

MULTIPLE ASPECTS OF CHRONIC DISEASES IN THE AMERICAS

Master of Public Health Field Experience

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Outline

- Internship overview
- Pan American Health Organization
- Core project - Dual threat of diabetes mellitus (DM) and tuberculosis (TB) in the Americas
- Additional activities

Internship overview

PAHO internship program

Purpose

- Realities of working at a large PH agency
- Pan American Health Organization (PAHO/WHO)

Specific goals

- Population-level analysis
- Strategic initiatives

Primary focus

- Chronic disease

PAHO internship program

- May 18 – August 13, 2010
- PAHO headquarters, Washington, D.C.
- Noncommunicable Disease Unit



PAHO internship program

Core project

- Cross-unit project
- Association of DM prevalence and the incidence of TB

Additional activities

- Health in the Americas
- Atlas of Diabetes Education in Latin America and the Caribbean
- Chronic Care Passport
- Grant proposal
- Economic evaluation of chronic diseases

Pan American Health Organization

PAHO



- Specialized organization for health of the Inter-American System (since 1902)
- Regional Office for the Americas of the World Health Organization (WHO) (since 1949)
- 35 member States and Territories
- 28 country offices
- 10 regional and subregional centers

PAHO

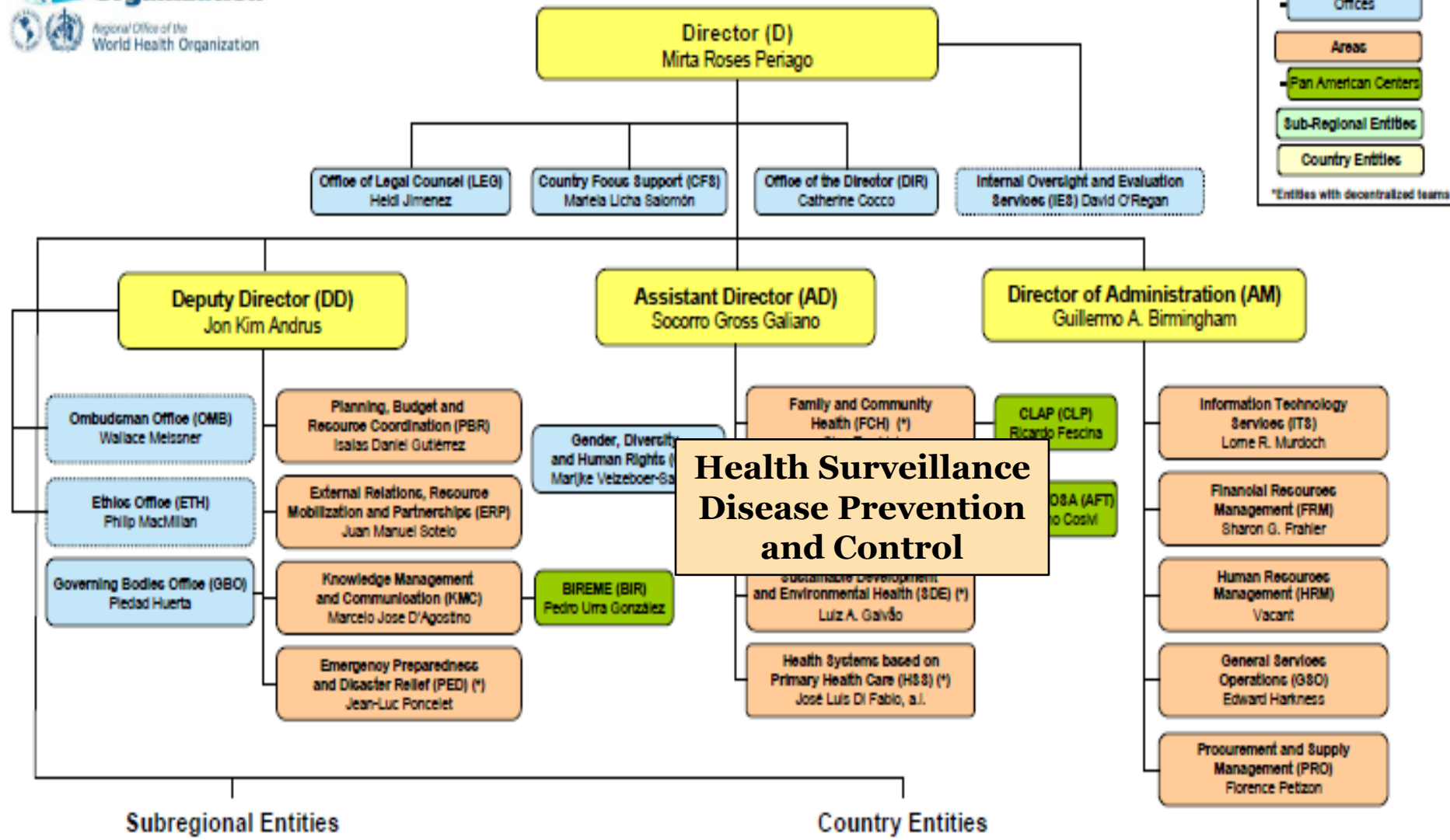
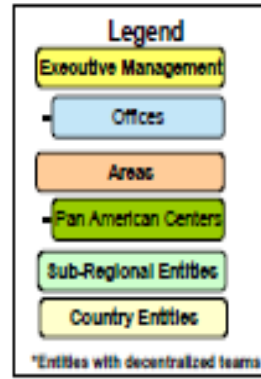


Mission

- To lead strategic collaborative efforts among member states and other partners
 - To promote equity in health
 - To combat disease
 - To improve the quality of, and lengthen, the lives of the peoples of the Americas



Organizational Chart of the Pan American Sanitary Bureau



PAHO



**Pan American
Health
Organization**

*Regional Office of the
World Health Organization*

Noncommunicable Disease Unit

- Established in 1995
- Special emphasis on cardiovascular disease, cervical cancer, and diabetes

Core project:
Dual threat of DM and TB

Background

Burden of tuberculosis

- The Americas
280,000 per year
- 2nd leading cause of death
from an infectious disease
- 95% low- and middle-income
countries



Burden of diabetes

The Americas

- 2010 – 55 million
- 2030 – 83 million

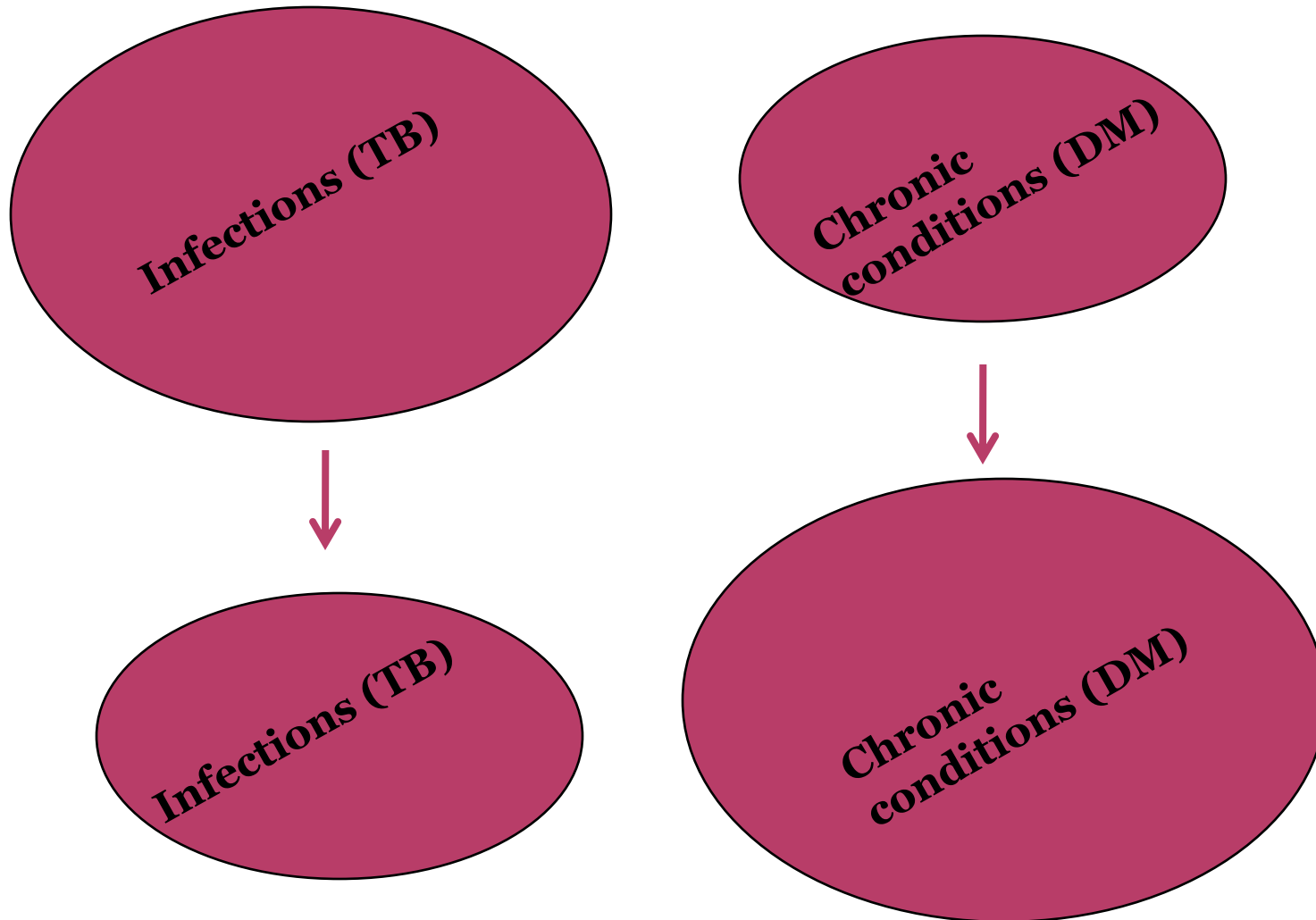


“Disease of affluence”?

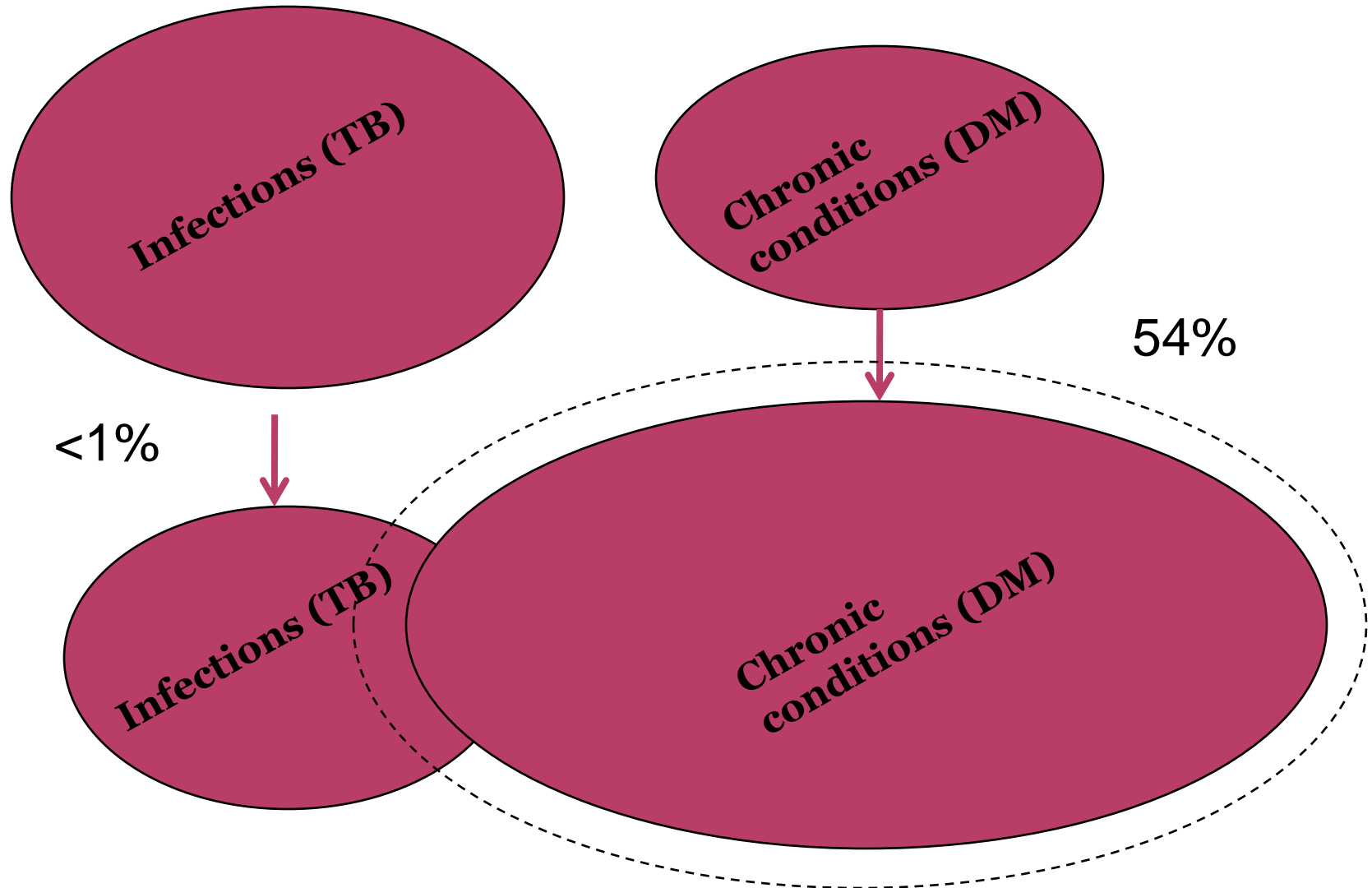
Top 10: Number of people with diabetes (20-79 years), 2010

COUNTRY/TERRITORY	2010 MILLIONS
1 India	50.8
2 China	43.2
3 United States of America	26.8
4 Russian Federation	9.6
5 Brazil	7.6
6 Germany	7.5
7 Pakistan	7.1
8 Japan	7.1
9 Indonesia	7.0
10 Mexico	6.8

Epidemiologic transition



Co-occurrence of TB and DM



TB and DM interaction



Chronic
hyperglycemia



Defects in
protective immunity



Enhanced
susceptibility
to infection

DM is a risk factor for TB

RR = 3.11

Jeon CY, Murray MB. Diabetes mellitus increases the risk of active tuberculosis: A systematic review of 13 observational studies. PLoS Med 2008 Jul 15;5(7):e152

Core project:
Dual threat of DM and TB

Study description

Goal

- To estimate the association of DM prevalence and the incidence of TB in countries across the Americas

Objectives

- To assess the proportion of incident cases of TB attributed to DM
- To assess the number of cases of TB that could be prevented with the elimination of DM

Methods and data

- Ecologic analysis

Data	Source
Population 25-79 years	U.N. Population Estimates, 2009
Incidence of TB (all forms)	World Health Organization, 2009
Prevalence of DM	Diabetes Atlas, 2009
RR of TB/DM	Kim et al., 1995

Data processing

- Age interval input data for the prevalence of DM and incidence of TB did not match
 - We applied prevalence of DM to single-year age populations
 - We regrouped data in similar age categories for both conditions
- Sex- and age-specific data for the incidence of all forms of TB were calculated based on statistics for smear-positive cases of TB

Data analysis

- TB incidence rate, number of cases per 100,000
- DM prevalence, %
- Population attributable fraction, PAF
 - Proportional reduction in the incidence rate of TB that would theoretically be achieved by eliminating DM in the population

$$\text{PAF} = P_{DM} (RR - 1) / 1 + P_{DM} (RR - 1)$$

P_{DM} = prevalence of DM

RR = relative risk for TB associated with DM

Data analysis

- Incidence rate of TB related to DM

PAF * TB incidence rate

- Number of incident cases of TB related to DM

PAF * number of TB incident cases

Study Results

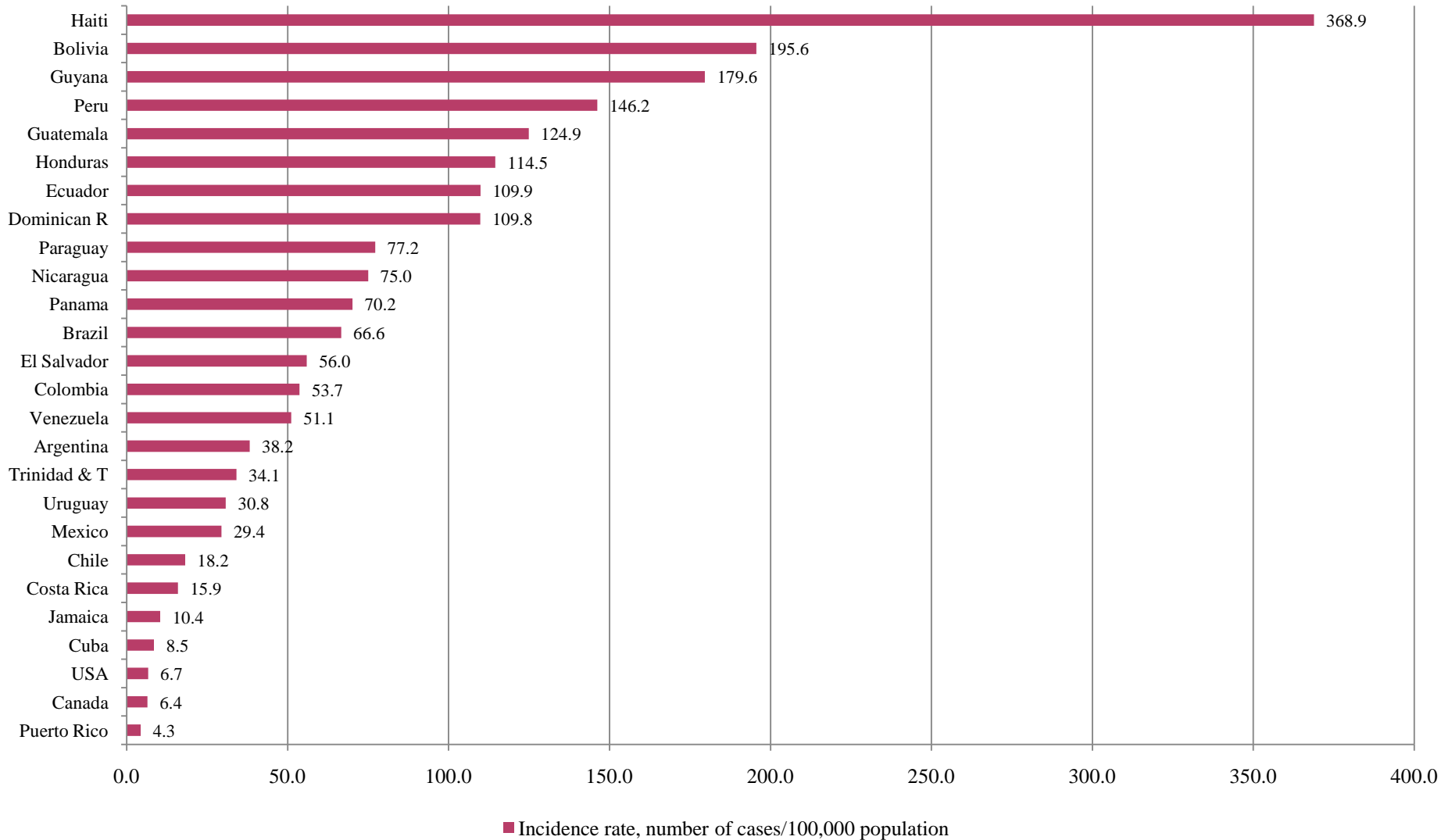
Results

- 26 countries from the Americas Region
- 520,318,334 population 25 – 79 years of age

Incidence rate of TB

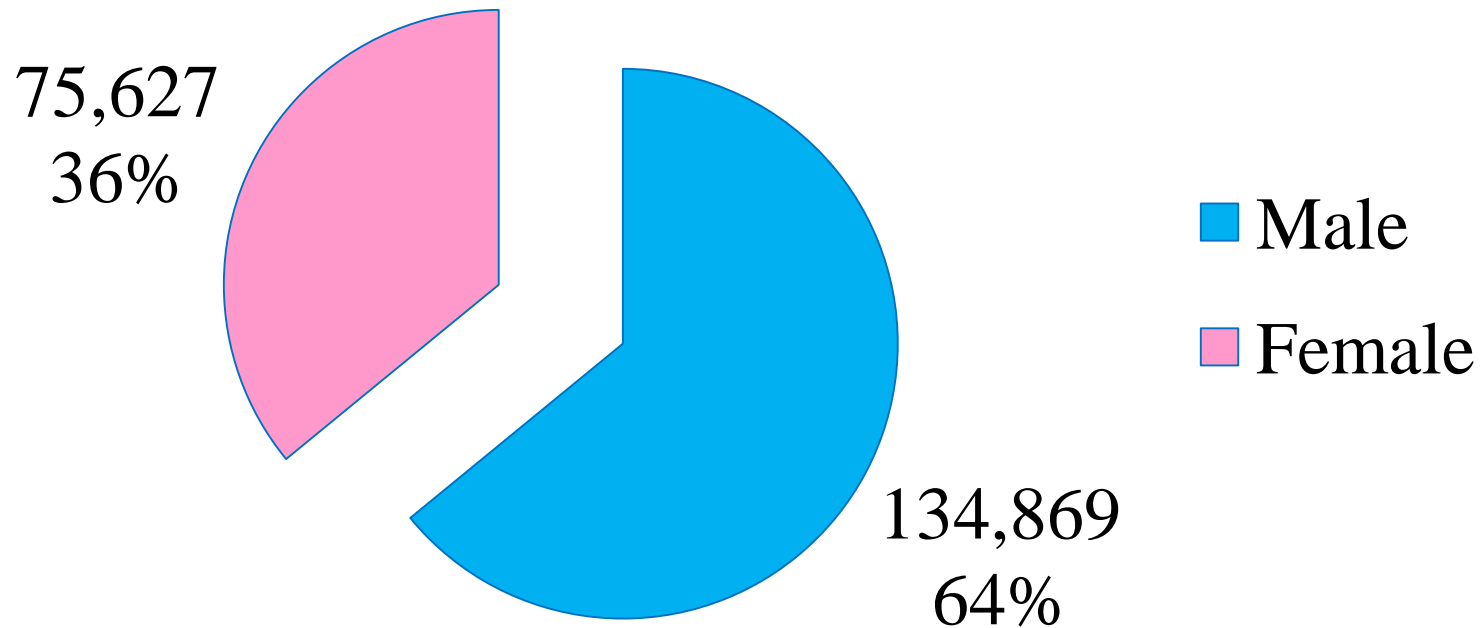
cases per 100,000 population

Overall: 40.5



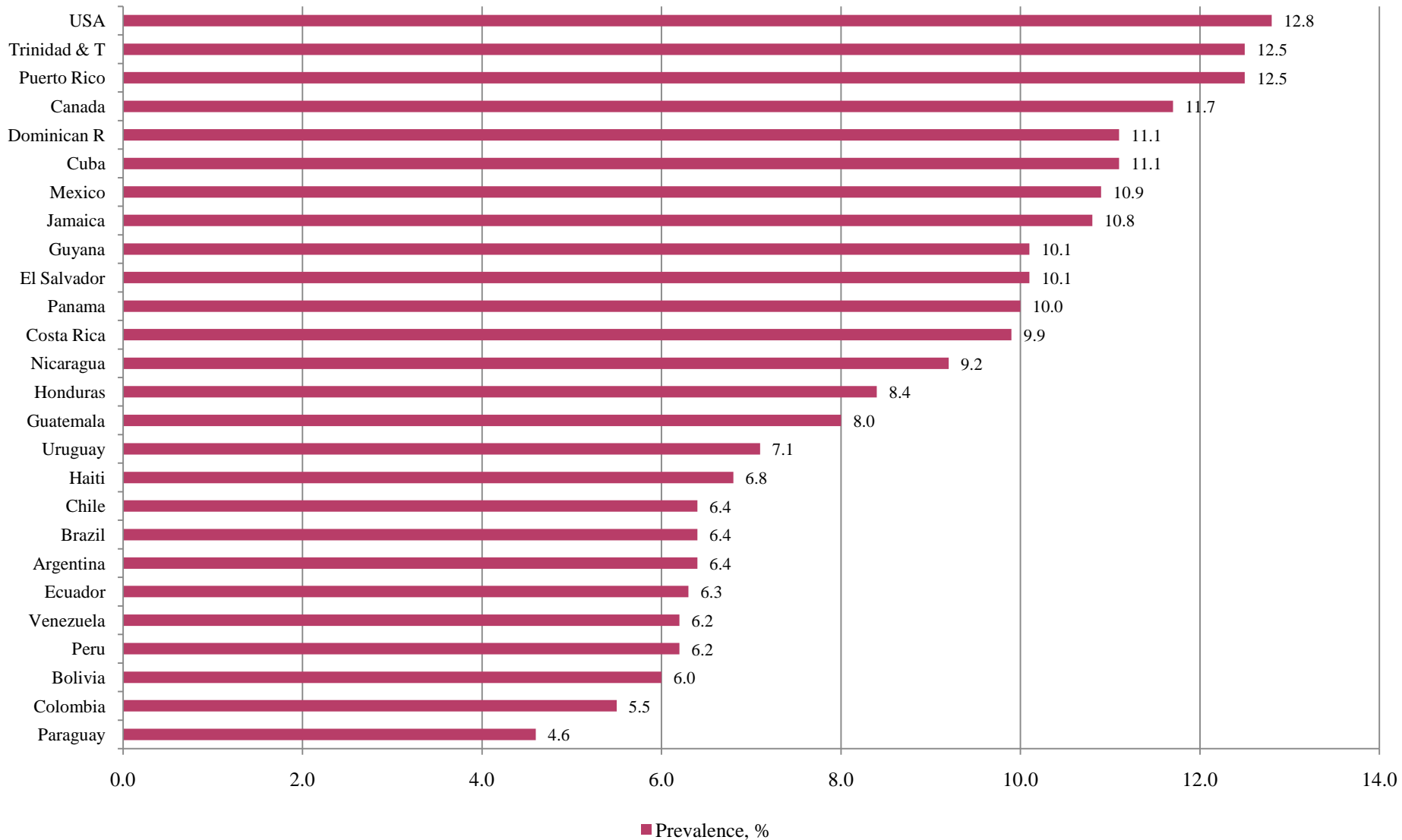
Sex distribution of TB cases

number of cases, %



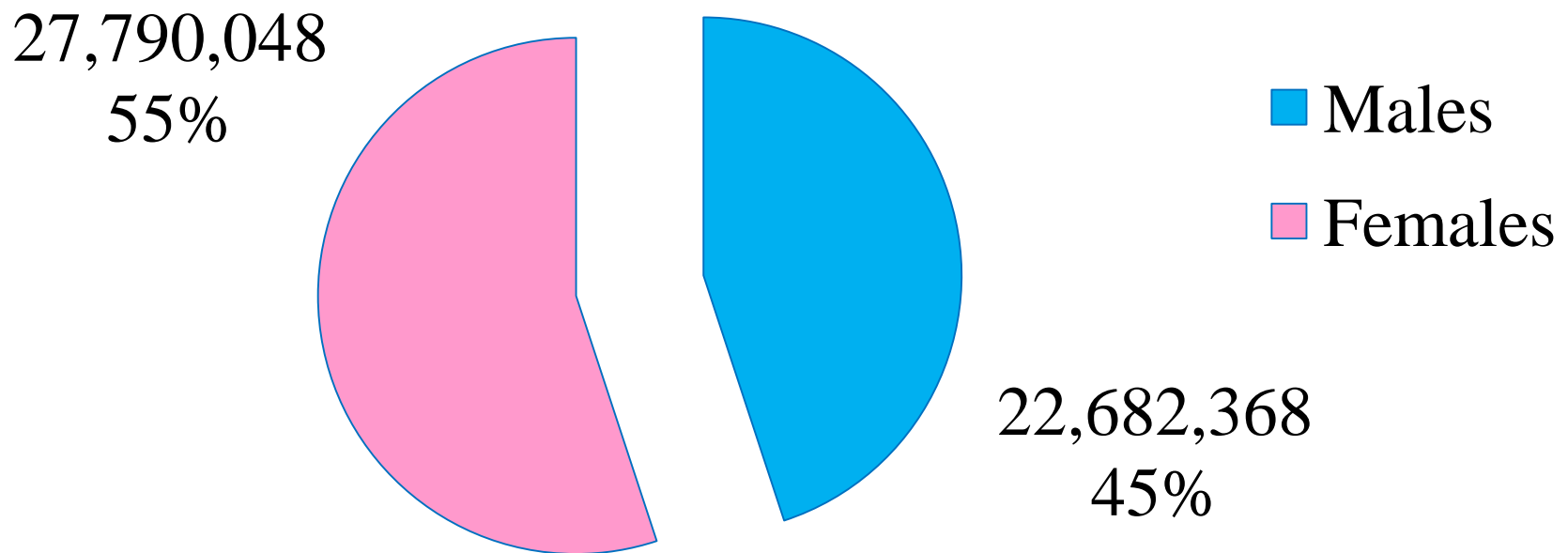
Prevalence of DM, %

Overall: 9.7



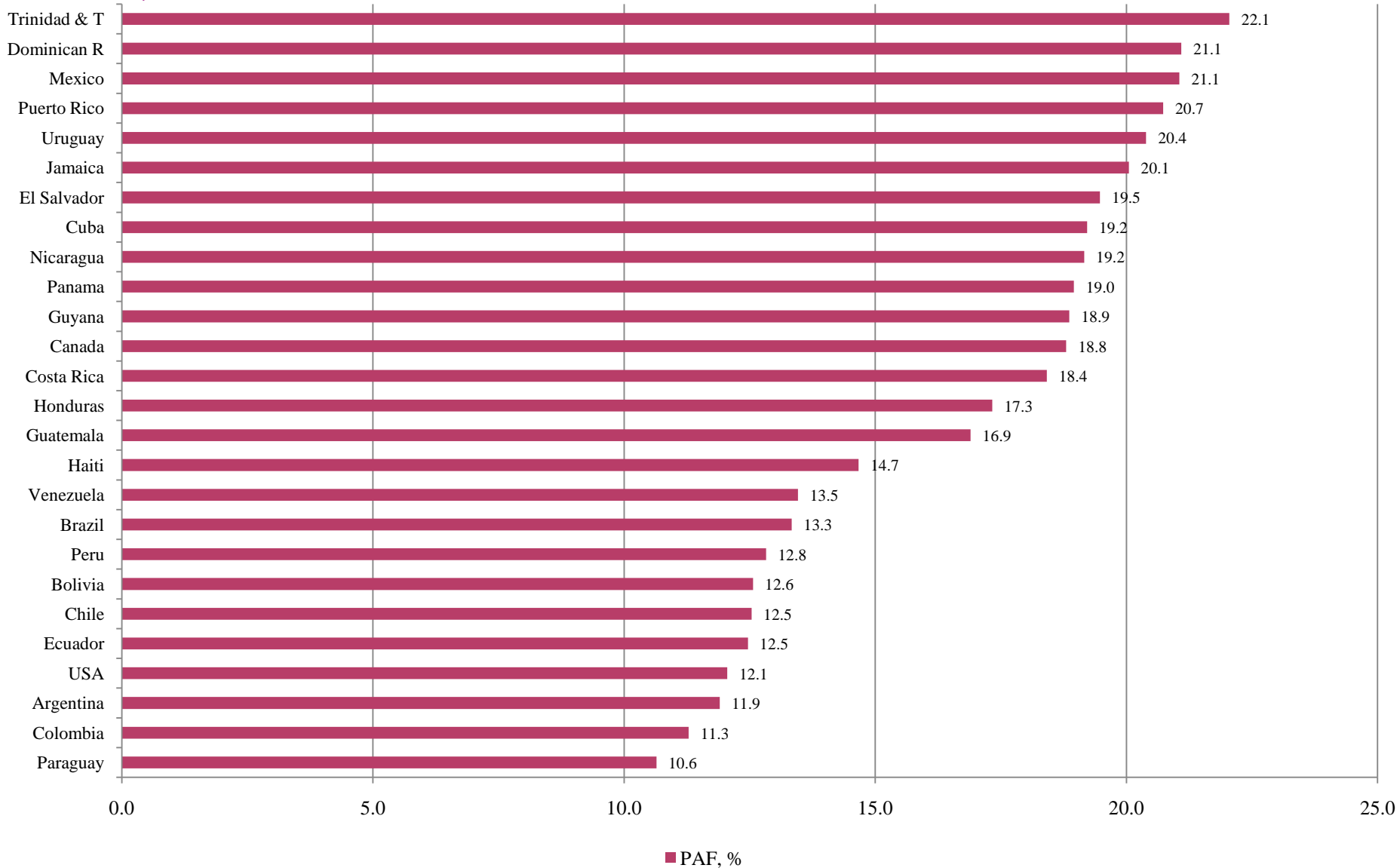
Sex distribution of DM cases

number of cases, %



PAF, % (Proportion of TB cases attributable to DM)

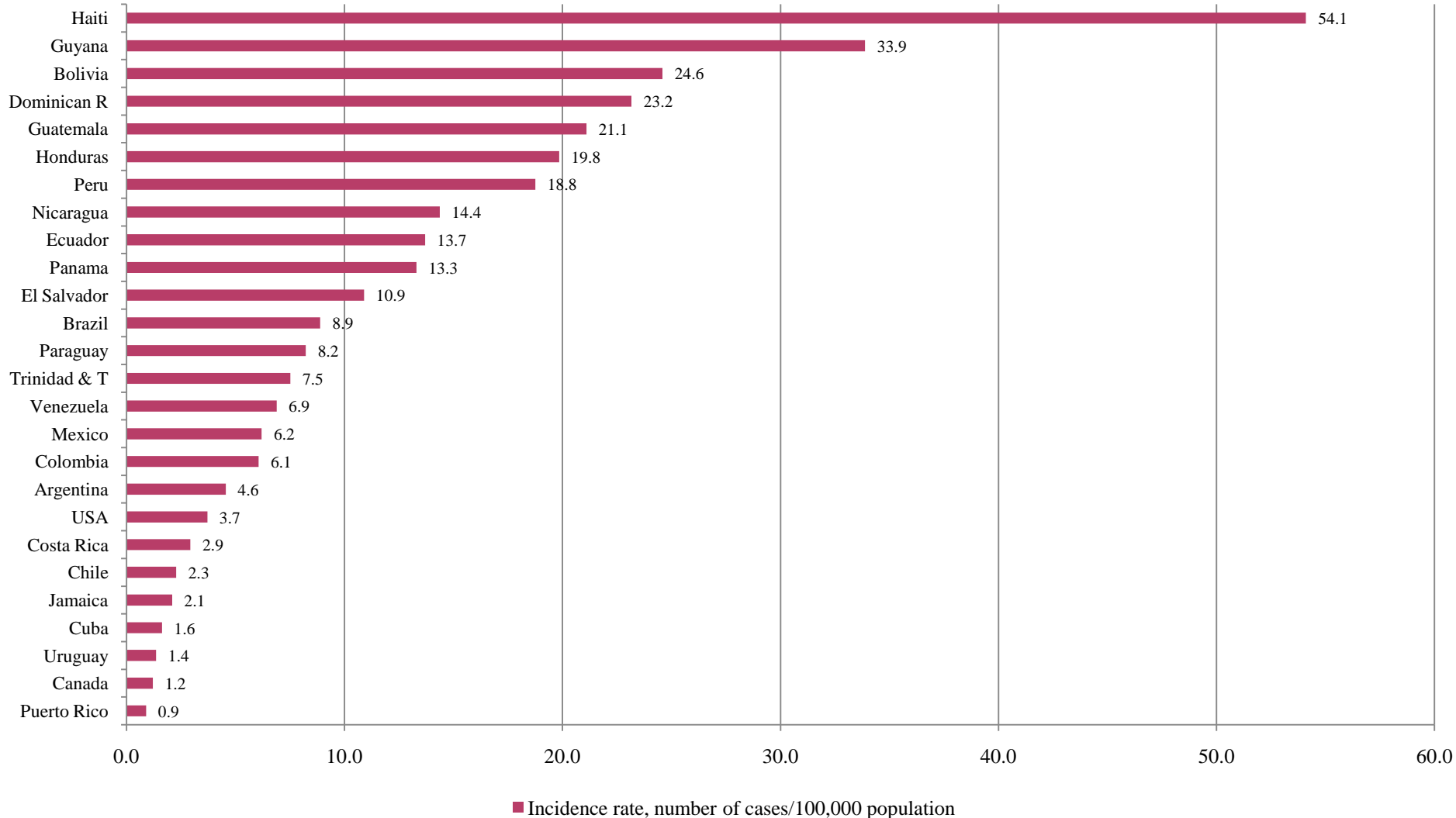
Overall: 16.5



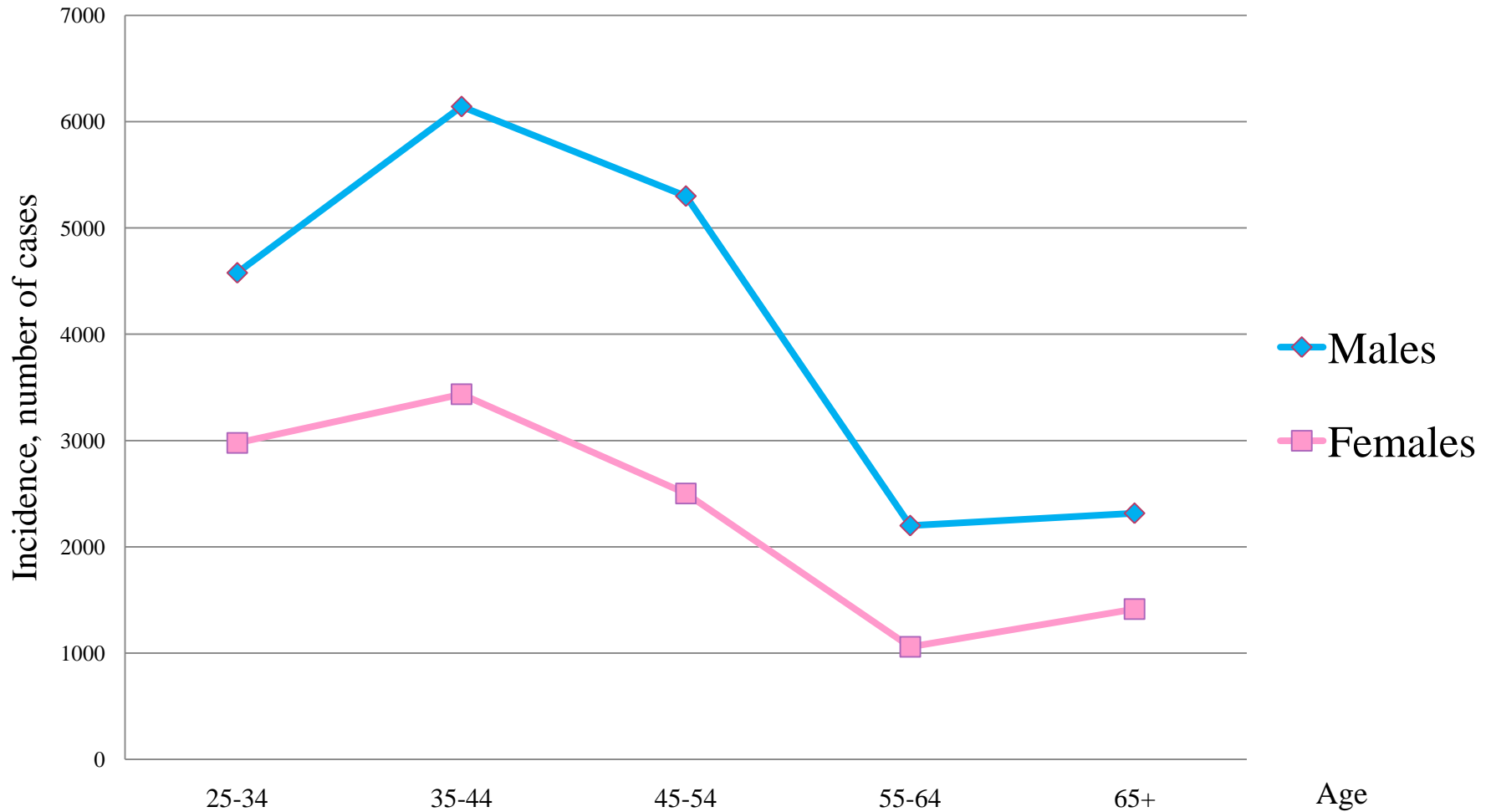
Incidence rate of TB/DM

cases per 100,000 population

Overall: 6.7



Incident cases of TB/DM by age and sex, number of cases



Incident cases of TB/DM by country, number of cases

Country	TB/DM cases	Country	TB/DM cases
Argentina	1,011	Haiti	2,495
Bolivia	1,042	Honduras	635
Brazil	9,696	Jamaica	29
Canada	273	Mexico	3,586
Chile	235	Nicaragua	369
Colombia	1,426	Panama	259
Costa Rica	78	Paraguay	242
Cuba	126	Peru	2,777
Dominican R	1,229	Puerto Rico	22
Ecuador	887	Trinidad & T	64
El Salvador	322	Uruguay	2,693
Guatemala	1,177	USA	74
Guyana	151	Venezuela	1,010
		Total	31,909

Conclusions

- DM is associated with the burden of TB in the Region of the Americas
- 16.5% of all incident cases of TB are attributed to DM
- 31,909 cases of TB could be prevented annually with the elimination of DM

Practical implications

- Cross-referral of TB and DM
 - Screening for DM among TB patients
 - Screening for active TB among people with DM
- Millennium Development Goals: “to have halted and begun to reverse incidence of TB” by 2015
 - Strategies for DM control and prevention should be considered for inclusion in TB programs

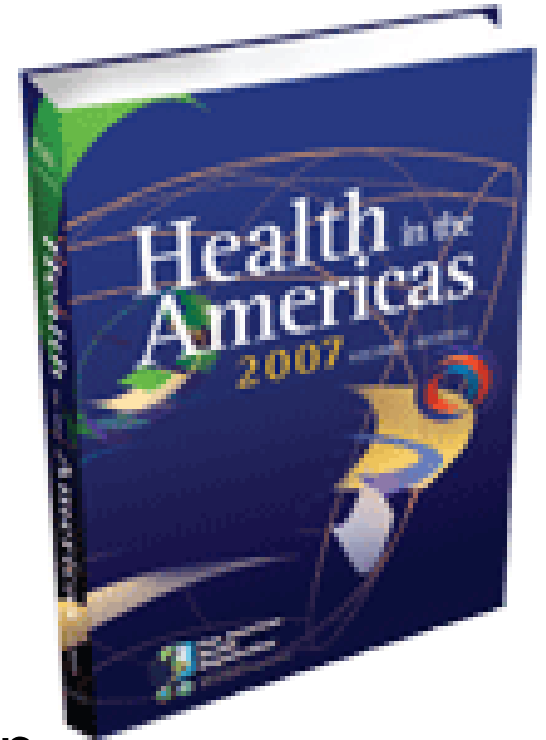
Additional activities with PAHO during my internship

Health in the Americas

- Launched in 1954
- Published every 5 years
- Last edition – 2007

Content:

- General issues on health and human development
- Evolution of health systems and services
- Specific conditions and risk factors



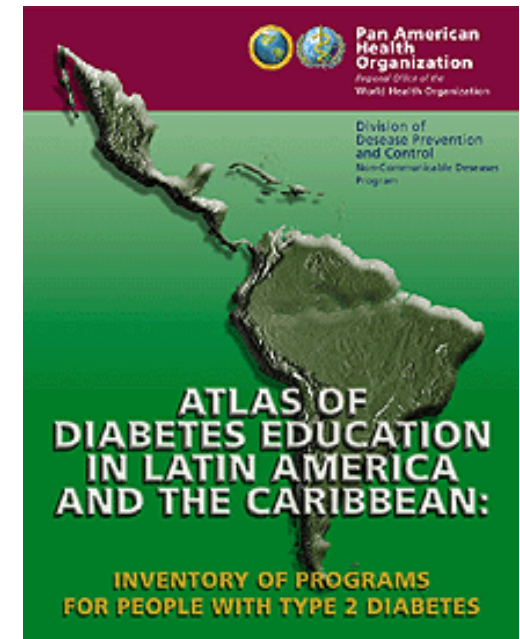
Health in the Americas

As part of my internship:

- Contribution to the next edition, Health in the Americas 2012
- Literature review on epidemiological patterns of DM in the Americas
- Data varied largely in terms of their scientific validity and methodological approaches

Atlas of Diabetes Education in Latin America and the Caribbean

- Inventory of educational programs for people with DM
- First edition – 21 programs for type 2 DM in 19 countries; published in 2002
- Second edition – 46 programs for type 2 DM and type 1 DM in 23 countries; in press now



Atlas of Diabetes Education in Latin America and the Caribbean

As part of my internship:

- Contribution to the 2nd edition of the Atlas, Introduction section
 - Updates of scientific evidences about DM as a major public health problem in the LAC Region
 - Importance of self-management in DM control
 - Biomedical and psychological benefits of educational interventions in people with DM
 - Related economic aspects

Chronic Care Passport

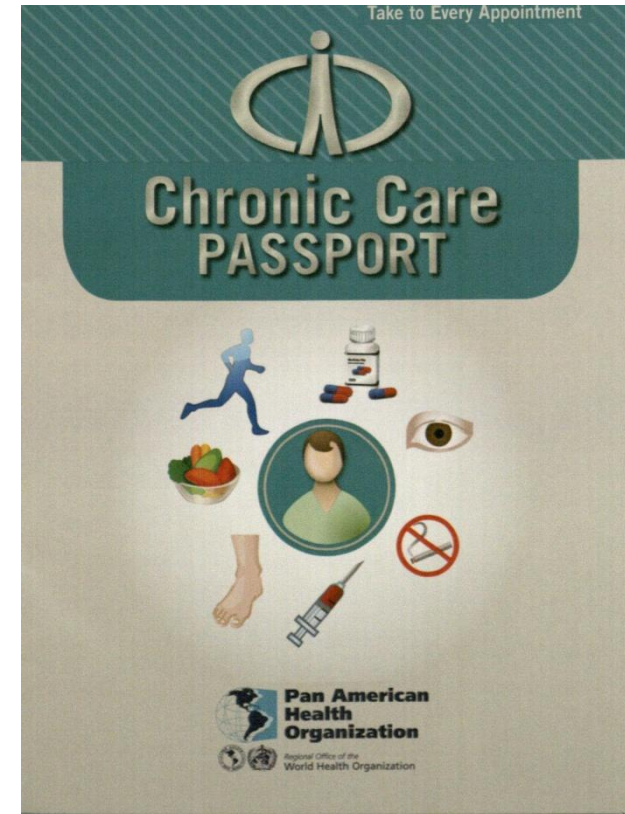
- CARIDIAB: Caribbean Diabetes Project
- 10 Caribbean countries
- Quality improvement initiatives for DM care
- Systematic monitoring and evaluation of patients with chronic conditions

<div style="text-align: center;">  paste your photo here </div> <div style="background-color: #333; color: white; padding: 5px; text-align: center;">  In Case of Emergency please contact: </div> <div style="margin-top: 5px;"> Name: <input type="text"/> Phone number: <input type="text"/> </div> <hr/> Name: <input type="text"/> Address: <input type="text"/> E-mail: <input type="text"/> Phone: <input type="text"/> Health Facility: <input type="text"/> Health Provider: <input type="text"/> E-mail: <input type="text"/> Phone: <input type="text"/> Initial Registration Date (DD/MM/YY): <input type="text"/> M.R. # <input type="text"/> ID/CCP # <input type="text"/> Date of Birth (DD/MM/YY): <input type="text"/> Height (cm/ins): <input type="text"/> Weight (Kg/Lbs): <input type="text"/> BMI at Registration (KG/M ²): <input type="text"/> Sex(M/F): <input type="text"/> Allergies: <input type="text"/>	<p>Please follow this healthy Lifestyle recommendations:</p> <ol style="list-style-type: none">  If you have diabetes, daily regimen of 3 meals and 3 snacks.  Moderate intake of carbohydrates, proteins, fats and salt.  Increase consumption of fish, fiber, fruits and vegetables.  Do not smoke and avoid excessive use of alcohol. <p>During your medical check up you should have the following</p> <ol style="list-style-type: none">  All the relevant blood tests taken and the results explained to you.  Your Blood Pressure recorded in every visit.  Your weight recorded in every visit.  Your urine tested for protein once per year.  If you have diabetes your feet checked in every visit and a dilated eye exam every year.  Your nutrition and physical activity pattern reviewed. Your medication reviewed. If you are on insulin, your injection sites should be checked. The opportunity to discuss any other health problems you have. 	M.R. # <input type="text"/> <table border="1"> <thead> <tr> <th>Diagnosis</th> <th>Yes</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>Diabetes </td> <td></td> <td></td> </tr> <tr> <td>Gestational diabetes </td> <td></td> <td></td> </tr> <tr> <td>Hypertension </td> <td></td> <td></td> </tr> <tr> <td>Neuropathy </td> <td></td> <td></td> </tr> <tr> <td>Myocardial Infarction </td> <td></td> <td></td> </tr> <tr> <td>Nephropathy </td> <td></td> <td></td> </tr> <tr> <td>High Cholesterol </td> <td></td> <td></td> </tr> <tr> <td>Stroke </td> <td></td> <td></td> </tr> <tr> <td>Diabetic Foot </td> <td></td> <td></td> </tr> <tr> <td>Retinopathy </td> <td></td> <td></td> </tr> <tr> <td>Amputation </td> <td></td> <td></td> </tr> <tr> <td>Erectile Dysfunction </td> <td></td> <td></td> </tr> <tr> <td>Depression </td> <td></td> <td></td> </tr> <tr> <td>Cancer </td> <td></td> <td></td> </tr> <tr> <td>Chronic Respiratory Disease </td> <td></td> <td></td> </tr> </tbody> </table>	Diagnosis	Yes	Date	Diabetes 			Gestational diabetes 			Hypertension 			Neuropathy 			Myocardial Infarction 			Nephropathy 			High Cholesterol 			Stroke 			Diabetic Foot 			Retinopathy 			Amputation 			Erectile Dysfunction 			Depression 			Cancer 			Chronic Respiratory Disease 		
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Chronic Care Passport

As part of my internship:

- Reviewed Chronic Care Passport and supplementing booklet for health care providers with instructions for its completion
- Provided my input from a clinical perspective



Grant proposal: Addressing the burdens of diabetes and tuberculosis in the Americas

- 2 sites – Brazil and Mexico
- 2 years project
- Goal – to improve the timely identification of DM and TB in people of the Americas
- Submitted to World Diabetes Foundation
- Funded; launched in April 2011

As part of my internship:

- Involved in reviewing the proposal

Inventory of studies: Economic evaluation of chronic diseases in the Americas

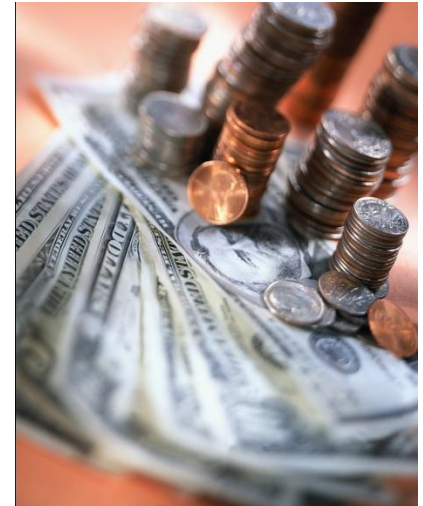
- Financial implications of health conditions and diseases
- Cost analysis
- Cost-effectiveness
- Based on extensive epidemiological data
- Lack of EE studies in developing countries



Inventory of studies: Economic evaluation of chronic diseases in the Americas

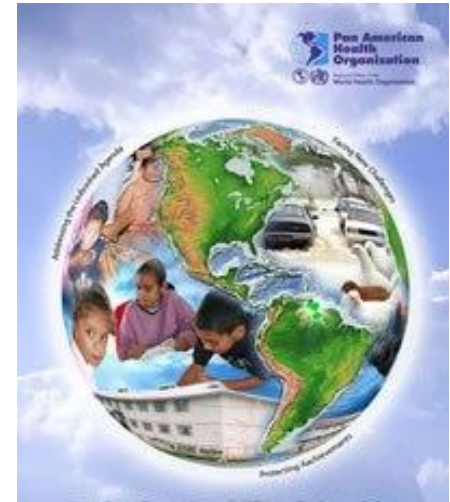
As part of my internship:

- Inventory of EE studies on chronic diseases in the LAC Region
- PubMed, LILACS
- 2000 – 2010
- CVD, DM, CR, CRD
- 27 studies
- Large variability of methodological approach
- Underreporting of validated models



General reflection

- Invaluable and rewarding experience
- Variety of training and professional development opportunities
- Daily work at PAHO, Organization's mission
- It takes time to see progress
- Consolidated my professional goals



Acknowledgments

- Dr. Mary Meck Higgins
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- Dr. Alberto Barceló
- Dr. Mirtha del Granado
- Kathryn Regiec

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