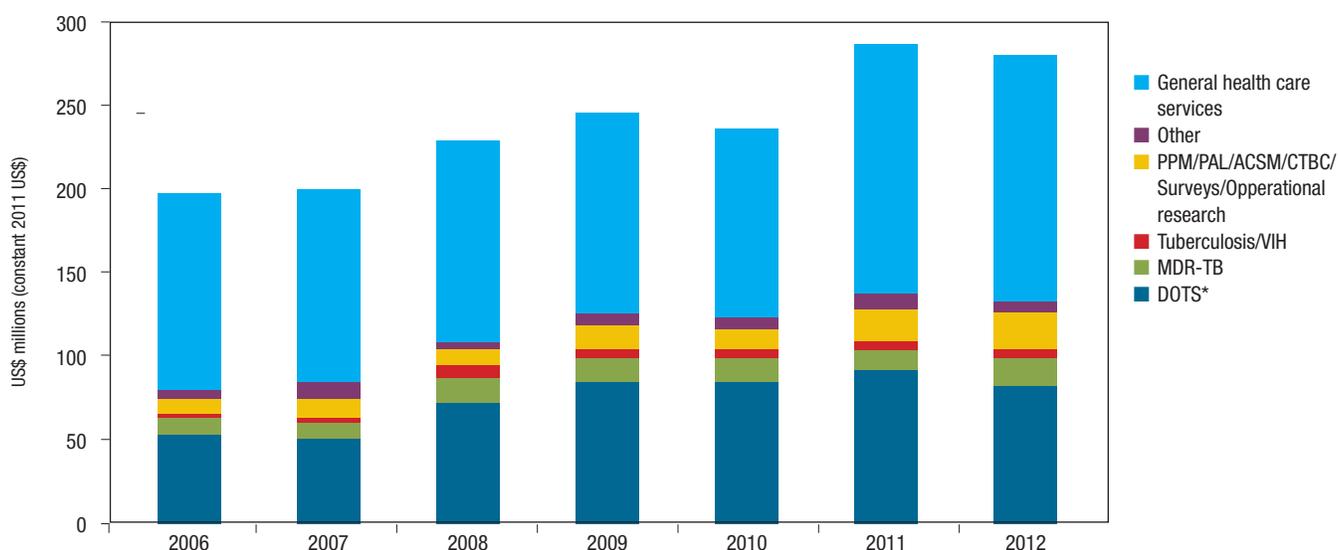
* The 15 countries are: Bolivia, Brazil, Chile, Colombia, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama and Paraguay.

4.2 Funding for TB care and control in the region of the Americas

The funding available for TB control in the 15 selected countries has increased since 2006 and is expected to reach USD 279 million in 2012 (Figures 27, 28 and 29). Most of this funding has been used to support the general use of health care services by TB and MDR-TB patients; these are costs associated with using general health-service staff resources and infrastructure for TB control, both of which are used when TB (and MDR-TB) patients are hospitalized or visit outpatient facilities for DOT or monitoring tests during treatment. The second largest use is for the diagnosis and treatment with first-line drugs (labelled “DOTS” in Figure 1). It is worth highlighting that the funding for treatment of MDR-TB has increased since 2006 and expected to reach USD 15.8 million.

Figure 27. Funding available for TB control by line item, 15 selected countries in the Region of the Americas, 2006-2012

* DOTS includes the funding available for first-line drugs, NTP staff, programme management and supervision, and laboratories



Across all the 15 selected countries, domestic funding from national governments is the single largest source of funding (Figure 28)[§], accounting for 90% of total expected funding in 2012. Analysis at the global level also show that national governments are the largest funding source for NTPs in almost all countries[‡]. Since 2008, the Global Fund is the largest source of donor funding for TB control in the Region of the Americas, as it is at the globally. Its contribution is expected to reach USD 15 million in 2012. Funding from other donors (for example, USAID, GDF, or DFID) is expected to be USD 9 million.

* In most countries these costs are not included in the NTP budgets. We estimate these costs based on the inputs of using health care services reported by countries: 1) the average number of outpatient visits for DOT or monitoring tests during treatment, and 2) the average number of days in hospital per TB (and MDR-TB) patient. These inputs are then multiplied by the WHO estimates of unit costs of outpatient visits and bed-days (see www.who.int/choice) to obtain the cost of the general use of health care services.

§ Domestic funding from national governments includes also loans that the government might take for TB. However, in the Region of the Americas no single country reports a loan for TB (see Table 2).

‡ WHO. Global Tuberculosis Control: WHO report 2011.

Figure 28. Funding available for TB control by source of funding, 15 selected countries in the Region of the Americas, 2006-2012

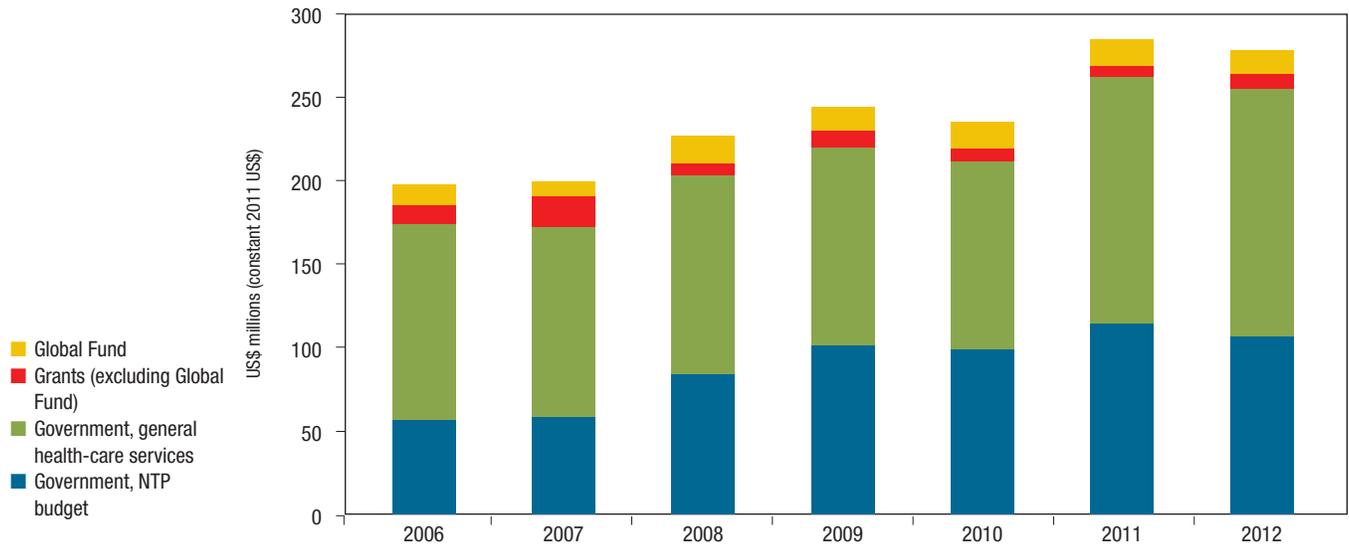
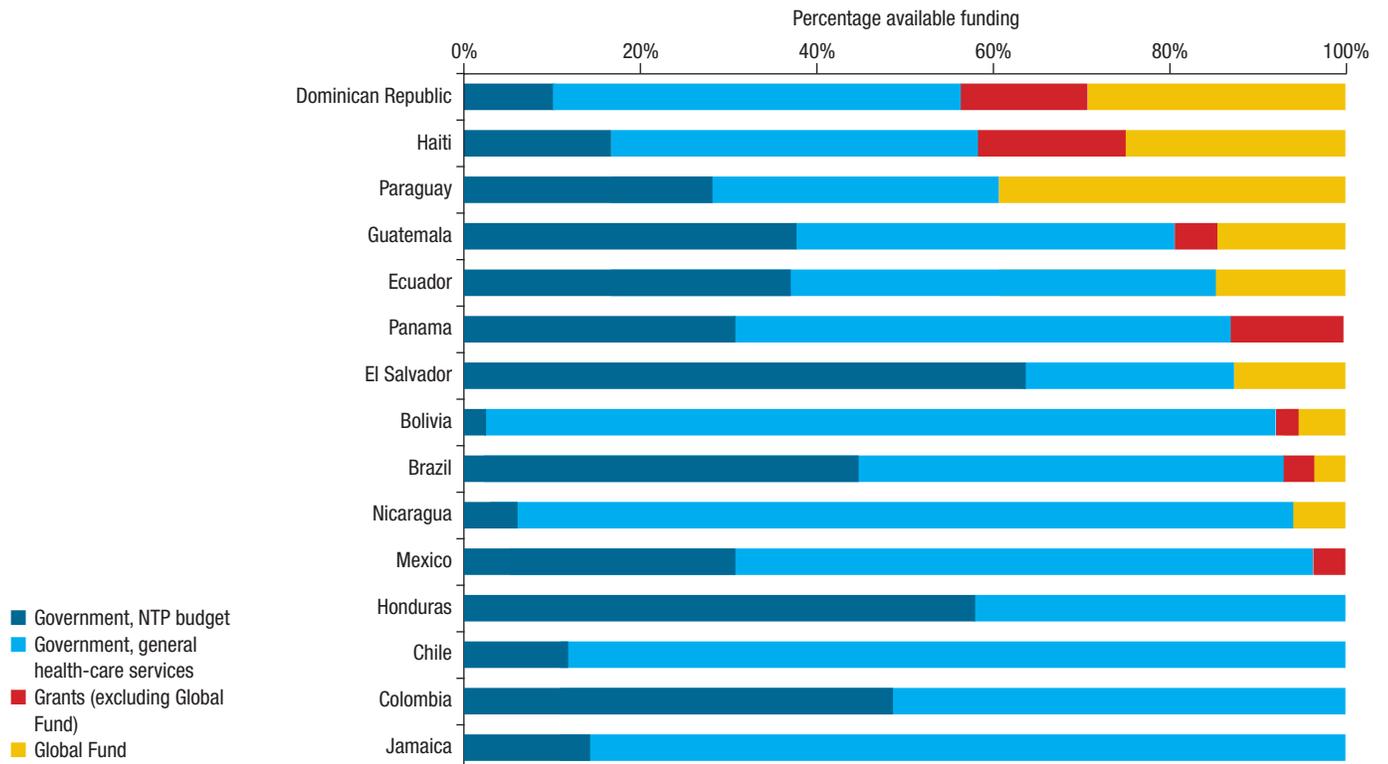


Figure 29. Source of funding for TB control, 15 selected countries in the Region of the Americas, 2012



In total, 70% of the funding expected for TB in these 15 countries is accounted for by just two countries: Brazil and Mexico (**Figure 30**). Colombia, Ecuador, Guatemala, Brazil and Mexico account for 84% of the expected funding in 2012, with 53% of all notified cases in the Region in 2010. Funding expected in the remaining 10 countries, which account for 19% of notified cases in the Region in 2010, amounts to USD 43 million, equivalent to 16% of total funding for these 15 countries.

NTPs continue to report funding gaps even though they have increased funding and there are 10 completed rounds of proposals to the Global Fund, (**Figure 31**). During the period 2007-2011 funding gaps were between USD 23-27 millions. However, in 2012 the funding gap will reach USD 40 million. The funding gap for first-line drugs is about USD 7 million in 2012, compared with around USD1 million in previous years. Mexico, Haiti and Colombia account for this large funding gap in first-line drugs, with funding gaps reported of USD 1.8 million, USD 1.8 million

Figure 30. Funding available for TB control by country, 15 selected countries in the Region of the Americas, 2006-2012

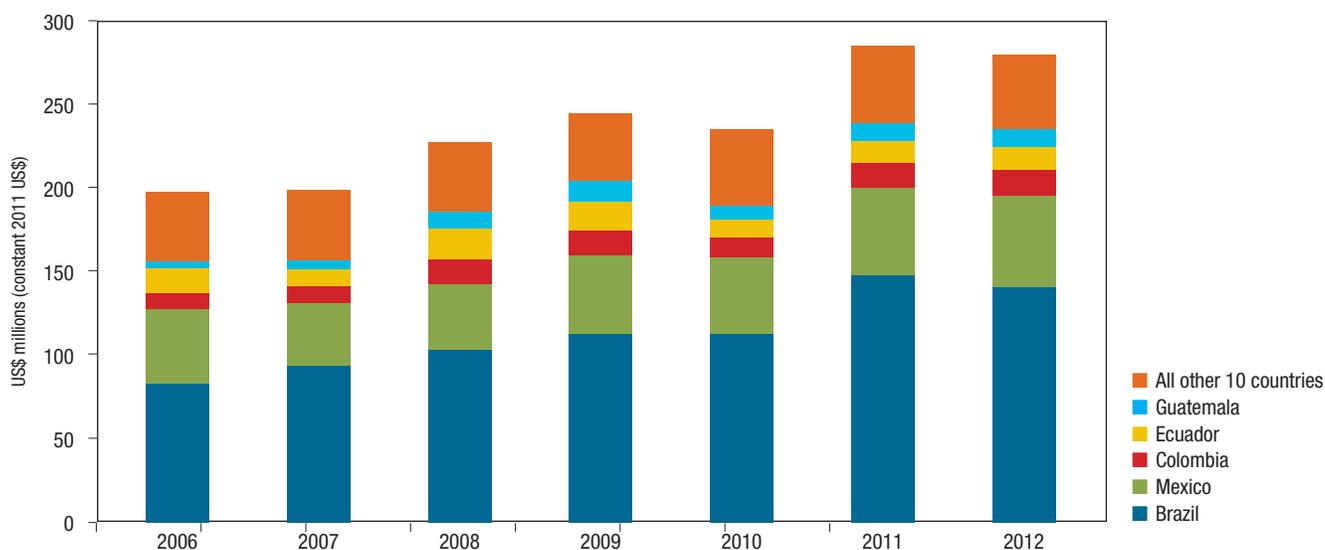
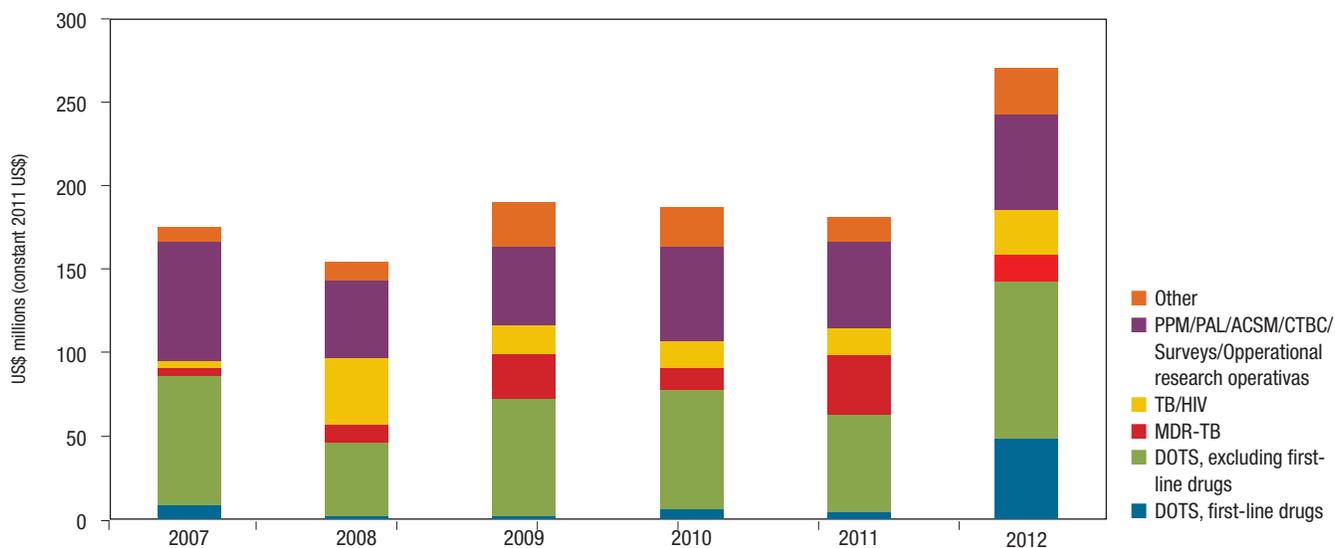


Figure 31. Funding gaps reported by NTPs, 15 selected countries in the Region of the Americas, 2007-2012



and USD 1.4 million respectively. Increased funding gaps are also expected for DOTS in 2012, it will reach USD 14 million, compared with 9 million in 2011. This increase is mainly explained by Brazil (USD 7.2 million in 2012 compared with USD 3.5 million in 2011) and the Dominican Republic (USD 2.4 million in 2012 compared with USD 0.2 million in 2011).

Trends in funding and funding gaps in these 15 countries as a whole conceal important variation among countries (Table 16 and Figure 32). Regional trends for funding are dominated mainly by the trends in Brazil, and to a lesser extent by trends in Mexico. The funding estimated to be required (equivalent to budget of NTP) in Brazil has steadily increased since 2006 and the available funding has kept pace.

In the other 14 countries there is a great amount of variation from year to year in the budgets and funding available reported by NTPs. However, considering only the start and end point of the period (2006 and 2012), countries could be classified into four groups: 1) those with a decreasing trend in budgets requested and funding available for TB control (Chile, Jamaica, Nicaragua and Dominican Republic); 2) those showing an increasing trend in budgets and funding available (Colombia, El Salvador, Guatemala, Mexico and Paraguay); 3) those with more or less stable budgets and funding available (Bolivia, Ecuador, Honduras, Panama); and 4) Haiti, whose budget increases from 2006 to 2012, but the funding available decreases.

Table 16. NTP budgets, funding available, cost of utilization of general health-care services and total funding required according to country plans, 2012 (USD millions)

Country	NTP budget	Fondos disponibles				Financial gap (a)	Cost of utilization of general health-care services (WHO estimate) (b)	Total funds required for TB control (c)
		Government (excluding loans)	Loans	Grants (excluding Global Fund)	Global Fund			
Brazil	86.6	71.2	0.0	1.4	0.9	13.1	68.5	155.1
Mexico	18.2	17.8	0.0	0.4	0.0	0.0	35.3	53.5
Colombia	9.3	6.7	0.0	0.0	1.0	1.6	8.0	17.3
Ecuador	8.0	6.5	0.0	0.0	0.9	0.6	7.0	15.0
Dominican Republic	7.3	1.3	0.0	1.2	2.9	1.9	4.6	11.9
El Salvador	6.4	3.5	0.0	0.0	0.7	2.2	1.3	7.7
Bolivia	5.0	0.0	0.0	0.0	0.9	4.1	6.7	11.7
Haiti	4.8	0.3	0.0	0.0	0.5	4.0	0.5	5.3
Paraguay	3.8	1.3	0.0	0.0	1.8	0.7	1.5	5.3
Panama	2.0	1.7	0.0	0.3	0.0	0.0	2.6	4.6
Jamaica	0.1	0.1	0.0	0.0	0.0	0.0	0.6	0.7
Chile	–	–	–	–	–	–	3.7	3.7
Guatemala	–	–	–	–	–	–	4.7	4.7
Honduras	–	–	–	–	–	–	1.4	1.4
Nicaragua	–	–	–	–	–	–	1.5	1.5
Total (d)	152	110	0	3	10	28	148	299

Notes:

– Data not reported by the country.

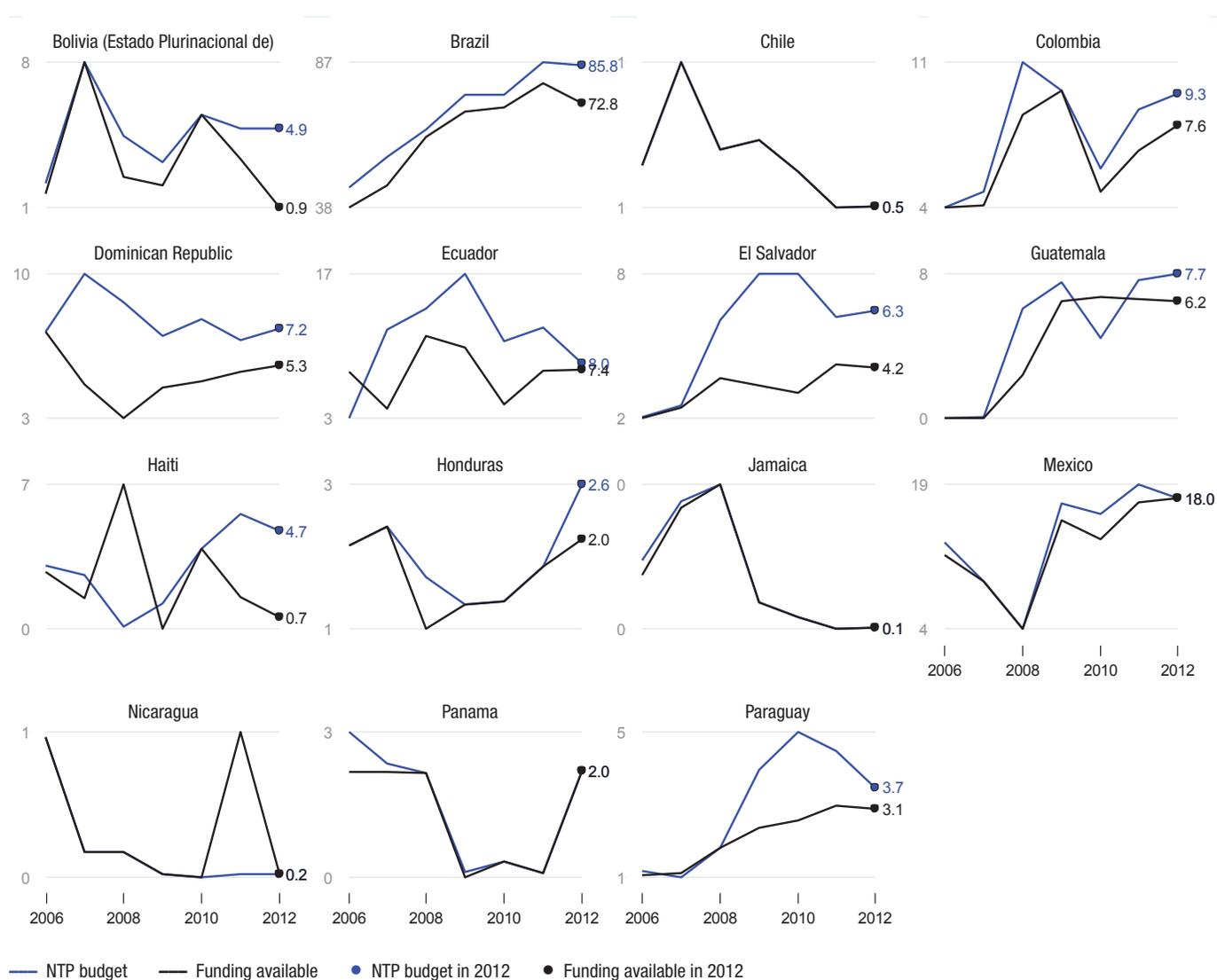
(a) Calculated as the NTP budget minus all the funding available.

(b) Reference 2 in the text explains the methods used for this estimation.

(c) Calculated as the NTP budget plus the cost of utilization of general health-care services.

(d) This total does not include estimates for Chile Guatemala, Honduras y Nicaragua, and are therefore lower than those in figures 1-5.

Figure 32. NTPs budget and funding available in the 15 selected countries in the Region of the Americas, 2006-2012



The ability to mobilize resources can be assessed by comparing the funding available with budgets and the ability to use the financial resources can be assessed by comparing the expenditures with the funding available (Table 17). The latest year for which data are available for all three indicators is 2010. In 2010, Bolivia, Chile, Honduras, Haiti, Jamaica, Nicaragua, and Panama were the most successful of the 15 countries in mobilizing funds for their budgets, while Ecuador and El Salvador were the least successful. Guatemala reported a larger amount of funding available compared with the budget required (i.e. a surplus instead of a funding gap), this is likely to be an error in the reporting of data that has not yet been corrected by the country.

Countries that have received increases in funding face the important challenge to be able to spend the extra money. The majority of these 15 countries (9/15) reported spending in a high proportion of their funding available (above 80%), and in some cases the funds that were raised and spent exceed the original budget (Dominican Republic, Mexico and El

Salvador). Six countries had expenditures that appeared to be particularly low relative to funding available: Guatemala, Bolivia, Nicaragua, Panama, Haiti and Paraguay. Probably in some of these six countries this reflects underreporting of expenditure data in 2010.

4.3 Cost per patient

The estimated cost per patient treated for TB with first-line drugs is shown for each of the 15 countries in **Figure 33** organized by groups of level of income*. There is great variation in the cost per patient in these 15 selected countries, the smallest cost is of USD 88 for Haiti and the highest of USD 4,719 for Jamaica. Only five countries show a cost per patient under USD 1,000: Haiti, Nicaragua, Bolivia, Honduras and Colombia. Six countries show a cost per patient between USD 1,000 and USD 2,000 (Paraguay, Brazil, Panama, Chile, Dominican Republic and Guatemala); and four above USD 2,000 (Ecuador, Mexico, El Salvador and Jamaica). Although the cost per patient treated tends to be higher in the higher-income countries, other variables such as the number of patients treated or the model of care influence also the cost per patient. Brazil has the third highest income level in the Region after Chile and Mexico, but it also treated the largest number of patients in the Region, therefore its average cost per patient is similar that of some low-middle income countries. The model of care in Jamaica implies a high rate of hospitalization (100% of new TB patients are hospitalized for 56-70 days); this explains their high cost for TB per patient.

Table 17. NTP budgets, funding available and expenditures in the 15 selected countries in the Region of the Americas, 2010 (USD millions)

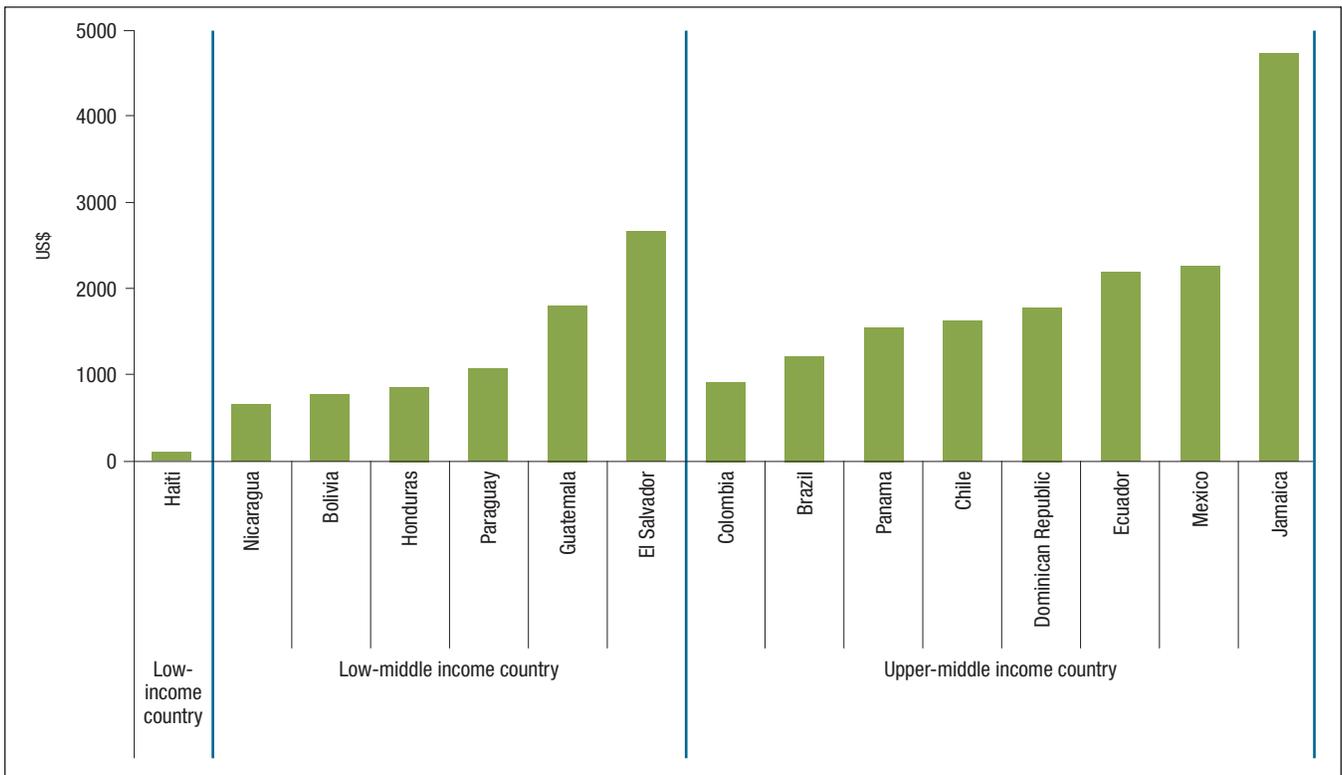
Country	NTP budget	Available funding (a)	Expenditures (b)	Available funding as % of NTP budget	Expenditures as % of available funds (c)
Ecuador	10	4.1	3.2	40%	79%
El Salvador	7.7	3.3	3.8	42%	116%
Paraguay	5.4	2.7	1.5	50%	57%
Dominican Republic	7.7	4.5	4.6	59%	102%
Colombia	5.5	4.3	4.3	78%	100%
Mexico	16	13.5	18.5	83%	137%
Brazil	76	71.5	69.1	94%	97%
Bolivia	5.6	5.6	1.0	100%	18%
Chile	0.7	0.7	0.6	100%	87%
Honduras	1.2	1.2	1.1	100%	94%
Haiti	3.9	3.9	2.2	100%	56%
Jamaica	0.1	0.1	0.1	100%	82%
Nicaragua (d)	0.2	0.2	0.1	100%	33%
Panama	0.4	0.4	0.2	100%	41%
Guatemala	4.3	6.4	0.2	149%	3%

Notes:

- a) Based on the 2010 budget data reported in 2010.
- b) Based on the 2010 expenditures reported in 2011.
- c) These figures can be above 100% when additional funds were mobilized after reporting data in 2010.

* World Bank classification of level of income: <http://data.worldbank.org/>

Figure 33. Cost per patient treated with first line drugs for the 15 selected countries in the Region of the Americas, organized by income level, 2010



CHAPTER 5

Conclusions

This chapter summarizes the main conclusions on TB epidemiology, control and financing in the Americas that can be drawn from this report:

- 1** TB incidence, prevalence and mortality continue to decline in the Region of Americas, and the Region is on track to meet the global targets for reduction in disease burden for 2015. Control efforts and policies should take into account the areas with a higher burden of TB: The major burden of TB is situated in South America, where the majority of TB cases occur every year, and in the Caribbean, especially in Haiti, where the incidence rate is eight times higher than the estimate for the whole Region. Suriname is the only country in the Region with increasing TB incidence over the past years.
- 2** Strengthening of laboratory capacity and performance should be one of the priorities for TB control in the Region of the Americas, given that there are shortages of laboratory capacity and external quality assurance in some countries with a high burden of TB. There is a great variety in the proportion of laboratory confirmed cases, emphasizing that strengthening laboratory capacity and performance would result in improved diagnosis and case detection of TB.
- 3** Treatment success among sputum smear-positive TB cases in the Americas is still low in some countries. The Region is currently making only limited progress towards the 2015 target for treatment success. Ensuring treatment adherence and strengthening of direct observed treatment might serve to increase treatment success in the forthcoming years. Adequate recording and reporting of treatment outcomes should be ensured.
- 4** Roll-out of drug susceptibility testing for previously treated TB cases should be priority in all countries, especially in those with low coverage of DST. Improving DST coverage among re-treatment cases is likely to result in higher case detection of MDR-TB cases in the Region of the Americas. Enhancing drug-resistance surveillance by establishing systems of continuous surveillance or by conducting drug-resistance surveys are needed to allow for a better assessment of the burden of drug-resistant TB.
- 5** Most countries, especially those in the Caribbean, require strengthening of HIV counseling and testing among TB patients. CPT and ART should be made available for all TB patients living with HIV. Better data are needed to assess the performance of TB/HIV collaborative activities including prevention of TB among people living with HIV in the population.
- 6** While funding available for TB control is greater in 2011 than in any year before, funding gaps remain large and middle-income countries in particular will have to do more to reduce those gaps using domestic sources.

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