

Epidemiological Profiles of Neglected Diseases and Other Infections Related to Poverty in Latin America and the Caribbean



**Pan American
Health
Organization**

Regional Office of the
World Health Organization



Prevention and Control of Communicable Diseases
Area of Health Surveillance and Disease Prevention and Control
Pan American Health Organization
HSD/CD/543
September 2009

**Epidemiological Profiles
of
Neglected Diseases and Other Infections Related to Poverty
in
Latin America and the Caribbean**



Contents

Prologue	iii
Preface	iv
Acknowledgements	v
Acronyms	vi
Executive Summary	viii
About the Study	I
<i>Background</i>	<i>1</i>
<i>Objectives</i>	<i>2</i>
General Objective.....	<i>2</i>
Specific Objectives	<i>2</i>
<i>Methodology</i>	<i>3</i>
Selected Diseases	<i>3</i>
Selected Countries	<i>3</i>
<i>Sources of Information</i>	<i>4</i>
Data.....	<i>4</i>
Cartography and Geo-Processing.....	<i>4</i>
<i>Outcomes</i>	<i>5</i>
Regional Profile.....	<i>5</i>
Country Profiles	<i>5</i>
Analysis of Overlapping Diseases	<i>5</i>
Regional Profiles	8
<i>Diseases Analyzed at First Subnational Level</i>	<i>9</i>
Lymphatic Filariasis.....	<i>9</i>
Onchocerciasis	<i>11</i>
Schistosomiasis.....	<i>13</i>
Trachoma	<i>15</i>
Human Rabies Transmitted by Dogs.....	<i>17</i>
Overlapping Diseases, Region of the Americas.....	<i>20</i>
<i>Diseases Analyzed at Country Level</i>	<i>22</i>
Soil-Transmitted Helminths.....	<i>22</i>
Chagas Disease.....	<i>26</i>
Leprosy	<i>31</i>
Neonatal Tetanus	<i>33</i>
Congenital Syphilis.....	<i>35</i>
Country Profiles	37
<i>Bolivia</i>	<i>37</i>
Core Data.....	<i>37</i>
Current Situation of the Disease.....	<i>38</i>
Overlapping Diseases	<i>40</i>
<i>Brazil</i>	<i>41</i>
Core Data.....	<i>41</i>
Current Situation of the Disease.....	<i>42</i>
Overlapping Diseases	<i>48</i>
<i>Colombia</i>	<i>49</i>
Core Data.....	<i>49</i>
Current Situation of the Disease.....	<i>50</i>
Overlapping Diseases	<i>53</i>

<i>Dominican Republic</i>	54
Core Data.....	54
Current Situation of the Disease.....	55
Overlapping Diseases	57
<i>Ecuador</i>	58
Core Data.....	58
Current Situation of the Disease.....	59
Overlapping Diseases	61
<i>Guatemala</i>	62
Core Data.....	62
Current Situation of the Disease.....	63
Overlapping Diseases	67
<i>Guyana</i>	68
Core Data.....	68
Current Situation of the Disease.....	69
<i>Haiti</i>	72
Core Data.....	72
Current Situation of the Disease.....	73
Overlapping Diseases	76
<i>Honduras</i>	77
Core Data.....	77
Current Situation of the Disease.....	78
Overlapping Diseases	79
<i>Mexico</i>	80
Core Data.....	80
Current Situation of the Disease.....	81
Overlapping Diseases	86
<i>Nicaragua</i>	87
Core Data.....	87
Current Situation of the Disease.....	88
Overlapping Diseases	89
<i>Saint Lucia</i>	90
Core Data.....	90
Current Situation of the Disease.....	91
Overlapping Diseases	93
<i>Suriname</i>	94
Core Data.....	94
Current Situation of the Disease.....	95
Overlapping Diseases	97
<i>Venezuela</i>	98
Core Data.....	98
Current Situation of the Disease.....	99
Overlapping Diseases	103
Final Comments	104
References	107

Prologue

Several health indicators have shown important improvements over the past few decades, thanks to the efforts and commitments made by governments and health workers in all the countries in the hemisphere. As the Director of the World Health Organization (WHO) indicated in September 2008 in her visit to the Headquarters of the Pan American Health Organization (PAHO), “this is a region that has crafted a long-term and foresighted health agenda, built on the spirit of Pan American solidarity.”

Nonetheless, Latin America continues to suffer from the fact that an exorbitant number of people—nearly 50 million—live in a state of extreme poverty (with an income of less than one dollar a day). Beyond numbers and averages, the lives and hopes of each of these individual men, women, and children are what keep us awake at night in their appeal for us to make ever greater efforts to improve their health and quality of life.

The majority of these people live in conditions favoring a greater burden of disease, many of which are neglected for a variety of reasons. Usually, these neglected diseases affect uncared-for populations and vulnerable groups such as indigenous populations, rural inhabitants, the elderly, women living in poverty, and children. This situation needs to be changed for the better.

“Eliminating certain illnesses or diseases that still afflict our peoples, even though we possess the knowledge and tools, ... is achievable. [It] is also ethically imperative that we make a determined effort to eliminate those diseases.”

As quoted from my inaugural address upon beginning a second term as PAHO Director last February, “one of my achievable dreams is to eliminate those health conditions or diseases that still afflict our peoples, despite the fact that we possess the knowledge and the tools with which to make them virtually disappear. This is feasible. We are therefore ethically bound to make a determined effort to implement them without further delay.”

For all the above, I am proud to present this study done by PAHO using data from the countries. Providing disaggregated data and maps of areas within the countries, it puts forth the unfinished agenda for certain diseases that should no longer exist as a public health problem in the Region—as well as how these diseases overlap in specific areas where greater efforts and integrated actions could be targeted.

With this work, we hope to contribute to achieving cost-effective actions focused specifically on the most vulnerable populations and groups and directed in a concrete way at fighting diseases related to poverty that, albeit continuing to cause great damage and enormous harm in terms of human suffering, as well as a huge financial burden, are euphemistically categorized under the heading of ‘forgotten’ or ‘neglected.’

Mirta Roses Periago
Director
Pan American Health Organization

Preface

The importance of neglected diseases and others related to poverty is evident when seeking to improve health conditions in the Americas by reducing the burden of infectious diseases, which is the goal of the Project on Prevention and Control of Communicable Diseases, in the Area of Health Surveillance and Disease Prevention and Control.

In order to eliminate or control these diseases, a joint effort is necessary not only within PAHO/WHO but also must include partners from different sectors and types of organizations, as well as commitments from the member countries.

This document, *Epidemiological Profiles for Neglected Diseases and Other Infections Related to Poverty in Latin America and the Caribbean*, is the finalized version of the preliminary profiles presented by the Pan American Health Organization (PAHO) at the *Consultation on a Latin America and Caribbean Trust Fund for the Prevention, Control, and Elimination of Neglected and Other Infectious Diseases*, held 15–16 December 2008 at PAHO headquarters in Washington, DC.

The study was done using secondary data as a first approach to put together information on several neglected diseases as well as others related to poverty, for which PAHO is already developing technical cooperation with the countries of the Region. The objective was to explore which countries—and, if possible, which geopolitical units at the first subnational level—show evidence of the presence of the diseases, as well as the overlapping of these diseases, and to gather and synthesize the available epidemiological information and existing plans for control; And finally to identify for which diseases better information is needed.

Following the meeting, a draft version of these profiles was sent to the countries for validation and comments, after which this final version was produced. A possible outcome of the meeting is a strategic plan to support the countries' fight against these diseases that may include better baselines disaggregated within the countries for some diseases.

This *Consultation Meeting* could be a great opportunity to bring together an important interprogrammatic and intersectoral coalition to fight poverty-related diseases.

Ximena Aguilera
Senior Advisor
Prevention and Control of Communicable Diseases
Area of Health Surveillance and Disease Prevention and Control
Pan American Health Organization

Acknowledgements

Below is a list of the personnel from the different technical areas and projects at PAHO who contributed to this study:

Area Manager, Health Surveillance and Disease Prevention and Control

Jarbas Barbosa da Silva (HSD)

Senior Advisor, Prevention and Control of Communicable Diseases

Ximena Aguilera (HSD/CD)

Technical Study Coordinator

Maria Cristina Schneider (HSD/CD): Advisor in Animal/Human Health Interface

Technical Committee for the Study (HSD/CD)

Ximena Aguilera, Maria Cristina Schneider, Steven Ault, Raquel Requejo, Julio Martinez, Carlos Lara and Jarbas Barbosa da Silva

Regional Advisor on Neglected Diseases

Steven Ault (HSD/CD)

Specialist in Project Planning and Management

Raquel Requejo (HSD/CD)

Regional Advisors

Roberto Salvatella (PAHO/WHO Representation in Uruguay): Chagas Disease

Zaida Yadón (HSD/CD at PAHO/WHO Representation in Brazil): Communicable Disease Research

Dionne Patz (HSD/CD): Priority Diseases in South America

Luis Fernando Leanes (HSD / Pan American Center for Foot-and-Mouth Disease, PANAFTOSA):
Zoonoses

Juan Carlos Silva (PAHO/WHO Representation in Colombia): Vision Health

Maurício Landaverde (Family and Community Health, Immunizations / FCH/IM): Immunizations

José Ramiro Cruz (Technology and Health Service Delivery, Essential Medicines, Vaccines, and Health Technologies / THS/EV): Blood Safety

Ricardo Fescina (FCH / Latin American Center for Perinatology and Human Development, CLAP)

Consultant on Geographic Information Systems

Patricia Nájera

Technical Assistants

Julio Martínez (HSD/CD)

Carlos Lara (HSD/CD)

Samantha Austin (Intern, HSD/CD)

Document Design, Layout, and Editing

Suzanna Stephens (HSD)

Cover Design and Photographs

Gilles Collette, Tagino Lobato, Armando Waak, David Spitz (PAHO Public Information Office)

Other Contributors

Rodolfo Rodriguez (acting Unit Chief of HSD/CD during 2007); Alfonso Ruiz (Consultant); Ramón Martínez (HSD / Health Analysis and Statistics, HA); Rubén Santiago Nicholls (HSD/CD), Neisa Rivas (HSD/CD), José Carnevali, PAHO Public Information Office; Naomi Penzo, HSD/CD.

Residents in HSD/CD: Sara Gil and María Rebollo.

Interns in HSD/CD: Shruthi Rereddy, Andrea Richter, and Brandon Hayes.

Acronyms

Acronym	Definition
Ag	Antigenemia
BOG	Office of Public Healthcare (<i>Bureau voor Openbare Gezondheidszorg</i>), Suriname
CENAVECE	National Center for Epidemiological Surveillance and Disease Control of Mexico (<i>Centro Nacional de Vigilancia Epidemiológica y Control de Enfermedades</i>)
CENCET	National Center for Tropical Diseases of the Dominican Republic (<i>Centro Nacional de Control de Enfermedades Tropicales</i>)
CENEPI	National Epidemiology Center of Brazil (<i>Centro Nacional de Epidemiologia</i>)
CGVEP	General Coordination for Epidemiological Surveillance of Brazil (<i>Coordenação Geral de Vigilância Epidemiológica</i>)
CLAP	PAHO Latin American Center for Perinatology and Human Development (<i>Centro Latinoamericano de Perinatología</i>)
DEC	Diethylcarbamazine (DEC-fortified salt is used to treat lymphatic filariasis)
EIR or EIP	World Health Organization (WHO) Evidence, Information, and Research Program / EIR (formerly the Evidence and Information for Policy Program / EIP; WHO counterpart for PAHO/HSD/HA)
EV	PAHO Project on Essential Medicines, Vaccines, and Health Technologies
FCH	PAHO Family and Community Health Area, Immunizations
FUNASA	National Health Foundation of Brazil (<i>Fundação Nacional de Saúde</i>)
GIS	Geographic information system
GT	Technical Group (<i>Grupo Técnico</i>)
HSD	PAHO Health Surveillance and Disease Prevention and Control Area
HSD/CD	PAHO Communicable Disease Prevention and Control Project
HSD/HA	PAHO Health Analysis and Statistics Project
IEC	Information/education/communication
IM	PAHO Immunization Project
IMCI	PAHO/WHO Program on Integrated Management of Childhood Illness
INNFA	National Institute for the Family and Child of Ecuador (<i>Instituto Nacional de la Niñez y la Familia</i>)
INS	National Institute of Health of Colombia (<i>Instituto Nacional de Salud</i>)
JRFs	Joint reporting forms
LAC	Latin America and the Caribbean
LF	Lymphatic Filariasis
MDA	Mass drug administration

Acronym	Definition
MDGs	United Nations Millennium Development Goals
MDT	Multidrug therapy (for treating leprosy)
MS	Ministry of Health of Brazil (<i>Ministério da Saúde</i>)
MSDS	Ministry of Health and Social Development of Venezuela (<i>Ministerio de Salud y Desarrollo Social</i>)
NDs	Neglected diseases
NGOs	Nongovernmental organizations
NTDs	Neglected tropical diseases
OEPA	Onchocerciasis Elimination Program for the Americas
PAHO	Pan American Health Organization
PANAFTOSA	Pan American Center for Foot-and-Mouth Disease (Headquarters of the PAHO Veterinary Public Health Project)
PCE	<i>Schistosomiasis mansoni</i> Control Program of Brazil (<i>Programa de Controle da Esquistossomose</i>)
PELF	Program to Program to Eliminate Lymphatic Filariasis (exists in various countries)
PEP	Post-exposure prophylaxis (for preventing rabies)
PPP	Purchasing power parity
REDIPRA	Meetings of Directors of National Programs for Rabies Control in Latin America (<i>Reuniones de Directores de los Programas Nacionales de Control de Rabia en América Latina</i>)
RIMSA	Inter-American Meetings, at Ministerial Level, on Health and Agriculture
SAC	School-age children (between 5 and 14 years old)
SIRVERA	Rabies Epidemiological Surveillance System (<i>Sistema de Vigilância Epidemiológica em Raiva</i>) (coordinated at Regional level by PAHO/PANAFTOSA)
STHs	Soil-transmitted helminths (geohelminths)
SUS	Unified Health System of Brazil (<i>Sistema Única de Saúde</i>)
SVS	Secretariat of Health Surveillance of Brazil (<i>Secretaria de Vigilância em Saúde</i>)
TCC	Technical cooperation among countries
THS	PAHO Technology and Health Service Delivery Area
UN	United Nations
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WER	WHO's <i>Weekly Epidemiological Record</i>
WHA	World Health Assembly (main WHO governing body)
WHO	World Health Organization

Executive Summary

In Latin America and the Caribbean, some 127 million people live in a state of poverty (under two dollars per day), and 50 million in extreme poverty (under one dollar per day). The majority of these people—including traditionally vulnerable groups such as indigenous populations, rural inhabitants, the elderly, and impoverished women and children—live in conditions that favor a greater burden of disease.

A number of these diseases exist with high possibilities for achieving their reduction to levels that no longer represent a public health problem—a reason that merits additional efforts towards their elimination. The availability of new technologies and strategies and the improvement of the health service infrastructure—particularly rising support for primary care—make their control and eventual elimination feasible.

The objective of this study is to explore which countries in the Region—and, if possible, which geopolitical units at the first subnational level—show evidence of the presence of selected poverty-related diseases, as well as the overlapping of these diseases; gather and synthesize the available epidemiological information and existing plans for control; and identify where information gaps exist. This study was done using secondary data.

Regional profiles were developed that included geo-process mapping of the selected diseases, showing all countries of the Region. According to the availability of information at the time of the study, some diseases were analyzed at the first subnational level (lymphatic filariasis, onchocerciasis, schistosomiasis, trachoma, and human rabies transmitted by dogs); and others, at country level (soil-transmitted helminths, Chagas disease, leprosy, congenital syphilis, and neonatal tetanus). This study allows us to view where we may find the diseases that constitute the unfinished agenda in the Region, such as lymphatic filariasis, onchocerciasis and human rabies transmitted by dogs. Also, the study suggests where information gaps exist and further studies are needed—such as for trachoma, where endemic regions border on non-endemic countries.

Country profiles provide information on the epidemiology of the diseases and the coverage status of primary strategies. These were developed for all countries with evidence of the presence of one or more of the following neglected diseases: lymphatic filariasis, onchocerciasis, schistosomiasis, and trachoma (11 countries)—as well as PAHO's priority countries, as defined by their socioeconomic status, for a total of 14 countries in all. Due to time constraints, these diseases were prioritized, however a further study could be done to include other diseases. While a considerable amount of information is available, further epidemiological information is needed to establish better baselines for many of the selected diseases. There is a disparity among the information available on country websites. Most of the strategies encountered for the control of these diseases included drug administration and intersectoral approaches.

An overlapping analysis was conducted for five diseases (lymphatic filariasis, onchocerciasis, schistosomiasis, trachoma, and human rabies transmitted by dogs), for which information was available at the first subnational level throughout the Region. Considering the population of Latin America and the Caribbean—some 580 million people—it is noteworthy that almost half (230 million) live in areas at the first subnational level (states/departments/provinces) where at least one of these five diseases is present. Of the total of 275 administrative units included in the study, one unit was found to contain four of the five selected diseases, two units were found to contain three of the five selected diseases (all in Brazil); 33 units were found to have two of the five diseases; and 66 of the 275 units reported only

one of the selected neglected diseases. In the overlapping maps it can be observed that each disease is present in the administrative unit.

The overlapping analysis suggests that many subnational units exist with more than one of the selected diseases present, implying that these areas could be considered a priority (as 'hot spots') and an integrated approach could be applied. It should also be taken into consideration that only five diseases were chosen for the overlapping study, but that the other neglected diseases—such as soil-transmitted helminths—are likely to be present throughout the Region.

In conclusion, a considerable amount of information exists for most of the diseases studied, particularly those for which there are established elimination targets and easily identifiable symptoms. However, for diseases with goals of achieving prevalence levels where they are no longer considered a public health problem, or diseases for which it is more difficult to measure prevalence, there is a great need for further studies on the epidemiological situation of these diseases—ones that are up-to-date, contain information at the local level, and use standardized criteria.

About the Study

Background

In Latin America, some 50 million people live in extreme poverty (at an income of less than one dollar a day), which represents 8.6% of the population of the Region; and around 127 million (22% of the population) live below the poverty line (earning less than two dollars a day). The majority of these people live in conditions that favor a greater burden of disease, many of which are neglected or for various reasons have not received the attention due them by health authorities. Usually, these neglected diseases affect uncared-for populations and vulnerable groups such as the indigenous population, rural inhabitants, the elderly, poor women, and children. They thus represent an important challenge towards the achievement of the Millennium Development Goals (MDGs) and are kept on the unfinished health agenda as a commitment made by the Member States of the Pan American Health Organization (PAHO) to renew primary health care.

There exist a number of communicable diseases that may well achieve a reduction of disease down to levels that no longer pose a public health problem or, at least, are acceptable to the Region for the moment—a reason that merits additional efforts towards their elimination. The availability of new technologies, strategies, and improvements in health service infrastructure—particularly the reactivation of primary care—make their control and eventual elimination feasible. In order to achieve this, however, it is necessary to have a political commitment to ensure greater availability of resources and international support.

The Region of the Americas has experience in this area and has demonstrated its great ability to eliminate and eradicate diseases, as has been done in the past with some diseases that are vaccine-preventable, e.g. polio and endemic measles. The Region continues to make efforts to maintain these achievements.

It is for this reason that PAHO, in its Strategic Plan for 2008–2012, reiterates health as a basic right. It intends, through its Strategic Objectives, to diminish unjust and remediable health inequalities among populations, while addressing health determinants in such a way that takes into account human development and by reducing the weight of communicable diseases—especially by revisiting the fight against forgotten diseases that tend to affect poverty-stricken populations and are endemic in the poorest of countries.

At present and for the next decade, PAHO will have the necessary political will with the recently elaborated Health Agenda of the Americas, which will guide joint actions with national and international partners interested in helping improve the health of the people of this Region. This agenda was conceived, among other reasons, to reduce the burden of certain communicable diseases and take action on the topic of diseases that disproportionately affect the poor.

There exist several mandates and resolutions of the WHO and PAHO Governing Bodies addressing public health problems that are possible to eliminate, among them leprosy (1991), onchocerciasis (1992 and 2008), lymphatic filariasis (World Health Assembly / WHA, 1997), Chagas disease (1998), and congenital syphilis in the Region of the Americas by 2010 (approved by the 142nd PAHO Executive Committee in 2008).

The PAHO Strategic Plan for 2008–2012 proposes, among various subjects, fighting against communicable diseases that exert their greatest impact on poor and marginalized populations in the Americas. Its actions can be guided by maintaining the achievements made and continuing with the elimination of some diseases that already have made great progress, as well as in coping with other preventable or curable diseases that to date have not occupied the necessary space in the international health agenda in the Americas.

In addition, WHO prepared a *Global Plan to Combat Neglected Tropical Diseases 2008–2015*, including an initial list of the diseases considered to have the necessary tools for their control (though not necessarily their elimination).

The political commitments made, including those of the Organization, has led the need of the unfinished agenda of health and human development to be met in the Region of the Americas. Thus, the reduction of the health, social, and economic burden of communicable diseases, among them neglected and other infectious diseases related to the poverty, involves advocacy. This initial epidemiological analysis and mapping of available information is part of the strategy of advocacy to fight these diseases and was presented at the meeting on *Consultation on the Latin America Trust Fund for the Prevention, Control and Elimination of Neglected and Other Infectious Diseases* held in December 2008 at PAHO Headquarters in Washington, DC.

Objectives

General Objective

Explore which countries in the Region—and, if possible, which geopolitical units at the first subnational level—show evidence of the presence of selected poverty-related diseases, as well as the overlapping of these diseases; gather and synthesize the available epidemiological information and existing plans for control.

Specific Objectives

- 1) Obtain initial information on each disease if it is present in the country and, if possible, disaggregated by the first subnational level (state/departments/provinces), including the review of the criteria on presence of that disease.
- 2) Find for each disease, if available through secondary sources, the number of cases, prevalence rates, and population at risk—if possible, disaggregated by the first subnational level (state/departments/provinces).
- 3) Identify for which diseases it is necessary to obtain better information.
- 4) Identify what would be the objective to be achieved by the project (control or elimination) in each country.
- 5) Identify the principal mode (or vector) of transmission.
- 6) Identify the main control strategies for each disease.
- 7) Obtain preliminary information for each disease based on the existence of programs or other ways of carrying out control activities in the countries.

Methodology

Selected Diseases

For this phase of the study, the diseases most traditionally considered as neglected (lymphatic filariasis, onchocerciasis, schistosomiasis, soil-transmitted helminthiasis and trachoma) were included. PAHO is developing a database on the prevalence of soil-transmitted helminths; some information from this database is included in this study, though it was not yet possible to analyze this information at first subnational level. Additionally, three other neglected diseases were included (Chagas disease, leprosy, and human rabies transmitted by dogs), as well as two other infections diseases related to poverty for which PAHO has been developing technical cooperation in the Region (congenital syphilis and neonatal tetanus). Due to time constraints in the development of this study, it was not possible to gather disaggregated information for all the selected diseases. Most of the diseases considered in this study are classified in the WHO global list as 'neglected.' In this document, the term "neglected" could be considered as associated with poverty, but not necessarily neglected in terms of action on the part of decision-makers. A second phase could subsequently be developed in which other important diseases for the Region could be included.

According to the availability of information during the time of the study, there were some diseases analyzed at first subnational level and others at country level.

Diseases

Analyzed at First Subnational Level

- | | |
|-------------------------------------|--------------------------------------|
| 1) Lymphatic filariasis | 4) Trachoma |
| 2) Onchocerciasis (river blindness) | 5) Human rabies transmitted by dogs. |
| 3) Schistosomiasis | |

Analyzed at Country Level

- | | |
|--------------------------------------|------------------------|
| 1) Soil-transmitted helminths (STHs) | 4) Congenital syphilis |
| 2) Chagas disease | 5) Neonatal tetanus. |
| 3) Leprosy | |

Selected Countries

All countries with evidence of the presence of one or more of the following neglected diseases: Lymphatic filariasis, onchocerciasis, schistosomiasis, and trachoma (11 countries), as well as PAHO's priority countries (as defined by their socioeconomic status) that were not included in the 11 countries selected but that are endemic for other selected diseases (14 countries in all). Table I includes a summary of countries and disease presence.

List of Countries

- | | | | |
|-----------------------|--------------|---------------|-----------------|
| 1) Bolivia | 5) Ecuador | 9) Honduras | 12) Saint Lucia |
| 2) Brazil | 6) Guatemala | 10) Mexico | 13) Suriname |
| 3) Colombia | 7) Guyana | 11) Nicaragua | 14) Venezuela |
| 4) Dominican Republic | 8) Haiti | | |

Sources of Information

Data

In this phase, only secondary sources of information were used, primarily information that has been published or placed on the websites of the respective Ministries of Health or of organizations that have mandates for technical cooperation on the subject (PAHO, WHO, and WHO's Onchocerciasis Elimination Program for the Americas, OEPA). For the presence of each disease and its magnitude, in case this information was not available on the official websites, other sources of information were used, such as publications, reports from Regional or subregional plans, and presentations from technical/scientific meetings. Most of the information utilized was provided by the PAHO Regional Advisors on the different subjects. All sources were listed and information reviewed by the study's technical team. The preliminary information used in this study was validated by the countries prior to the publication of this final version, and the comments sent by the countries were included. The information on core data was published by PAHO using different sources in *Health Situation in the Americas: Basic Indicators, 2007*.

Cartography and Geo-Processing

The cartography was made available by PAHO's Health Analysis and Information Project (HSD/HA), which compiled it from different sources, including the WHO Evidence, Information, and Research Project (EIR) First Administrative Level Boundaries dataset (EIP_admin, Version 1) and the digital cartography provided by the countries' health departments and/or the national geographic agencies. HSD/HA standardized the subnational administrative units according to WHO coding schemes. (See <http://www.who.int/whosis/database/gis/salb/>.)

For this study, different geo-processing techniques were used, including geo-coding the NTD statistical databases (for neglected tropical diseases or NTDs), applying specific cartographic projections to the Regional and national levels, performing spatial queries to assemble the classification schemes on the different geographic analysis units, and generating new variables in order to identify the spatial overlapping of neglected diseases. The geo-processing and spatial analysis were performed in the Geographic Information System's software (GIS) ArcView 3.3.

Outcomes

Regional Profile

This includes a summary of relevant Regional core data with demographic and socioeconomic indicators and mortality data. There is a preliminary summary by disease, with a brief description of the disease, its epidemiological situation, objective and indicators, main strategies, mandates/resolutions/expert recommendations, main achievements, and comments. Geographic maps of the presence of the disease in the countries, whenever possible at first subnational level (state, department/province). A database at first subnational level was created on selected diseases, with disaggregated information available on the 14 countries. All countries of Latin America and the Caribbean are included in the Regional profiles.

Country Profiles

This includes a summary of relevant Regional core data with demographic and socioeconomic indicators as well as mortality data. There is a preliminary summary by disease, with a brief description of the epidemiological situation, whenever possible disaggregated within the country, and the main control strategies developed in the country. Geographic maps of the presence of the disease in the countries were included, whenever possible by first subnational level (state/department/province), using data from the database created or by copying country information from different sources. This section includes only those diseases where information was available at first subnational level for all selected countries: lymphatic filariasis, onchocerciasis (river blindness), schistosomiasis, trachoma, and human rabies transmitted by dogs. Soil-transmitted helminths are also included in the country profiles.

Analysis of Overlapping Diseases

In cases where several diseases are present and information is available, the PAHO-created database was used for an analysis of the overlapping diseases. To improve consistency in the overlapping analysis, only the presence of five of the neglected diseases studied (schistosomiasis, lymphatic filariasis, onchocerciasis, trachoma, and human rabies transmitted by dogs) were considered, because these were the diseases where information was available at first subnational level for all selected countries. The information on overlapping diseases for the Americas and for each country appears at the end of the Regional Profiles and of each Country Profile, respectively. The objective of this analysis was to select priority geo-political areas for interventions (hot spots), given their epidemiological and socioeconomic status. In order to fight neglected diseases and improve living conditions in these areas, entering into partnerships becomes crucial to addressing the social determinants of health, e.g. access to drinking water and sanitation, adequate housing, and education.

Table I

Presence of diseases in selected countries of Latin America and the Caribbean according to the methodology and criteria listed below.

Country	Disease									
	Lymphatic filariasis	Onchocerciasis	Schistosomiasis	Trachoma	Soil-transmitted helminths	Human rabies transmitted by dogs	Chagas Disease	Leprosy	Neonatal tetanus	Congenital syphilis
<i>Total number of countries in which the diseases are present in Latin America and the Caribbean</i>	4	6	4	3	All	10	21	25	16	25
Anguilla	-	-	-	-	X	-	-	-	-	...
Antigua and Barbuda	-	-	-	-	X	-	-	-	-	...
Argentina	-	-	-	-	X	- ^b	X	X	X	X
Aruba	-	-	-	-	X	-	-	-	-	...
Bahamas	-	-	-	-	X	-	-	-	-	X
Barbados	-	-	-	-	X	-	-	-	-	...
Belize	-	-	-	-	X	-	X	-	-	X
Bolivia	-	-	-	-	X	X	X	X	X	X
Brazil	X	X	X	X	X	X	X	X ^a	X	X
Cayman Islands	-	-	-	-	X	-	-	-	-	...
Chile	-	-	-	-	X	-	X	X	-	X
Colombia	-	X	-	-	X	X	X	X	X	X
Costa Rica	-	-	-	-	X	-	X	X	-	X
Cuba	-	-	-	-	X	X	-	X	-	X
Dominica	-	-	-	-	X	-	-	-	-	...
Dominican Republic	X	-	-	-	X	- ^b	-	X	X	X
Ecuador	-	X	-	-	X	-	X	X	X	X
El Salvador	-	-	-	-	X	X	X	X	X	X
French Guiana	-	-	-	-	X	-	X	-	-	...
Grenada	-	-	-	-	X	-	-	-	-	...
Guadeloupe	-	-	-	-	X	-	-	-	-	...
Guatemala	-	X	-	X	X	X	X	X	X	X
Guyana	X	-	-	-	X	-	X	X	-	X
Haiti	X	-	-	-	X	X	-	X	X ^a	X

Country	Disease									
	Lymphatic filariasis	Onchocerciasis	Schistosomiasis	Trachoma	Soil-transmitted helminths	Human rabies transmitted by dogs	Chagas Disease	Leprosy	Neonatal tetanus	Congenital syphilis
Honduras	-	-	-	-	X	-	X	X	X	X
Jamaica	-	-	-	-	X	-	-	X	-	X
Martinique	-	-	-	-	X	-	-	-	-	...
Mexico	-	X	-	X	X	X	X	X	X	X
Montserrat	-	-	-	-	X	-	-	-	-	...
Netherland Antilles	-	-	-	-	X	-	-	-	-	...
Nicaragua	-	-	-	-	X	-	X	X	X	X
Panama	-	-	-	-	X	-	X	X	X	X
Paraguay	-	-	-	-	X	-	X	X	X	X
Peru	-	-	-	-	X	X	X	X	X	X
Saint Kitts and Nevis	-	-	-	-	X	-	-	-	-	...
Saint Lucia	-	-	X	-	X	-	-	X	-	...
Saint Vincent and Grenadines	-	-	-	-	X	-	-	-	-	...
Suriname	-	-	X	-	X	-	X	X	-	...
Trinidad and Tobago	-	-	-	-	X	-	-	X	-	X
Turks and Caicos Islands	-	-	-	-	X	-	-	-	-	...
Uruguay	-	-	-	-	X	-	X	X	-	X
Virgin Islands (UK)	-	-	-	-	X	-	-	-	-	...
Virgin Islands (USA)	-	-	-	-	X	-	-	-	-	...
Venezuela	-	X	X	-	X	X	X	X	X	X

^a This disease is only present as a public health problem in this country. ^b Presence during 2008 - No evidence. No information.

Criteria

Chagas disease:	Evidence of presence through any type of transmission in the last 10 years.
Schistosomiasis:	Evidence of presence of the disease in the last 10 years.
Lymphatic filariasis:	Evidence of presence of the disease in the last 3 years.
Soil-transmitted helminths:	Evidence of presence of the disease in the last 10 years.
Leprosy:	Evidence of presence of the disease in the last 3 years.
Onchocerciasis:	Evidence of presence of the disease in the last 3 years.
Human rabies transmitted by dogs:	Evidence of presence of the disease in the last 3 years.
Trachoma:	Evidence of presence of the disease in the last 10 years.
Neonatal tetanus:	Evidence of presence of the disease in the last 3 years.
Congenital syphilis:	Evidence of presence of the disease in the last 3 years.

Note: Countries shaded in tan were those included in the study.

Regional Profiles

Core Data for Latin America and the Caribbean

Demographic Indicators	Data	Year
▪ Total Population (in thousands):	572,183	2007
▪ Urban Population (in %):	77.9	2007
▪ Life Expectancy at Birth (in years):	73.1	2007
▪ Men	70.0	2007
▪ Women	76.3	2007

Socioeconomic Indicators

▪ Literate Population (total 15+ years old) (total in %):	89.9	1999–2005
▪ Men	90.7	1999–2005
▪ Women	89.1	1999–2005
▪ Gross National Income (US\$ per <i>capita</i> PPP value):	8,304	2005
▪ Population Below International Poverty Line (in %):	8.6	2004
▪ Population Using Improved Sources of Drinking Water (total in %):	90	2004
▪ Population Using Improved Sanitation Facilities (total in %):	76	2004

Mortality Indicators

▪ Infant Mortality Rate (per 1000 live births):	22.2	2004
▪ Mortality Rate from Communicable Diseases (per 100,000 pop.):	77.4	2000–2004
▪ Mortality from Ill-Defined and Unknown Causes (in %):	8.5	2004

Selected Diseases Present in Latin America and the Caribbean

<i>Analyzed at First Subnational Level</i>		<i>Analyzed at Country Level</i>	
▪ Lymphatic Filariasis	✓	▪ Soil-Transmitted Helminths	✓
▪ Onchocerciasis	✓	▪ Chagas Disease	✓
▪ Schistosomiasis	✓	▪ Leprosy	✓
▪ Trachoma	✓	▪ Neonatal Tetanus	✓
▪ Human Rabies Transmitted by Dogs	✓	▪ Congenital Syphilis	✓

Diseases Analyzed at First Subnational Level

Lymphatic Filariasis

Brief Description

Lymphatic filariasis (LF) is a chronic parasitic disease caused by the filarial worms *Wuchereria bancrofti*, *Brugia malayi* or *Brugia timori*. In its worst phase, lymphatic filariasis results in the "elephantiasis" of the leg due to a combination of parasitic and bacterial/fungal infections of the lymphatic tissues and the skin. The primary vectors of the disease are mosquitoes. *W. bancrofti* is the only parasite species found in the Americas; the principle vector is the mosquito *Culex quinquefasciatus*.

Epidemiological Situation in the Region

There is evidence of foci with active transmission of lymphatic filariasis in four countries in the Region during the last three years:

- | | |
|---------------------------------|-----------|
| 1) Brazil (State of Pernambuco) | 3) Guyana |
| 2) Dominican Republic | 4) Haiti |

Another focus in the state of Alagoas in Brazil was eliminated. It is estimated that up to 11 million people are at risk of infection. The largest population at risk is in Haiti (90%). The disease in Haiti and the Dominican Republic affects mostly populations of African descent who live in low-income areas.

Objective/Indicator

Objective: To eliminate the disease as a public health problem by the year 2020, to interrupt its transmission and to prevent and control disability.

- Indicators:**
1. Less than 1% prevalence of microfilaria in adults in sentinel sites and spot-check sites in the area; no children between ages 2 and 4 are antigen-positive.
 2. To reach 100% treatment administration in implementation units in endemic areas annually.

Primary Strategies

- Mass drug administration (MDA) once a year for at least 5 years with coverage of no less than 75% or consumption of diethylcarbamazine (DEC)-fortified table salt in the daily diet.
- Surveillance of LF morbidity by local health surveillance systems.
- Morbidity case management
- Integration/coordination of MDA with deworming, immunization of children and mothers, Integrated Management of Childhood Illness (IMCI), and/or the distribution of vitamin A and micronutrients.
- Integration with control strategies for leprosy and other skin infections.
- Policy, communication strategies and education in schools.

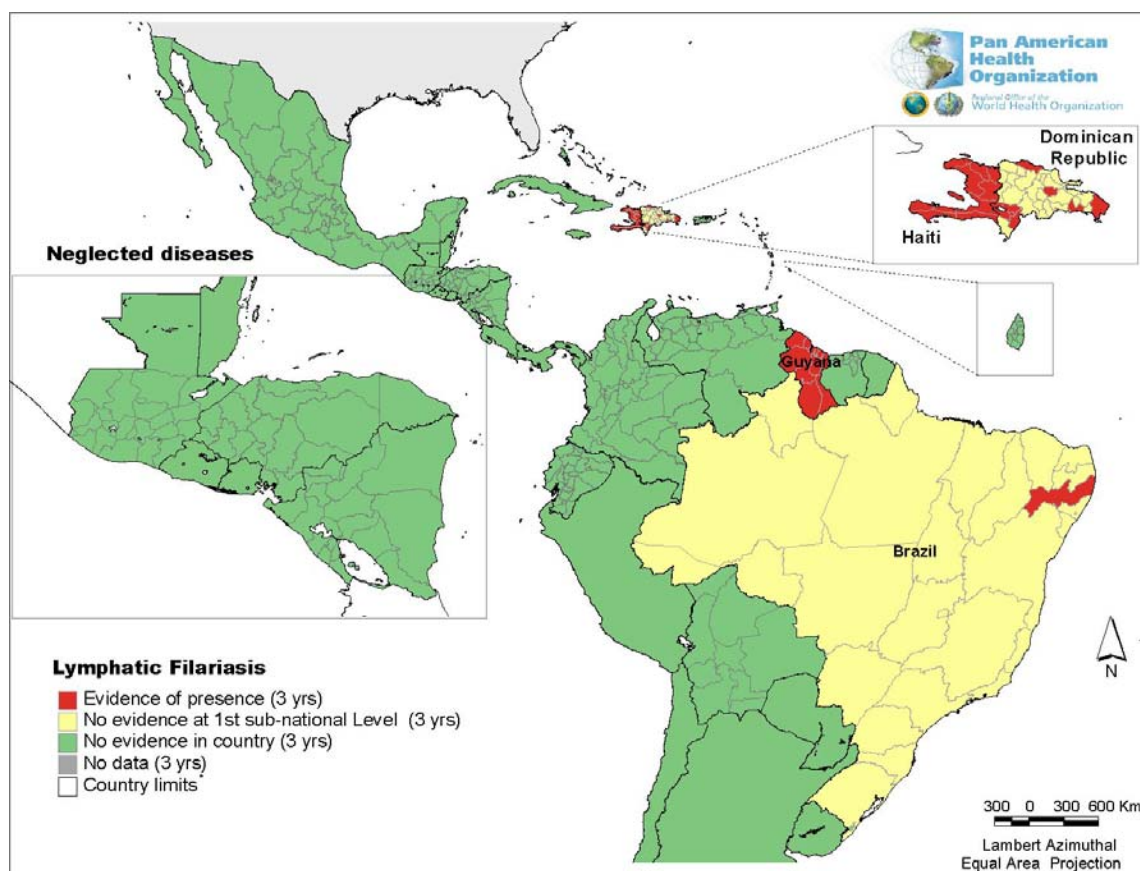
Mandates/Resolutions and Expert Recommendations

- Resolution WHA 50.29 1997: the elimination of LF as a public health problem in the world by 2020.
- The potential for elimination of LF in the Americas is presented for the WHO during the launch of the Global Alliance to Eliminate Lymphatic Filariasis in 2000.
- Disease identified as having the greatest potential for elimination at the *Conference on Global Disease Elimination and Eradication as Public Health Strategies*, 1998.

Achievements

- As of September, 2008, transmission has been interrupted in areas of Costa Rica, Suriname, and Trinidad and Tobago and these areas may not require MDA interventions in the future.
- In 2007, an estimated 900,000 persons at risk in the Region were covered by MDA.
- Of two foci in Brazil, one is now considered to be in a stage of pre-elimination due to an intervention strategy of blood surveys and selective treatment of individuals.
- In Haiti, which has the largest total population at risk in the Region, more than 1.2 million persons were treated in 2005, achieving a coverage rate of 70% in targeted areas. The Haitian city of Leogane, which began MDA coverage in 2000, reached microfilaria prevalence below 1% in all four sentinel sites, demonstrating the positive impact of the intervention.

Presence of lymphatic filariasis at the first subnational level, Latin America and the Caribbean, 2005–2007.



Source: PAHO/HSD/CD based on reports submitted by the Ministries of Health to PAHO/WHO for the Program for the Elimination of Lymphatic Filariasis, 2005–2007.

Comments

- There is evidence that the disease is present in 4 countries: Brazil, Guyana, Haiti, and the Dominican Republic. Around 22 million people live in the 29 administrative units at the first subnational level that show evidence of lymphatic filariasis.
- The greatest population at risk is in Haiti (with 90%).
- In Haiti and Guyana, the population at risk is distributed among all first subnational levels.
- In the Dominican Republic, a country that shares an international border with Haiti, there is evidence of lymphatic filariasis in several departments.
- In Brazil, there are foci in only one state, where intervention is underway.
- This disease could potentially be eliminated but needs more intensive action in the priority countries.

Onchocerciasis

Brief Description

Onchocerciasis (“river blindness”) is a non-fatal chronic disease produced by the parasite *Onchocerca volvulus*, a filaria worm transmitted through the bite of the *Simulium* spp fly. The *filariae* form nodes in subcutaneous tissue. Morbidity produced by these *filariae* ranges from cutaneous manifestations (edema, intense pruritus) to ocular manifestations ranging from vision deterioration to blindness.

Epidemiological Situation in the Region

There has been evidence of 13 foci in 6 countries over the last 3 years:

- | | | |
|-------------|--------------|--------------|
| 1) Brazil | 3) Ecuador | 5) Mexico |
| 2) Colombia | 4) Guatemala | 6) Venezuela |

Among these foci, transmission appears to have been interrupted in 6 of them following massive treatment (1 in Colombia, 3 in Guatemala, and 2 in Mexico). They will be under surveillance for at least three years to certify elimination, according to the criteria defined by the appointed expert group. It is estimated that 500,000 people are at risk in the Region, the largest concentration of whom reside in remote communities on the borders of southern Venezuela and northern Brazil, and in northern Guatemala and southern Mexico. The disease mostly affects indigenous populations and those of African descent who live in rural or mountainous areas.

Objective/Indicator

Objective: To eliminate ocular morbidity and to interrupt transmission.

Indicator: To reach an 85% rate of treatment administration twice yearly in endemic areas.

Primary Strategies

- Mass drug treatment administration at least twice a year in order to reach at least 85% of the population in each endemic area.
- Surveillance for signs of ocular morbidity, microfilaria, nodules.
- Dermatological care through the primary healthcare system in areas where skin infection is a problem.

Mandates/Resolutions and Expert Recommendations

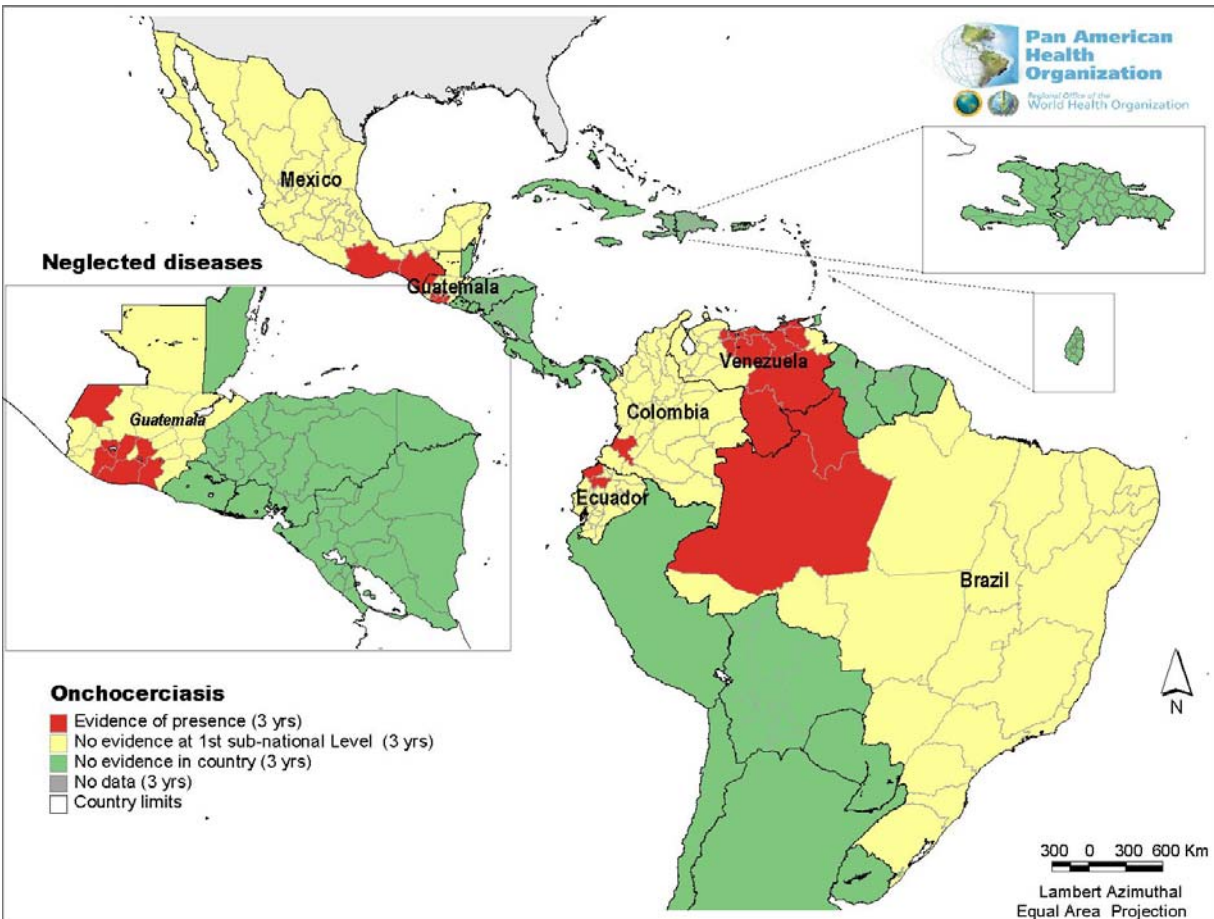
- PAHO Resolution CD35/14 from the 35th Directing Council in 1991 calls for the elimination of onchocerciasis.
- Three conferences or expert meetings suggest that onchocerciasis can be eliminated in the Region.
- PAHO Resolution CD48R.12/10 from the 48th Directing Council in 2008, “Towards the Elimination of Onchocerciasis (River Blindness) in the Region of the Americas,” calls for the interruption of transmission in all 13 foci by 2012.
- Onchocerciasis is identified as one of the diseases with the greatest potential for elimination at the *Conference on Global Disease Elimination and Eradication as Public Health Strategies*, 1999.

Achievements

- All six countries currently have operating programs that administer treatment and/or post-treatment surveillance in the 13 foci and have exceeded the minimum requirement of 85% coverage biannually.
- There have been no new cases of blindness caused by onchocerciasis in the Region since 1995.

- Six of the foci have interrupted transmission over last two years and are in the post-treatment surveillance period.
- The goal has been set to stop transmission in the Region by 2012 and this goal is expected to be achieved.

Presence of onchocerciasis at the first subnational level, Latin America and the Caribbean, 2005–2007.



Source: PAHO/HSD/CD based on data from: Onchocerciasis Elimination Program for the Americas (OEPA). Available from: www.oepa.net Accessed October 2008.

Comments

- There is evidence of onchocerciasis existing in six countries over the past 3 years: Brazil, Colombia, Ecuador, Guatemala, Mexico, and Venezuela. Around 33 million people live in the 25 administrative units at the first subnational level that show evidence of the disease.
- Many of the foci share a border at the first subnational level or with another country.
- In Brazil, the focus is located in municipalities along the border between the states of Amazonas and Roraima, along the international border with Venezuela, where there is a large indigenous population (Yanomami).
- In Venezuela, foci extend along 11 departments.
- The population most at risk lives in remote communities.
- This disease could potentially be eliminated in the Region within a short period. However, major attention is being focused on border areas with indigenous populations.

Schistosomiasis

Brief Description

Schistosomiasis (“snail fever”) is a parasitic disease caused by trematode flatworms. Urinary schistosomiasis results in progressive damage to the bladder, ureters, and kidneys. Intestinal schistosomiasis results in progressive enlargement of the liver and spleen, intestinal damage, and hypertension of the abdominal blood vessels. The most frequent mode of transmission is contact with water that contains snails infected with *Schistosoma* larvae. Only intestinal schistosomiasis (caused by *Schistosoma mansoni*) occurs in the Americas.

Epidemiological Situation in the Region

The disease is present in four countries in the Region, according to evidence from the past 10 years:

- 1) Brazil 2) St. Lucia 3) Suriname 4) Venezuela

A study suggests that the disease has been eliminated in previously endemic Martinique and Guadeloupe. In previous decades, the disease was known to exist in Puerto Rico and the Dominican Republic. However, no evidence of its presence has been found for the past 10 years, which suggests that an epidemiological study is needed to confirm elimination. It is estimated that around 25 million people live at risk in the Americas; and around 1 to 3 million people are estimated to be infected.

Objective/Indicator

Objective: To reduce prevalence and parasite load in high-transmission areas.

Indicator: Prevalence < 10% in high-transmission areas as measured by quantitative egg counts.

Primary Strategies

- Chemotherapy for at least 75% of at-risk school-age children.
- Improvements of excreta disposal systems and drinking water, education.

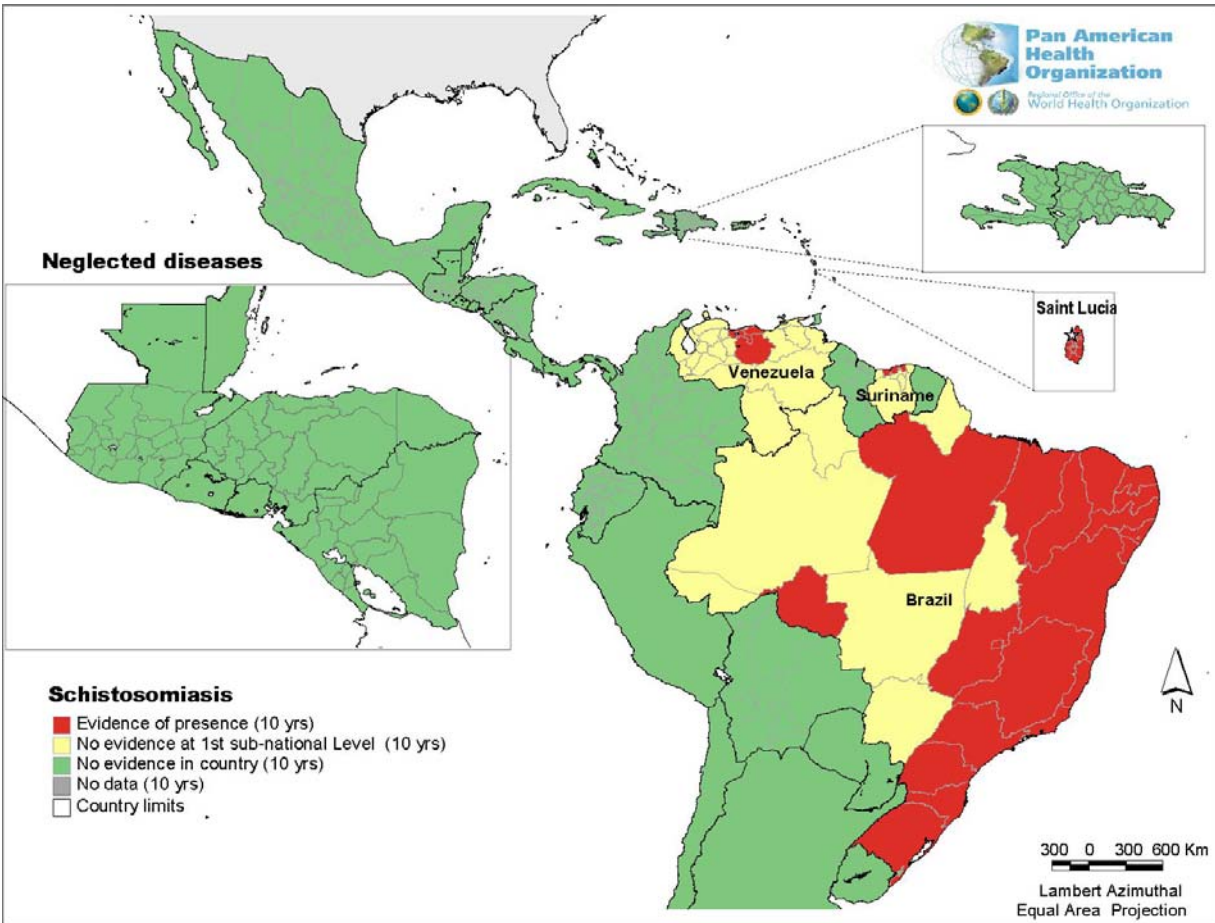
Mandates/Resolutions and Expert Recommendations

- Resolution WHA 54.19 2001: Maintain efficient control in order to eliminate schistosomiasis as a public health problem in low-transmission zones (Latin America being an example of this).
- Identified as one of the diseases with the greatest potential for elimination at the *Conference on Global Disease Elimination and Eradication as Public Health Strategies, 1999*.

Achievements

- In Brazil, regular treatment of communities from 1980 to 2000 has reduced the number of hospital admissions due to schistosomiasis infections by 60% in adults and 90% in children. About 12.5 million treatments were administered between 1977 and 2005. In addition, the risk of infection has been reduced through environmental sanitation. A total of 934,449 dwellings received benefits from sanitary improvements between 1977 and 2005.
- In the Caribbean, the incidence of schistosomiasis has been dramatically reduced, making it possible for the disease to be eliminated, e.g. the French territories.

**Presence of schistosomiasis at the first subnational level,
Latin America and the Caribbean, 1998–2007.**



Source: PAHO/HSD/CD based on: Ministries of Health of Brazil, Saint Lucia, and Suriname & Alarcón de Noya, B. et al. *Schistosomiasis mansoni* in Areas of Low Transmission. Epidemiological Characterization of Venezuelan Foci. *Memórias do Instituto Oswaldo Cruz*. Rio de Janeiro; 2002; 91(1): 5-10.

Comments

- Evidence suggests that the disease is present in four countries: Brazil, Saint Lucia, Suriname, and Venezuela. Around 171 million people live in the 39 administrative units at the first subnational level that show evidence of schistosomiasis.
- The population most at risk is in the coastal states of Brazil.
- The disease is considered to be present in only one island of the Caribbean.
- Studies are needed to determine the elimination status of areas where the disease was once present, but for which there has been no presence in the last 10 years, e.g. Puerto Rico and the Dominican Republic.
- Up-to-date prevalence studies have not been available for most of the endemic areas; a more precise estimation of the burden of this disease should be conducted.
- There is evidence that this disease is present over large areas in two endemic countries (Brazil and Saint Lucia).

Trachoma

Brief Description

Trachoma is an infectious disease caused by the bacterium *Chlamydia trachomatis*. The main symptom is conjunctival inflammation. The disease is transmitted by direct or indirect contact with towels or other tissues/fabrics that have been used by an infected person, as well as by flies that carry the infection from person to person. Blindness can occur following repeated infections during childhood. Trachoma is associated with poverty, a lack of access to improved water and sanitation, poor personal hygiene, and limited access to health services.

Epidemiological Situation in the Region

There is evidence of the disease in three countries in the Region over the last 10 years:

- 1) Brazil
- 2) Mexico
- 3) Guatemala

In Mexico, the disease is limited to 5 municipalities in Chiapas, with low socioeconomic levels and primarily encountered in indigenous populations. In Guatemala, trachoma has been reported in 92 communities in the departments of Sololá and Suchitepequez. In Brazil, a new national survey is currently being carried out; only one state does not have preliminary data. The survey confirms its presence in all 26 states studied, with an average of 5% prevalence for trachoma in the population surveyed (school-age children). The highest prevalence is in states in the North and Northeast. Foci have been confirmed in border states of Brazil, but no data about prevalence studies in neighbor countries was found. It is estimated that around 50 million people live in risk areas. About one million cases have been identified, most of them in Brazil.

Objective/Indicator

Objective: To eliminate new cases of blindness caused by trachoma.

Indicator: Reduction of follicular trachomatous to less than 1 case per 1000 adults and less than 5% prevalence in children (1–9 years).

Primary Strategies

- The "SAFE" strategy is used with the following components:
 - 1) Preventing blindness through eyelid surgery to correct the inversion or entropion of the upper eyelid and trichiasis.
 - 2) Using antibiotics in endemic areas.
 - 3) Reducing transmission through face-washing.
 - 4) Improving the environment.

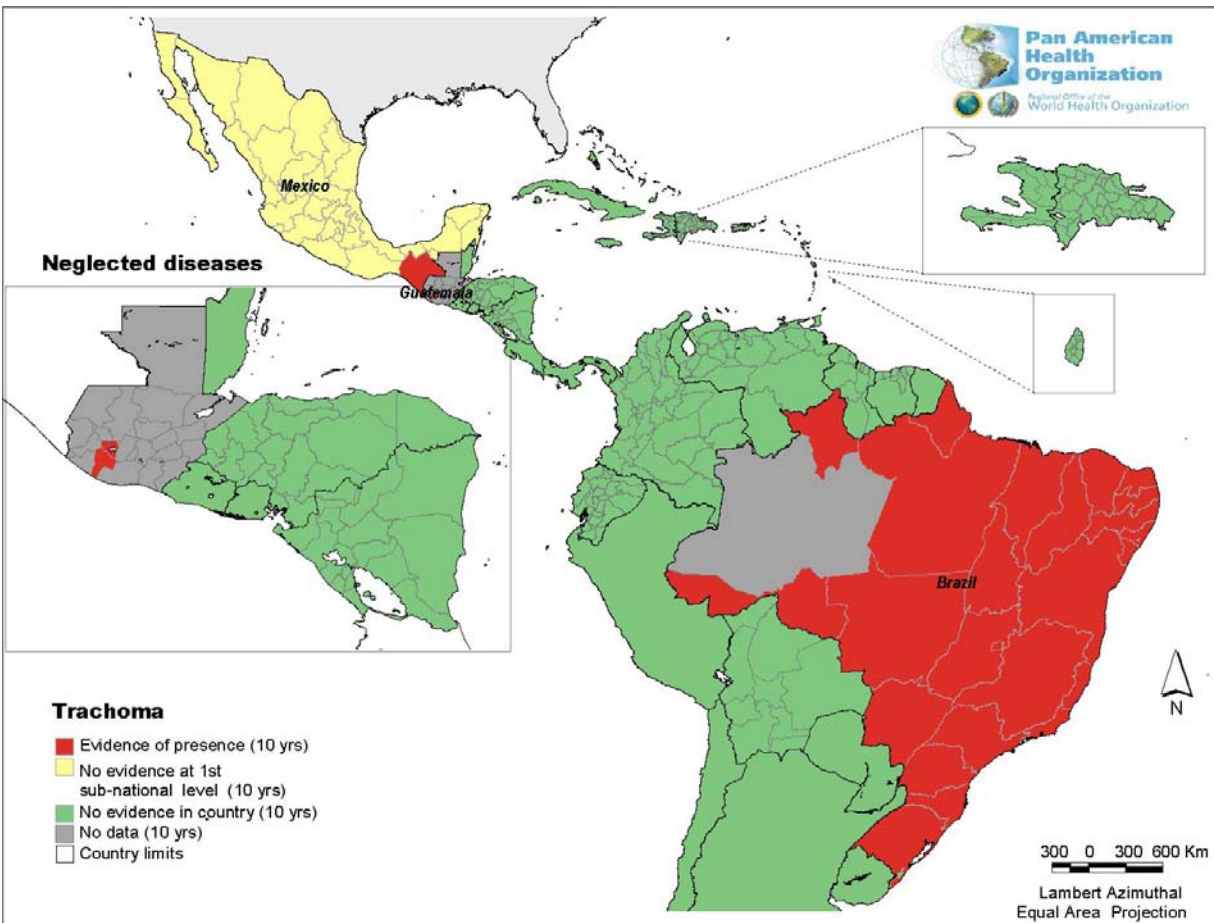
Mandates/Resolutions and Expert Recommendations

- World Health Organization: World Health Assembly Resolution WHA51.11 on the global elimination of blindness caused by trachoma (1998).
- Identified as one of the diseases with the greatest potential for elimination at the *Conference on Global Disease Elimination and Eradication as Public Health Strategies, 1999*.

Achievements

- Due to the efforts of the Trachoma Prevention and Control Program in Chiapas, Mexico, is close to eliminating the disease in that state, the only Mexican state that continues to report active cases of trachoma.
- Brazil has a national trachoma control program carrying out an active search for cases, with an important reduction in prevalence.

Presence of trachoma at the first subnational level, Latin America and the Caribbean, 1998–2007.



Sources: PAHO/HSD/CD based on:

Mexico: PAHO. Situación Epidemiológica en México. Available from <http://www.mex.ops-oms.org/contenido/tracoma/sitmex.htm>.

Brazil: Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. III Mostra de estratégias de Saúde da Família. Tracoma: Aspectos clínicos epidemiológicos e gerencias. 8 August 2008.

Guatemala: Comité prociegos y sordos de Guatemala. Cuadro de registro de personas con catarata y tracoma por estado, edad y sexo en el área sur-occidental I. 2002. Unpublished.

Comments

- There is evidence of the disease in three countries in the Region: Mexico, Brazil, and Guatemala. Around 176 million people live in 29 of the administrative units at first subnational level that show evidence of trachoma.
- In Mexico, the disease is limited to 5 municipalities in Chiapas; and in Guatemala, trachoma has been reported in 92 communities in 2 departments.
- In Brazil, a national survey has confirmed presence in 26 of the 27 states, with an average of 5% of prevalence of trachoma.
- Foci have been confirmed in the border states of Brazil, but no data on prevalence studies in neighbor countries has been found.
- Prevalence surveys using the same methodology are suggested for most of the Region—except for Brazil, which is concluding a national survey.
- A large population at risk has already been identified and may be even larger after national surveys have been carried out in other countries of the Region.

Human Rabies Transmitted by Dogs

Brief Description

Rabies is an acute viral encephalopathy that is fatal if vaccine prophylaxis is not timely applied. It is transmitted mainly via the saliva of rabid animals. Most human cases are transmitted by dogs. Other human rabies cases transmitted by bats are important in the Americas; most of these cases occur in remote areas of the Amazon Region, on the Pacific coast of Colombia, and—though in constant but smaller numbers—on the Pacific coast of Mexico. Rabies exists in many other wild animals, but the contact that these animals have with humans is circumstantial and not as significant as contact with dogs, which are often domestic.

Epidemiological Situation in the Region

One or more cases of human rabies transmitted by dogs have been reported in 10 countries over the past 3 years:

- | | | | | |
|------------|-------------|----------------|-----------|---------------|
| 1) Bolivia | 3) Colombia | 5) El Salvador | 7) Haiti | 9) Peru |
| 2) Brazil | 4) Cuba | 6) Guatemala | 8) Mexico | 10) Venezuela |

The majority of the cases occur in poor neighborhoods in the outlying areas of large cities, mostly in Haiti and Bolivia. Cases of human and canine rabies have been reduced by nearly 90% over the past 20 years, since the inception of a Regional elimination program. Even though the number of human cases is low (14 in 2007) due to country efforts, the number of people who live in risk areas is high (almost 60 million people), which calls for control actions. Some areas of the Region have eliminated human and canine rabies, which shows that it is indeed possible to achieve elimination of dog-transmitted human rabies in the Region. (See the map on the “Epidemiological situation of canine rabies, Latin America, 2001–2003”).

Objective/Indicators

Objective: To eliminate human rabies transmitted by dogs.

- Indicators:*
1. Zero cases of human rabies transmitted by dogs reported to SIRVERA (Rabies Epidemiological Surveillance System coordinated by PAHO).
 2. Vaccination of at least 80% of the canine population (within a short period of time).

Primary Strategies

- Vaccination of at least 80% of the canine population in endemic areas.
- Care given to 100% of the exposed population at risk with post-exposure prophylaxis when indicated.
- Epidemiological surveillance (suggested 0.1% of sample of canine population annually).
- Information/Education/Communication (IEC) to increase awareness of the risk of rabies.

Mandates/Resolutions and Expert Recommendations

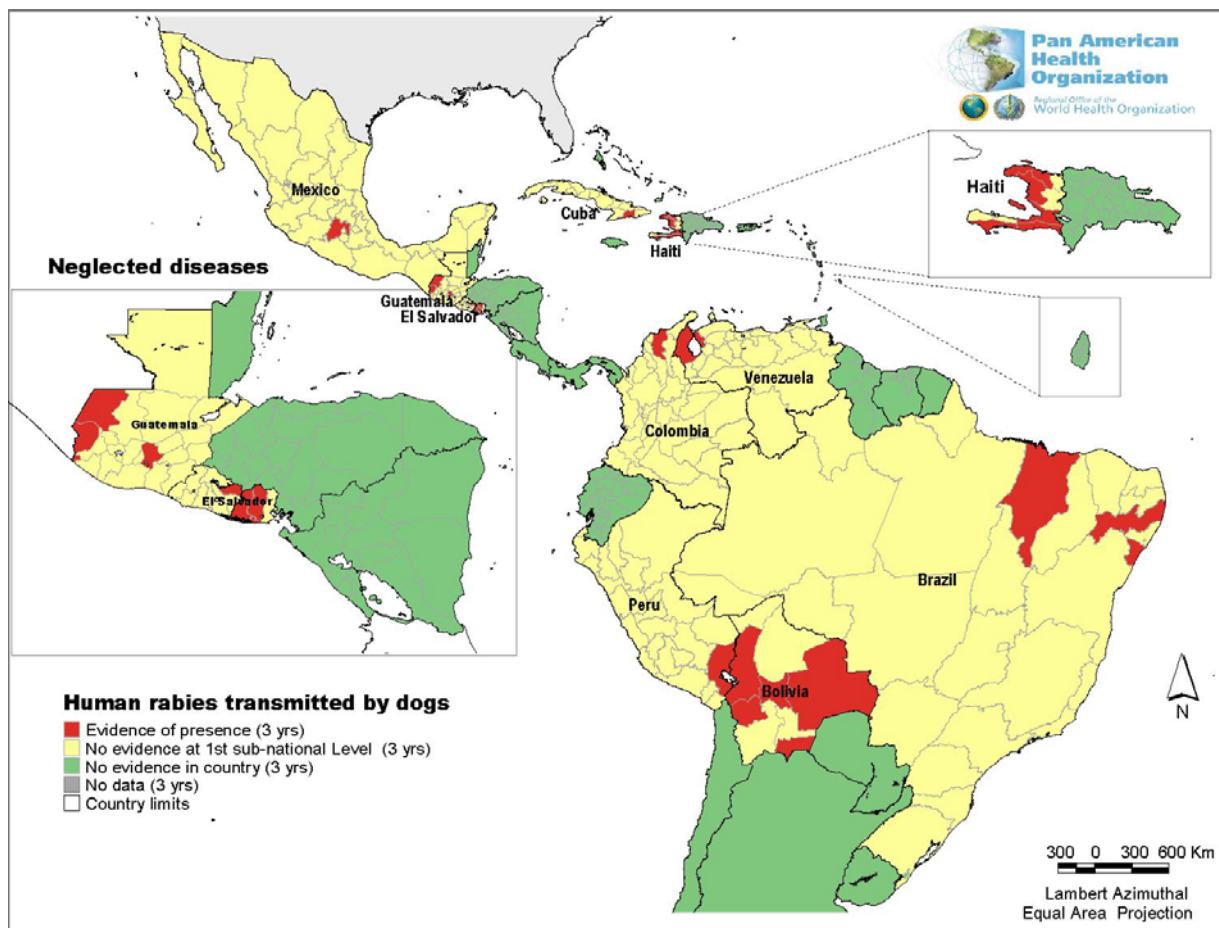
- The First Regional Action Plan, finalized in 1983, was presented to the *Inter-American Meeting, at Ministerial Level, on Health and Agriculture (RIMSA)* in 1984.
- A study on progress made to eliminate human rabies transmitted by dogs and a new Regional action plan to prevent and control rabies were presented at the *14th Inter-American Meeting, at Ministerial Level, on Health and Agriculture (RIMSA)* in 2005. Resolutions resulting from RIMSA 14 and 15 were also presented to the PAHO Directing Council in 2005 and 2008; Resolution CD48.R13 of the 48th PAHO Directing Council urges Member States to execute and maintain the actions required to eliminate dog-transmitted human rabies from the hemisphere by 2012.

- Rabies is among the diseases identified as having the greatest potential for elimination at the *Conference on Global Disease Elimination and Eradication as Public Health Strategies*, 1998.

Achievements

- Over the past 20 years, since the start of a regional control program coordinated by PAHO, human rabies has been reduced by 91%; and canine rabies, by 93%.
- Human and canine cases have been eliminated from Chile, Uruguay, most of Argentina, southern Brazil, Costa Rica, Panama, and parts of Mexico and Peru.
- Mass canine vaccinations campaigns have been performed for many years, vaccinating more than 45 million dogs per year.
- A surveillance system with human and animal cases has been in place for 30 years.
- Around one million people receive medical care annually after having been bitten by a dog.
- The determinants of the elimination of dog-transmitted human rabies, as well as control actions, are well known and have been agreed upon by experts and national rabies program directors at the biennial *Meetings of Directors of National Programs for Rabies Control in Latin America (REDIPRA)*.

Presence of dog-transmitted human rabies cases at the first subnational level, Latin America and the Caribbean, 2005–2007.



Source: PAHO/HSD/CD based on SIRVERA, PAHO/PANAFTOSA, 2008.

Comments

- Even though the number of cases of human and canine rabies has been reduced by nearly 90% over the past 20 years, and even though the number of cases is low, the disease nonetheless has been present in 10 countries during the last 3 years.
- Around 60 million people live in the 20 of the administrative units at first subnational level that show evidence of human rabies transmitted by dogs.
- The majority of the cases of human rabies transmitted by dog currently occurring have been in Haiti and Bolivia, where rabies is present in almost half of all first subnational administrative units.
- In addition, the disease has been present in a few departments/states of Brazil, El Salvador, and Guatemala.
- For the others countries, it might be worth considering their unfinished agenda.

Epidemiological situation of canine rabies, Latin America, 2001–2003.

Legend

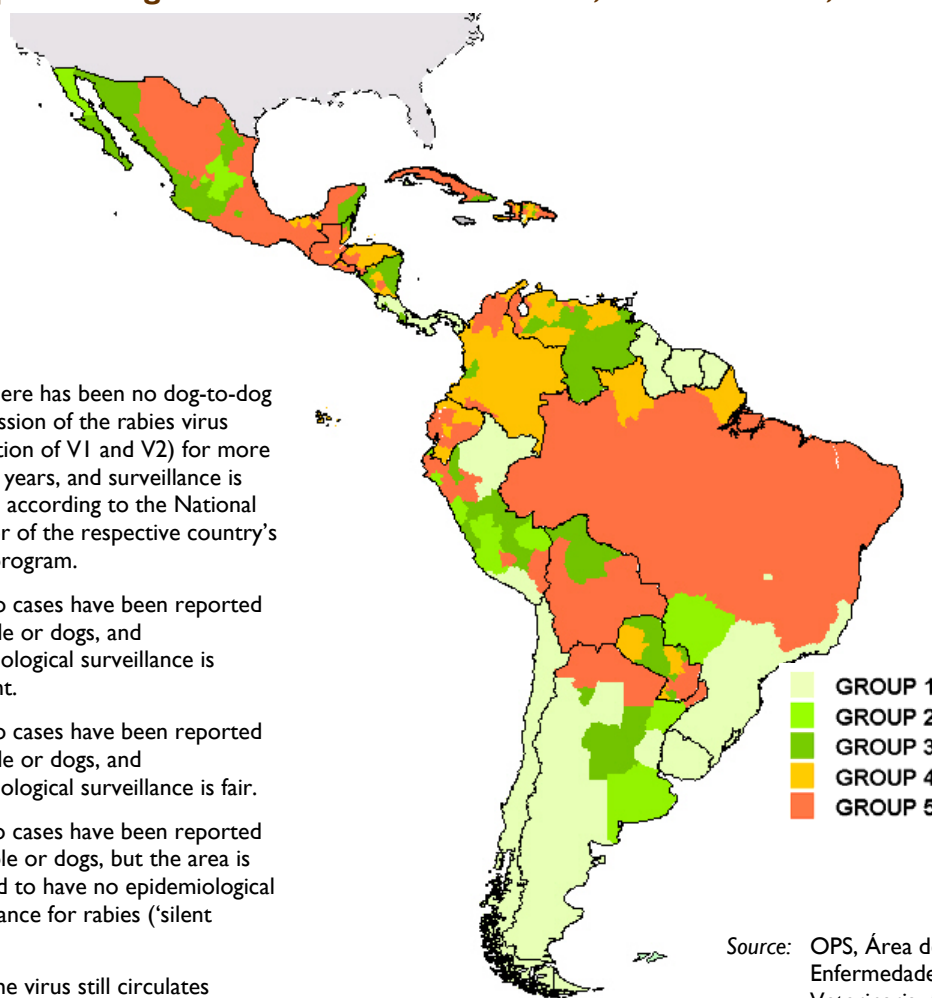
Group 1: There has been no dog-to-dog transmission of the rabies virus (circulation of V1 and V2) for more than 10 years, and surveillance is reliable, according to the National Director of the respective country's rabies program.

Group 2: No cases have been reported in people or dogs, and epidemiological surveillance is excellent.

Group 3: No cases have been reported in people or dogs, and epidemiological surveillance is fair.

Group 4: No cases have been reported in people or dogs, but the area is believed to have no epidemiological surveillance for rabies ('silent areas').

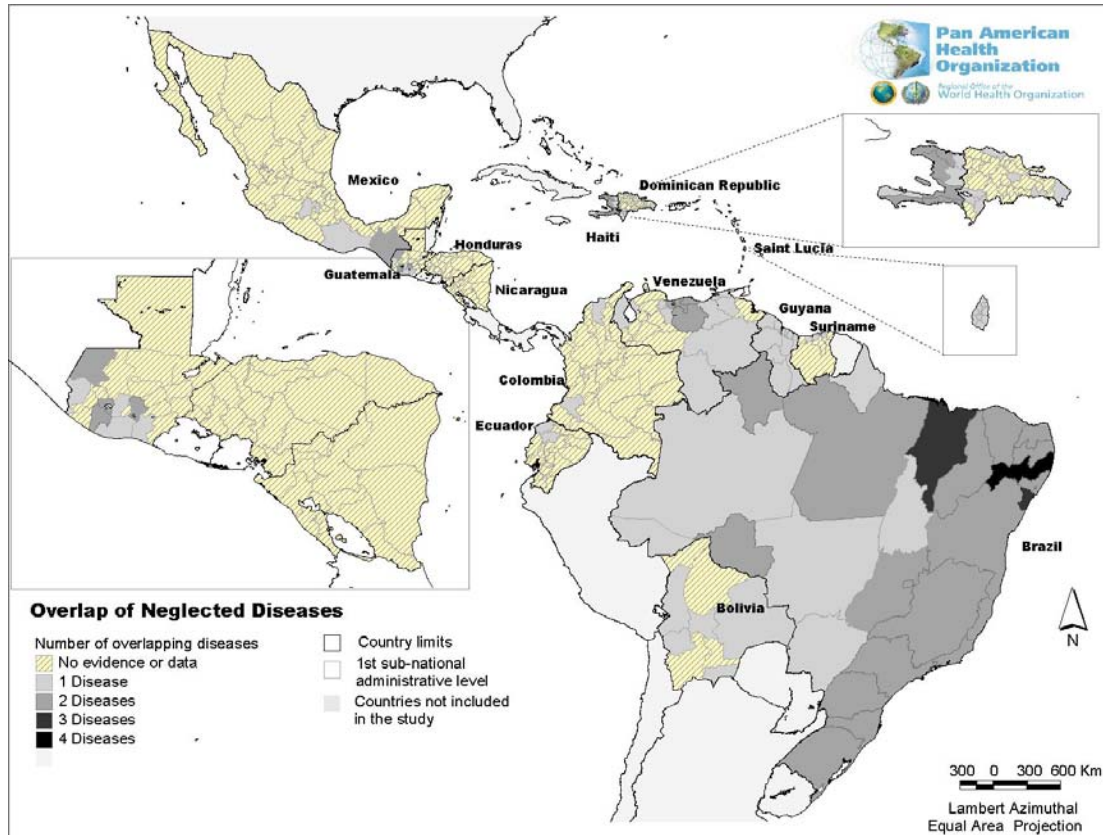
Group 5: The virus still circulates among people or dogs; there have been reports of one or more cases of canine rabies or human rabies transmitted by dogs between 2001 and 2003.



Source: OPS, Área de Prevención y Control de Enfermedades, Unidad de Salud Pública Veterinaria. *Eliminación de la rabia humana transmitida por perros en América Latina: análisis de la situación, año 2004*. OPS: Washington D.C., 2005.

Overlapping Diseases, Region of the Americas

Overlapping diseases present in the country at the first subnational level, Latin America and the Caribbean.

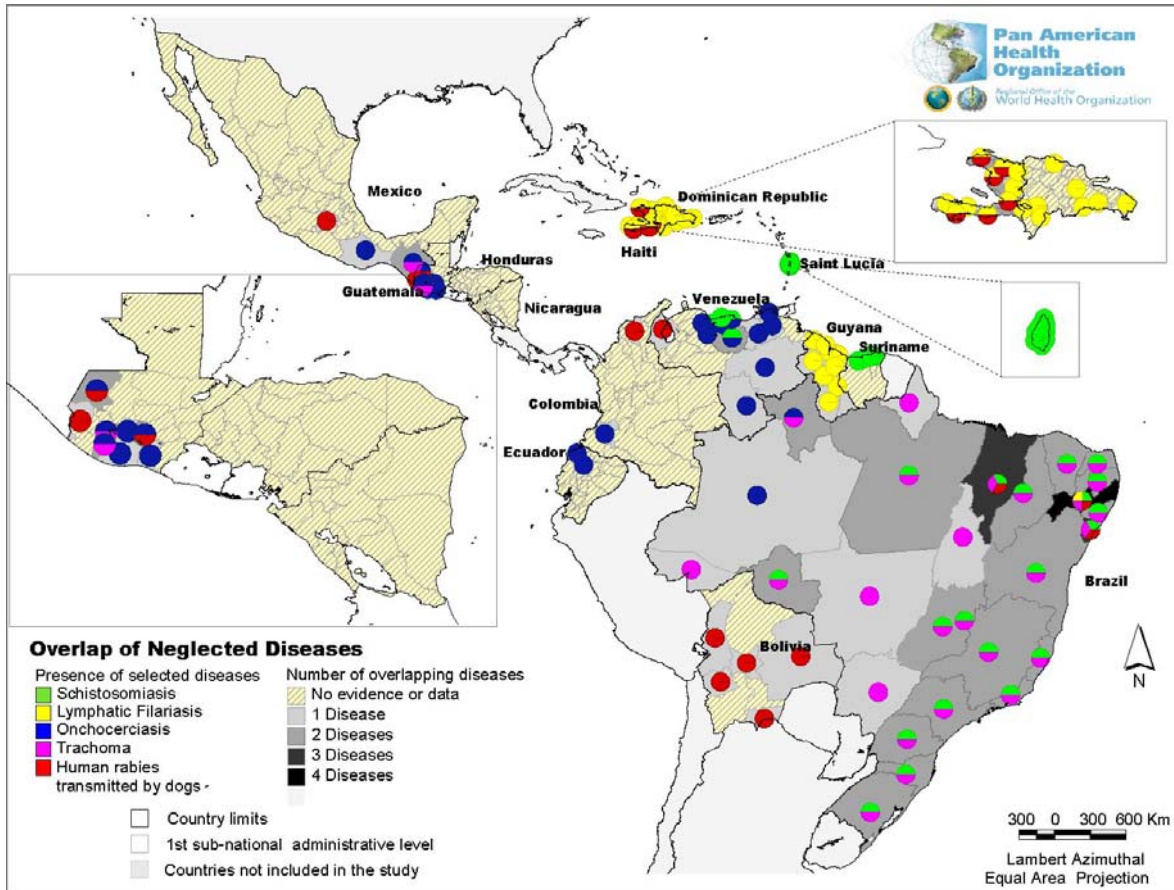


Source: PAHO, based on several sources.

Comments

- To improve consistency in the overlapping analysis (identification of hot spots), only the presence of five of the neglected diseases studied (lymphatic filariasis, onchocerciasis, schistosomiasis, trachoma, and human rabies transmitted by dogs) have been considered, due to the fact that this information is available at first subnational level for all 14 selected countries.
- A total of 102 of the 275 geographic units in the study currently present one or more of the selected diseases.
- Only one first subnational level has evidence of the presence of four of the five selected neglected diseases; and two others present three of them, all in Brazil. These represent 1% of the total geographic units included in this study, but with a population of 15 million people living in these states in Brazil.
- With the presence of two diseases, there are 33 first subnational levels, representing 12% of the total 275 geographic units in the study, with a population of 164 million people. They are as follows: 18 in Brazil, 6 in Haiti, 4 in Guatemala, 4 in Venezuela, and 1 in México.
- Sixty-six administrative units (almost one fourth) of the 275 reported the presence of one neglected disease (and more than 50 million people live in these areas).
- Considering the total population of the Latin America and the Caribbean—580 million people—it could be suggested that almost half of them (230 million) live in areas at first subnational level (states/departments/provinces) where one of more of the selected neglected diseases is present.

Overlapping diseases present in the country at the first subnational level, Latin America and the Caribbean.



Source: PAHO, based on several sources.

Comments

- Three of the five PAHO priority countries (Bolivia, Guyana, and Haiti, defined by their socioeconomic status) have one or more neglected diseases present in a large part of their territory.
- Lymphatic filariasis is present at all first subnational levels in Guyana and Haiti (PAHO priority countries).
- Human rabies transmitted by dogs is present at almost half of all subnational levels in Bolivia and Haiti (PAHO priority countries).
- Analyzing onchocerciasis from a Regional perspective suggests that there are still countries (Venezuela and Guatemala) with foci at several first subnational levels, while others are closer to the elimination goal.
- Trachoma is present in all Brazilian states, suggesting that surveys in border countries will be important to confirm that the diseases is not present.
- In the Caribbean, schistosomiasis is an important disease. Currently, there is only evidence for Saint Lucia and some coastal areas of Suriname. The disease is also present in coastal areas of Venezuela and Brazil. There could be an information gap in other areas.
- Brazil has a large territory bordering with many countries. For this study, it was easy to find information for many diseases, suggesting that the country has a good surveillance and information system with online data display open to the public, disaggregated by the first subnational level. In other countries, there may be an information gap for these diseases.

Diseases Analyzed at Country Level

Soil-Transmitted Helminths

Brief Description

Soil-transmitted helminths (STHs) are an infection caused by the intestinal worms *Ascaris lumbricoides*, *Trichuris trichiura*, *Ancylostoma duodenale*, and *Necator americanus*. Such infection is transmitted through the ingestion of eggs from contaminated soil or by active penetration of the skin by larvae in the soil. It produces varied symptoms including impaired growth, cognition, and anemia.

Epidemiological Situation in the Region

It is estimated that soil-transmitted helminths have been present in all the countries of the Region during the last 10 years. WHO has recommended a methodology to be used in prevalence studies on soil-transmitted helminths that will support identification of local priority intervention areas. The PAHO prevalence database includes data from 526 studies done throughout the Region. Most of them are localized point prevalence studies covering a broad range in the number of people surveyed. To minimize the statistical errors, the 95% confidence intervals for all of the prevalence studies found were calculated.

Currently, there are only 8 of 35 countries which have recently completed national level parasitological surveys (principally prevalence studies) for STH between 2002-2006, with the following prevalence ranges at the first administrative level: Argentina 9.0-38.7%; Belize: 43.6-52.2%; Brazil: 2-36%, Haiti: 15-87%; Honduras: 12.2-97%, México: 0.01-16.3%, Nicaragua 27-80% and Venezuela: 3-19%. Of them, only Venezuela and México reported prevalence under 20%.

For the other countries, point-prevalence studies have been carried out in several places, with the following prevalence ranges: Bolivia: 4.5-65.4%, Colombia: 10.7-49.3%, Cuba: 4.5-47.3%, Dominican Republic: 5.3-55.3%; Ecuador: 28.5-71%, Guatemala: 12.7-68%, Guyana: 12.3-38%, Peru: 1.8-80.4%, Saint Lucia: 35-45%, Suriname: 36-43%.

These data are very limited in that many of these studies are at least 5 years old and most are limited to very small geographic areas or populations in the country in question. Thus at least 27 countries in the Region are in need of mapping or re-mapping STH prevalence.

With respect to identifying and treating populations of school-age children at risk of morbidity from STH, the WHO recommends that all school-age children living in zones or areas where STH prevalence is 20%-50% receive at least one anthelmintic treatment at least once a year; where prevalence is greater than 50% treatment should be given twice a year. This is referred to as preventive chemotherapy by mass drug administration (MDA). For areas where prevalence is under 20% only selective (individual) treatment is recommended.

Besides the opportunity to receive the indicated anthelmintic treatment if prevalence data indicate it, family (school-child) access to both safe water supply and adequate basic sanitation are critical to achieving the long-term reduction in burden (intensity of infection) and prevalence of STH in school-age children.

In general in our Region it is basic sanitation which lags behind. Thus regional estimates of the number of school-age children at risk of STH morbidity should be based on the proportion of this group without access to improved sanitation, that is, 15% of school-age children in urban areas and 55% in rural areas. In estimated numbers, this indicates that 12.9 million school-age children in urban areas and 13.4 million school-age children in rural areas may need periodic deworming, for a total of 26.3 million school-age children in the LAC Region can be considered at risk. According to PAHO's database on STH, the reported coverage reached in 2007 was 8.6 million presumably at-risk school-age children, or 32.7% of the estimated total population of school-age children at risk. Thus the treatment coverage gap was 17.7 million children (67.3% unreached). Looking at coverage targets based on the World Health Assembly Resolution 54.19 (2001) which set a benchmark of at least 75% to 100% treatment coverage targeted for school-age children at risk, our data indicate that coverage in the Region should have reached at least 19.7 million and up to 26.3 million children in 2007.

Objective/Indicator

Objective: To reduce prevalence among school-age children in high-risk areas (areas with prevalence > 50%).

Indicator: Prevalence among school-age children < 20% as measured by quantitative egg count.

Primary Strategies

- Mass drug administration (MDA) for at least 75% of at-risk school-age children. If prevalence of any STH infection among school-age children is $\geq 50\%$ (high-risk community), treat all school-age children twice each year. If prevalence of any STH infection among school-age children is between $\geq 20\%$ and $< 50\%$ (low-risk community), treat all school-age children once each year.
- To promote access to safe water, sanitation and health education through intersectoral collaboration.
- Encourage satisfactory hygienic habits on the part of children.

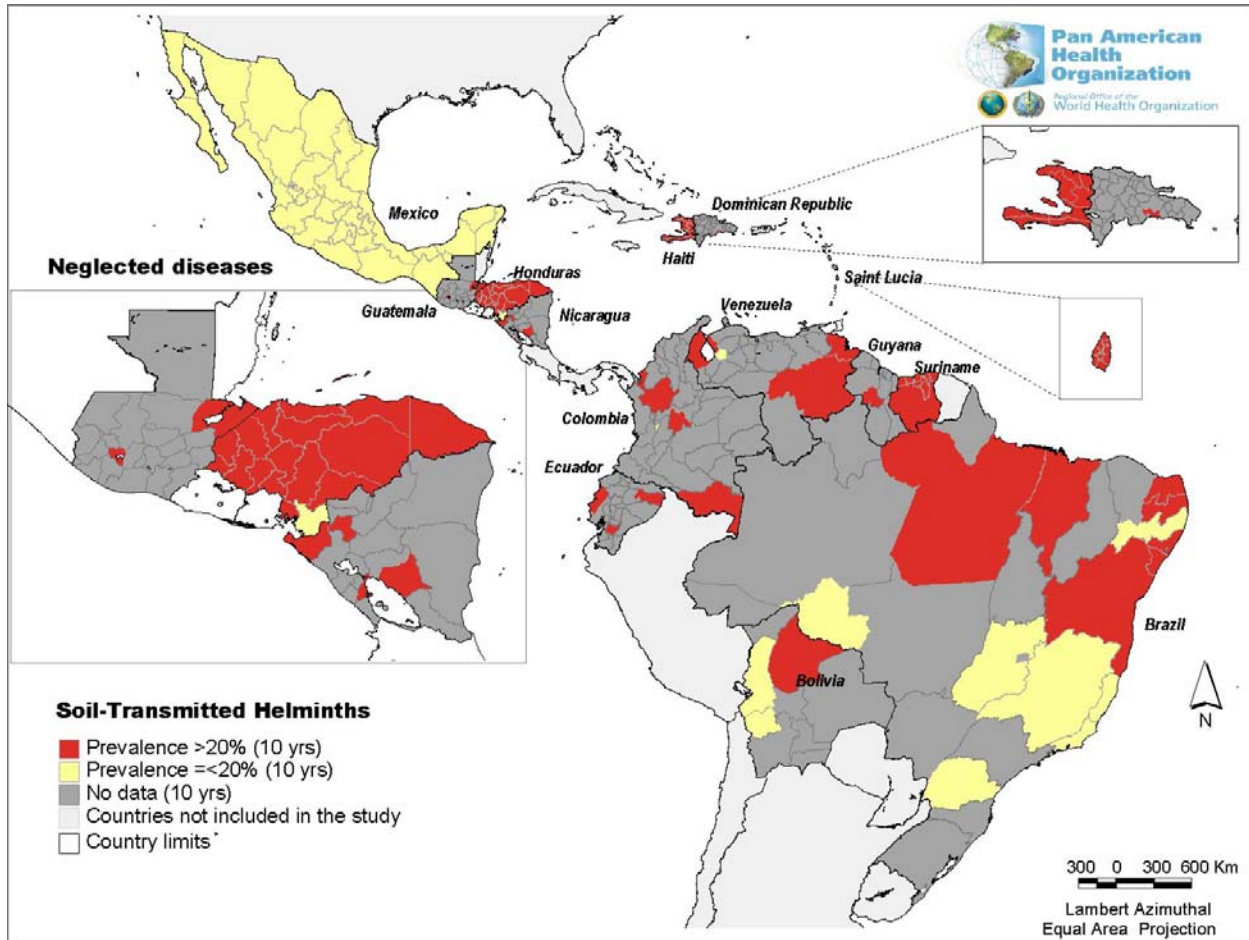
Mandates/Resolutions and Expert Recommendations

- Resolution WHA 54.19 2001: maintain efficient control in order to eliminate soil transmitted helminths as a public health problem in the zones of low transmission (of which Latin America is an example.)

Achievements

- In 2005, an estimated 38.2 million school-age children in the Region were treated with MDA.
- Of the 38.2 million children treated in 2005, Brazil and Mexico treated an estimated 26.9 million of them.
- In 2005, the Dominican Republic reached an estimated coverage of 106.17% of all its school-age children.
- In 2006, Belize, El Salvador, Guatemala, Honduras, and Mexico had reached more than 50% coverage for school-age children.
- Also in 2006, The Dominican Republic, Ecuador, and Nicaragua reached the goal of more than 75% STH coverage for school-age children.
- In 2007, Haiti and Nicaragua achieved coverage of more than 75% treated for STHs.

Prevalence of Soil-Transmitted Helminths according to existing studies, Latin America and the Caribbean, 1998–2007.

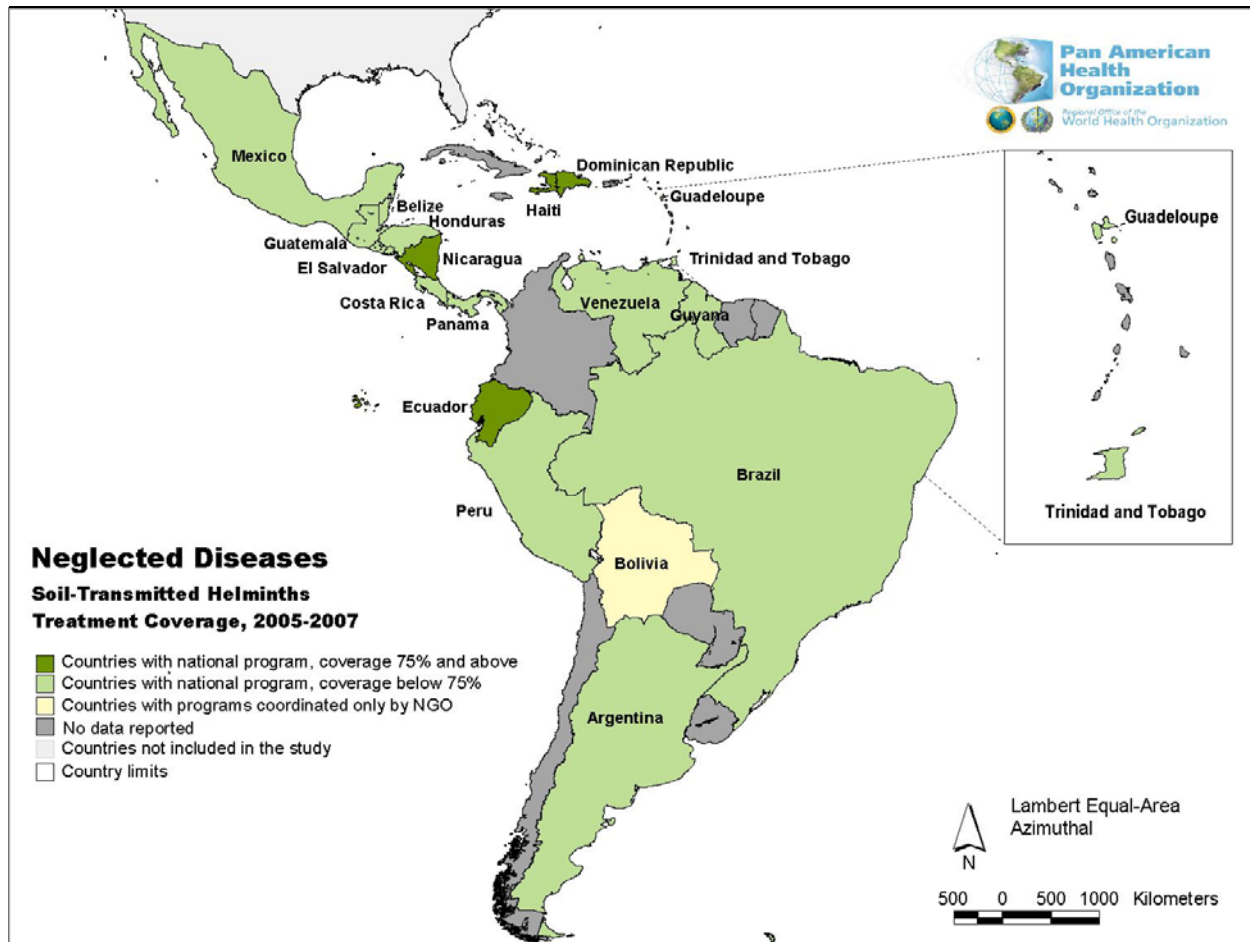


Source: PAHO/HSD/CD. Soil-Transmitted Helminths Prevalence Database. Washington, DC: PAHO; 2008. Unpublished.

Comments

- Prevalence studies have been conducted in many countries, with a broad range in the number of people surveyed (not always representative of the population).
- This map shows existing information gaps in the national-level parasitological surveys of many countries. Some updated prevalence studies exist, but more are needed for most of the countries, for which the statistical sample methodology recommended by WHO should be used.
- Of the 14 countries considered in this study, 6 of them, Brazil, Haiti, Honduras, Mexico, Nicaragua and Venezuela, have data representing nationwide prevalence of STH in SAC.
- Haiti and Honduras (PAHO priority countries) show a nationwide prevalence above 20%.
- All the other countries except Mexico present prevalence data above 20% at least in some geographic areas.

Soil-transmitted helminths treatment coverage, Latin America and the Caribbean, 2005–2007.



Source: PAHO/HSD/CD. Soil-Transmitted Helminths Prevalence Database. Washington, DC: PAHO; 2008. Unpublished.

Comments

- Of the 14 countries included in this study, 4, Ecuador, Dominican Republic, Haiti and Nicaragua, have national programs which have reached the goal of administering anthelmintic treatment to at least 75% of SAC.
- Six countries, Brazil, Guatemala, Guyana, Honduras, St. Lucia and Venezuela, have national programs but have not yet reached the 75% goal of SAC in areas where prevalence is higher than 20%. Mass Drug Administration (MDA) should be intensified in these countries.
- Nationwide MDA programs should be implemented in 3 countries, Bolivia, Colombia, and Suriname. With the co-endemicity of schistosomiasis in Suriname, there is an opportunity to integrate the 2 programs.
- In Haiti and Guyana MDA for STH is articulated with the Lymphatic Filariasis Elimination Program.
- According to the prevalence data (below 20%), Mexico is the only country among the 14 where the treatment strategy recommended is selective treatment for individual cases instead of MDA.

Chagas Disease

Brief Description

Chagas disease, also known as American trypanosomiasis, is caused by the parasitic protozoan *Trypanosoma cruzi*. Approximately 30% of all cases result in chronic cardiac and digestive manifestations within 20 to 30 years after initial infection. There are different forms of transmission, vector-borne being the most important, primarily by triatomine insects. The disease is also transmitted by blood (e.g. transfusionally, congenitally, via organ transplants or intravenous drug use) and in other ways, e.g. orally.

Epidemiological Situation in the Region

There has been evidence of Chagas disease in 21 countries of the Americas over the past 10 years:

- | | | |
|---------------|-------------------|---------------|
| 1) Argentina | 8) Ecuador | 15) Nicaragua |
| 2) Belize | 9) El Salvador | 16) Panama |
| 3) Bolivia | 10) Honduras | 17) Paraguay |
| 4) Brazil | 11) Guatemala | 18) Peru |
| 5) Chile | 12) Guyana | 19) Suriname |
| 6) Colombia | 13) French Guiana | 20) Uruguay |
| 7) Costa Rica | 14) Mexico | 21) Venezuela |

It is estimated that 8 to 9 million people are currently infected and 40,000 new cases of vector-borne Chagas appear every year. However, estimates are elevated, though there has been a significant reduction in transmission. The incidence and prevalence of the disease are higher among socially disadvantaged and ethnic groups. WHO established the economic loss due to early mortality and morbidity due to Chagas among the young population at \$US 8.156 million per year.

Objective/Indicator

Objective: To interrupt domestic vector-borne and transfusional transmission of *T. cruzi*.

Indicator: For vector-borne transmission, less than 1% vector-borne transmission, measured by negative seroprevalence in children up to five years of age and less than 1% of seropositive mothers; for transfusional transmission, 100% blood screening coverage.

Primary Strategies

- To eliminate vectors in the home with the application of insecticide.
- Environment management programs.
- Information/Education/Communication (IEC).
- Screening of blood samples in blood banks to avoid transmission by blood transfusion.
- Screening of pregnant women and opportune treatment of infected newborns.
- Good practices on food preparation to avoid oral transmission.

Mandates/Resolutions and Expert Recommendations

- World Health Assembly Resolution WHA 51.14 proposed in 1998 the elimination of domestic transmission of Chagas disease by the year 2010.
- Domestic vector-borne transmission of the disease identified with greatest potential for elimination at the *Conference on Global Disease Elimination and Eradication as Public Health Strategies*, 1998.

Achievements

- It has been estimated that by the end of the 1980s, 30 million people will be infected; and there will be 70,000 new cases each year. Due to a Regional effort, there are currently 8 million infected people and 40,000 new cases each year of vectoral Chagas transmission.
- Vector-borne and transfusional transmission of *T. cruzi* has been interrupted in Uruguay.
- Vector-borne transmission of *T. cruzi* by *Triatoma infestans* has been interrupted in Brazil, Chile, Paraguay, and some provinces of Argentina.
- Vector-borne transmission by *Rhodnius prolixus* has been interrupted in the previously endemic areas of Guatemala; it has also been reduced in Costa Rica, El Salvador, Honduras, and Nicaragua.
- Twelve countries of the Region have already achieved the goal of 100% blood bank screening; and four other countries are very close to that goal.
- A study carried out in Brazil suggested that every US dollar invested in Chagas Disease control saved seven US dollars (US\$ 7).

**Presence of Chagas disease, all modes of transmission,
Latin America and the Caribbean, 1998–2007.**

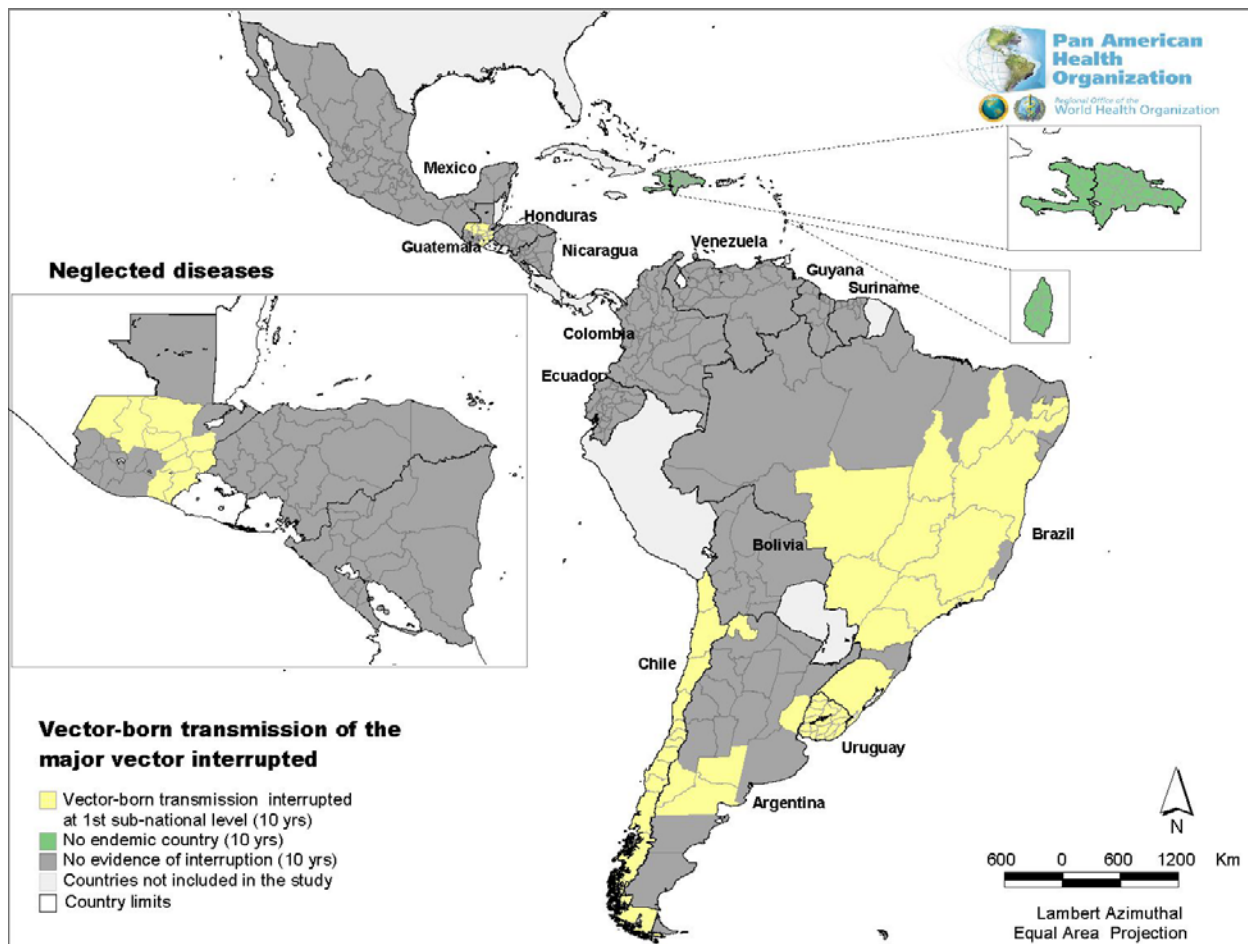


Source: PAHO/HSD/CD based on PAHO. *Health in the Americas*. Vol I. Washington, DC: PAHO; 2007.

Comments

- Overall, the disease is being better controlled in the Region, although there is evidence of it being transmitted in its various modes in 21 countries of the Americas.

Vector-borne transmission of Chagas disease by the major vector interrupted, Latin America and the Caribbean, 2007.

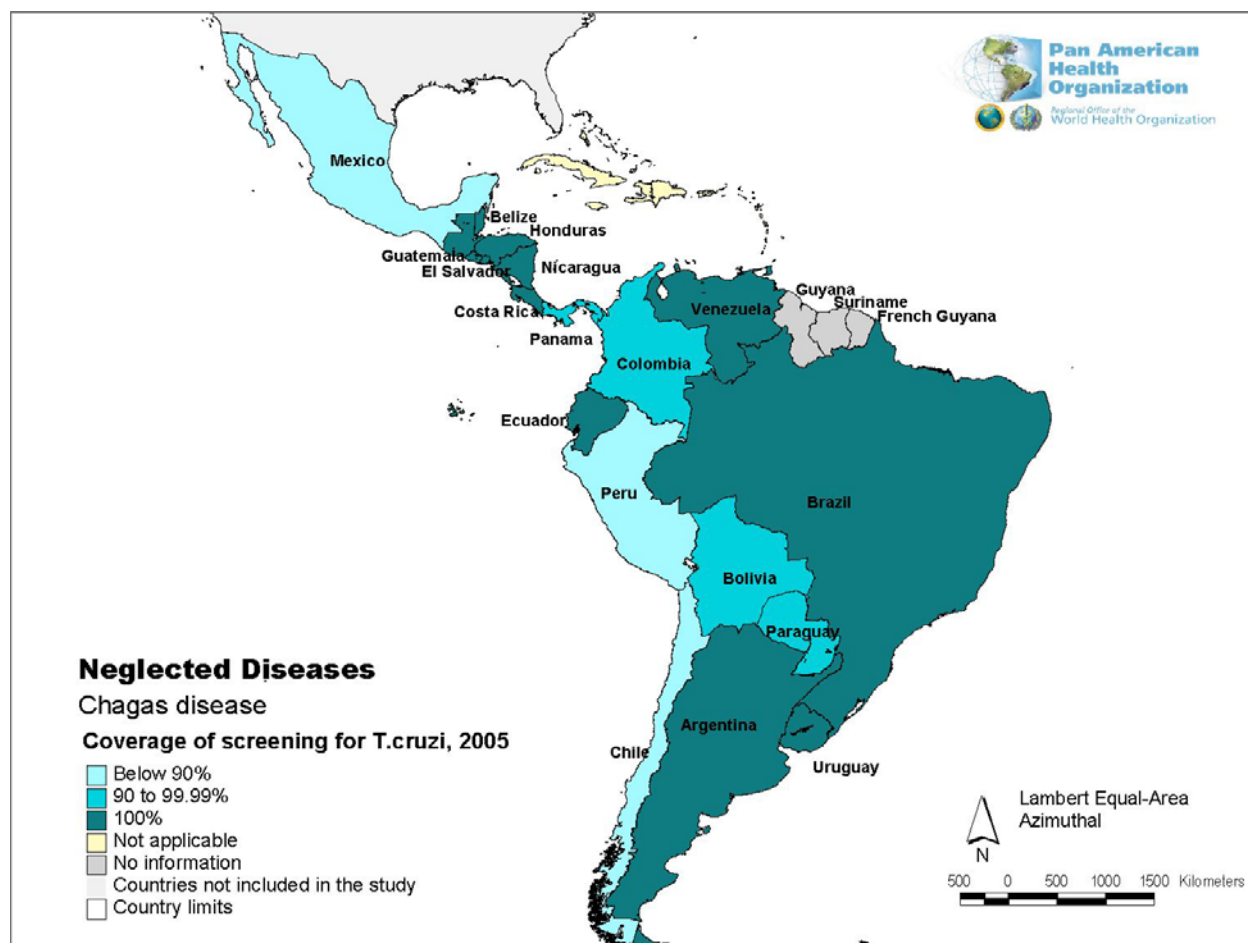


Source: PAHO/HSD/CD based on: Reports from sub-regional meetings on the control of Chagas disease transmitted by vectors

Comments

- Some countries and areas—such as Chile, Uruguay, most of the endemic areas of Brazil, and some provinces of Argentina—have successfully interrupted vector-borne transmission of the main vector.
- Vector-borne transmission has also been interrupted in the previously endemic areas of Guatemala and furthermore has been reduced in Costa Rica, El Salvador, Honduras, and Nicaragua.
- Some areas in the Americas are considered non-endemic in terms of vector-borne transmission, such as southern Chile and Argentina.
- Around 60 administrative units at the first subnational level had interrupted transmission of Chagas disease by the major vector as of 2007.

Coverage for *T. cruzi* screening in Latin America and the Caribbean, 2005 (in %).



Source: PAHO/HSD/CD based on PAHO/THS/EV, *Supply of blood for transfusion in the Caribbean and Latin American countries in 2005: Baseline data for the Regional Plan of Action for Transfusion Safety 2006–2010*. Washington, DC: PAHO; 2007.

Comments

- Twelve countries have already achieved the goal of 100% blood-bank screening.
- Another four are very close to the above goal, with a coverage of between 90% and 99.99%.
- Three countries are currently below 90% coverage.
- In 2007, two other countries achieved 100% blood-bank screening (Peru and Paraguay). Chile set a national standard to achieve 100% blood-bank screening in 2008.
- Because transfusional Chagas disease appears not to be occurring in the Caribbean islands, systematic screening is currently not being carried out for this disease.

Leprosy

Brief Description

Leprosy is a chronic bacterial skin disease caused by *Mycobacterium leprae*, a bacterium which primarily affects skin and peripheral nerves. The main mode of transmission is thought to be airborne, through droplets discharged by the respiratory tracts of untreated cases. It is completely curable with multidrug therapy (MDT) and is considered one of the least known infectious diseases, though it is heavily stigmatized and primarily affects poor, marginalized people.

Epidemiological Situation in the Region

There are 25 countries where the disease has been present over the past 3 years:

- | | | | | |
|--------------|-----------------------|---------------|---------------|-----------------------|
| 1) Argentina | 6) Costa Rica | 11) Guatemala | 16) Mexico | 21) Saint Lucia |
| 2) Bolivia | 7) Cuba | 12) Guyana | 17) Nicaragua | 22) Suriname |
| 3) Brazil | 8) Dominican Republic | 13) Haiti | 18) Panama | 23) Trinidad & Tobago |
| 4) Chile | 9) Ecuador | 14) Honduras | 19) Paraguay | 24) Uruguay |
| 5) Colombia | 10) El Salvador | 15) Jamaica | 20) Peru | 25) Venezuela |

Only in Brazil did the national average not reach the elimination goal of less than one case per 10,000 inhabitants. In addition, Brazil has the greatest disease burden in terms of morbidity, despite the fact that prevalence has been reduced substantially since 2004. In 2007, 49,388 cases of leprosy were reported in the Americas, and 42,000 new cases were detected. In the same year, 3,400 new cases (8% of the total) were detected with grade 2 disability.

Objective/Indicator

Objective: To eliminate leprosy as a public health problem.

Indicator: Less than 1 case per 10,000 population.

Primary Strategies

- Integrated strategy for this neglected skin disease.
- Treatment with timely multi-drug therapy in at least 99% of all patients.
- Early detection and reduction of grade 2 disability.

Mandates/Resolutions and Expert Recommendations

- 1991 World Health Assembly: Resolution on Elimination of leprosy as a public health problem by 2000.
- Identified as one of the diseases with the greatest potential for elimination at the *Conference on Global Disease Elimination and Eradication as Public Health Strategies*, 1998.

Achievements

- During the past 10 years, more than 10 million patients globally have been cured using multidrug therapy (MDT).
- MDT implementation began in 1985; by 2001, coverage was almost universally available.
- The impact of MDT on reducing the disease burden could be observed over the period from 1992 to 1999. Leprosy prevalence dropped by 80%, resulting in a reduction in incidence from 8.1 per 10,000 inhabitants in 1992 to 1.4 in 1999. Leprosy prevalence at the beginning of 2008 was 0.96 per 10,000 inhabitants in the Americas.

Presence of leprosy in countries where it is considered a public health problem at the first subnational level, Latin America and the Caribbean, 2005–2007.



Source: PAHO/HSD/CD based on WHO *Weekly Epidemiological Record* (WER) 80 (34): 289-95. 2005; WER 81(32): 309-16. 2006; WER 82 (25): 225-232. 2007.

Comments

- There are 25 countries where the disease has been present over the past 3 years.
- However, only Brazil did not reach the national average of less than one case per 10,000 inhabitants, which constitutes the criteria for considering the disease to be a public health problem.
- Most of the non-Latin Caribbean countries and territories do not present evidence of leprosy. It is present, though not as a public health problem, in Guyana, Jamaica, Saint Lucia, Suriname, and Trinidad and Tobago.
- All PAHO priority countries present evidence of leprosy, but not as a public health problem.

Neonatal Tetanus

Brief Description

Neonatal tetanus is caused by the bacillus *Clostridium tetani*. It is a neurological disease that affects newborns and manifest as trismus, irritability, spasms and general rigidity. Failure to suckle is often the first sign of infection in the neonate. Transmission usually occurs through infection during unhygienic cutting of the umbilical cord or improper handling of the cord stump. *Clostridium tetani* contaminates the wound or the umbilical cord and produces a neurotoxin.

Epidemiological Situation in the Region

There are 16 countries where the disease has been present over the past 3 years:

- | | | | |
|--------------|-----------------------|---------------|---------------|
| 1) Argentina | 5) Dominican Republic | 9) Haiti | 13) Panama |
| 2) Bolivia | 6) Ecuador | 10) Honduras | 14) Paraguay |
| 3) Brazil | 7) El Salvador | 11) Mexico | 15) Peru |
| 4) Colombia | 8) Guatemala | 12) Nicaragua | 16) Venezuela |

Only in Haiti has neonatal tetanus persisted as a public health problem in some municipalities (not reaching the elimination goal of less than one case per 1000 newborns per year.) During 2007, Haiti reported 38 of the 63 cases reported in Latin America. In some municipalities, the incidence rate has reached a level of up to 4 per 1,000 live births. Other countries that reported cases during 2007 were: Bolivia, 1 case; Brazil, 5 cases; Colombia, 4; Dominican Republic, 2; Ecuador, 2; Guatemala, 2; Mexico, 4; Peru, 4; and Venezuela, 1.

Objective/Indicator

Objective: To eliminate the disease as a public health problem

Indicator: Less than 1 case per 1000 newborns per year in a municipality or district.

Primary Strategies

- Immunization of women of childbearing age with tetanus toxoid.
- Identification of high risk areas.
- Adequate surveillance.
- Clean delivery and post-delivery practices.

Mandates/Resolutions and Expert Recommendations

- In 1989, the World Health Assembly adopted a resolution calling for the elimination of neonatal tetanus throughout the world by 1995. This resolution was endorsed by the Directing Council of PAHO.
- Identified as one of the diseases with the greatest potential for elimination at the *Conference on Global Disease Elimination and Eradication as Public Health Strategies, 1998*.

Achievements

- The total number of cases of neonatal tetanus was 1,495 cases in 1987 and 63 in 2007. This represents a reduction of 96%.
- Neonatal tetanus has been eliminated as a public health problem in all Latin American countries except for Haiti.
- The countries of the region started to classify their municipalities by risk level (high, medium and low). Only Haiti has high-risk municipalities in the Region.

**Presence of cases of neonatal tetanus at first subnational level,
Latin America and the Caribbean, 2005–2007.**



Source: PAHO/HSD/CD based on PAHO/FCH/IM, Country reports through the PAHO/WHO/UNICEF Joint Reporting Forms (JRFs), 2005–2007, PAHO.

Comments

- Neonatal tetanus has been eliminated as a public health problem in all Latin American and Caribbean countries except in Haiti.
- Every year Haiti reports up to 60 % of the total number of cases of Latin America.
- The countries have been working to have their municipalities classify by risk level.
- Vaccination of childbearing age women has already started in high risk municipalities in Haiti.
- Activities will need strong support to achieve the elimination goal.

Congenital Syphilis

Brief Description

Congenital Syphilis results from fetal infection by the bacterium *Treponema pallidum*. It can produce fetal death, neonatal death, and different degrees of chronic illness and disability in children. It is transmitted from the infected mother to the fetus through the placenta.

Epidemiological Situation in the Region

- There is currently no information on the actual prevalence of congenital syphilis in Latin America and the Caribbean, but it is estimated that 250,000 cases of congenital syphilis occur each year in the Region.
- Only six countries in the Region had information available on the prevalence of syphilis among pregnant women, with a range varying from 0.08% in Chile to 5.19% in Paraguay.
- According to a 2006 survey, 14 countries reported the incidence of congenital syphilis in live births, with a range varying from 0.0 in Cuba to 1.56 in Brazil.
- It is estimated that every year more than 100,000 children in the Region are lost to fetal death or spontaneous abortion as a result of congenital syphilis, and 100,000 more are born infected and incur different levels of disability.

Objective/Indicator

Objective: To eliminate congenital syphilis as a public health problem.

Indicator: Less than 0.5 cases per 1,000 live births.

Primary Strategies

- Obligatory notification of syphilis and congenital syphilis for pregnant women.
- Universal blood screening during the first prenatal visit (<20 weeks,) during the third trimester, during labor, and following stillbirth and abortion/miscarriage.
- Timely and adequate treatment for all expectant mothers with syphilis (penicillin cures congenital syphilis), and the same for spouses and newborns.

Mandates/Resolutions and Expert Recommendations

- World Health Assembly Resolution WHA59.19, which in 1989 endorsed the prevention and control of sexually transmitted diseases.
- World Health Organization Executive Board Report EB 117/8 presented a draft strategy in 2006 for the prevention and control of sexually transmitted diseases.
- Pan American Health Organization, 38th Directing Council Resolution CD38.R8, which in 1996 resolved to urge Member States to adopt the Plan of Action to Eliminate Congenital Syphilis.
- Pan American Health Organization, 38th Directing Council document CD38.14, which in 1996 endorsed a Plan of Action for the Elimination of Congenital Syphilis in the Americas.

Achievements

- The World Bank estimated that the detection and treatment of prenatal syphilis is one of the most cost-effective interventions available.

Presence of congenital syphilis, Latin America and the Caribbean, 2005–2007.



Comments

- Among the 15 countries with information available on the incidence of congenital syphilis, 7 reported rates that qualify the disease as a public health problem (i.e. with a rate of more than 0.5 cases per 1,000 live births).
- Of the countries with available information, only one of them (Cuba) did not present any evidence of the disease during 2006 (at which time a survey was conducted).

Country Profiles

Bolivia



Core Data

Demographic Indicators

	Data	Year
▪ Total Population (thousands):	9,525	2007
▪ Urban Population (%):	65.1	2007
▪ Life Expectancy at Birth (years) total:	65.6	2007
▪ Men	63.4	2007
▪ Women	67.7	2007

Socioeconomic Indicators

▪ Literate Population (15+ years old) (%) total:	86.7	1999–2005
▪ Men	93.1	1999–2005
▪ Women	80.7	1999–2005
▪ Gross National Income (US\$ per capita) PPP value:	2,740	2005
▪ Population Below International Poverty Line (%):	23.2	1998–2004
▪ Population Using Improved Sources of Drinking Water (%) total:	85	2004
▪ Population Using Improved Sanitation Facilities (%) total:	46	2004

Mortality Indicators

▪ Infant Mortality Rate (per 1,000 live births):	54	1999–2003
▪ Mortality Rate from Communicable Diseases (per 100,000 pop.):	182.3	2000–2004
▪ Ill-Defined and Unknown Causes (%):	45	2003

Selected Diseases Present in the Country

<i>Analyzed at First Subnational Level</i>		<i>Analyzed at Country Level</i>	
▪ Lymphatic Filariasis		▪ Soil-Transmitted Helminths	✓
▪ Onchocerciasis		▪ Chagas Disease	✓
▪ Schistosomiasis		▪ Leprosy*	
▪ Trachoma		▪ Neonatal Tetanus*	
▪ Human Rabies Transmitted by Dogs	✓	▪ Congenital Syphilis	✓

* Present but not as a public health problem.

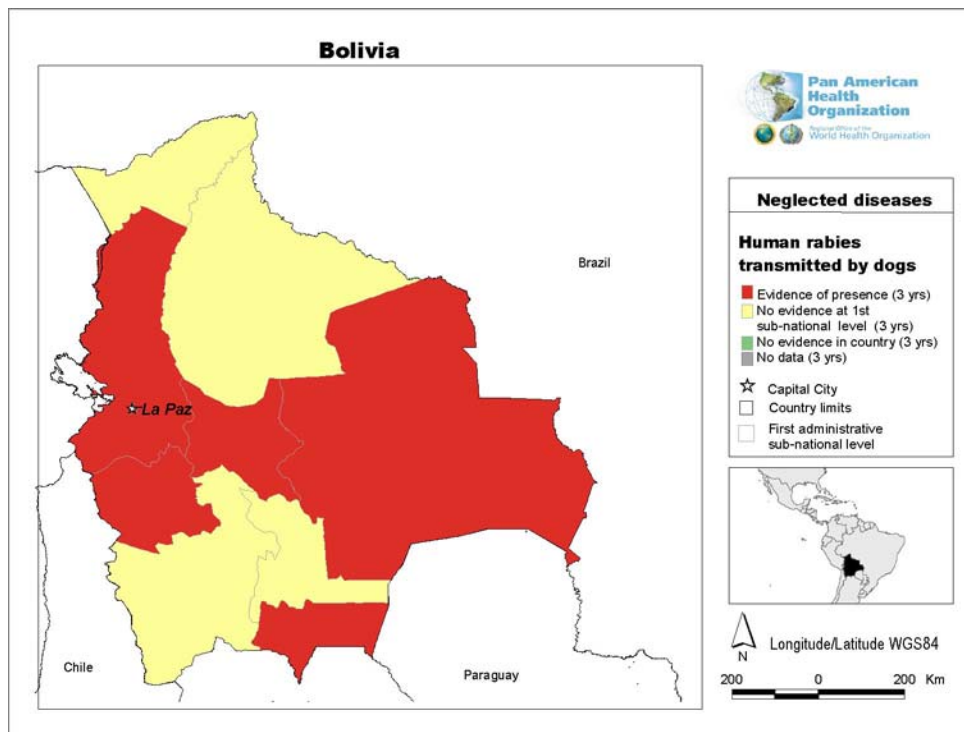
Current Situation of the Disease

Human Rabies Transmitted by Dogs

Epidemiological Situation

- **Number of cases:** 2007 – 4 cases (3 in Santa Cruz, 1 in Oruro); 2006 – 4 cases (3 in Santa Cruz, 1 in Cochabamba); 2005 – 8 cases (4 in Santa Cruz, 2 in Cochabamba, 1 in La Paz, 1 in Tarija).
- **Population at risk:** About 6 million people (population living in an administrative unit at the first subnational level with one or more cases in 2005-2007).
- **Areas of major risk or focus:** Santa Cruz, Cochabamba, La Paz, Tarija, Oruro.

Presence of cases of human rabies transmitted by dogs at the first subnational level, Bolivia, 2005–2007.



Source: PAHO/HSD/CD based on SIRVERA, PAHO, 2008.

Control Measures

- **Control programs:** Carried out by the Ministry of Health.
- **Information available:** The country reports any human cases to SIRVERA (the Rabies Epidemiological Surveillance System coordinated by PAHO/PANAFTOSA). Canine surveillance is also in place, showing 285 dogs positive for rabies in 2007.
- **Primary strategies:** Nationwide vaccination of the canine population; post-exposure prophylaxis (PEP) provided to the population exposed to (or at risk of contracting) rabies; surveillance system; education/information/communication (IEC) campaigns to raise awareness about the risks of the disease.
- **Information on coverage:** Most of the country has a coverage of over 80%, thanks to canine vaccination campaigns; but some municipalities show low coverage. Around 8,000 people receive PEP each year. There are three laboratories in the country that carry out rabies surveillance.

Soil-Transmitted Helminths

Epidemiological Situation

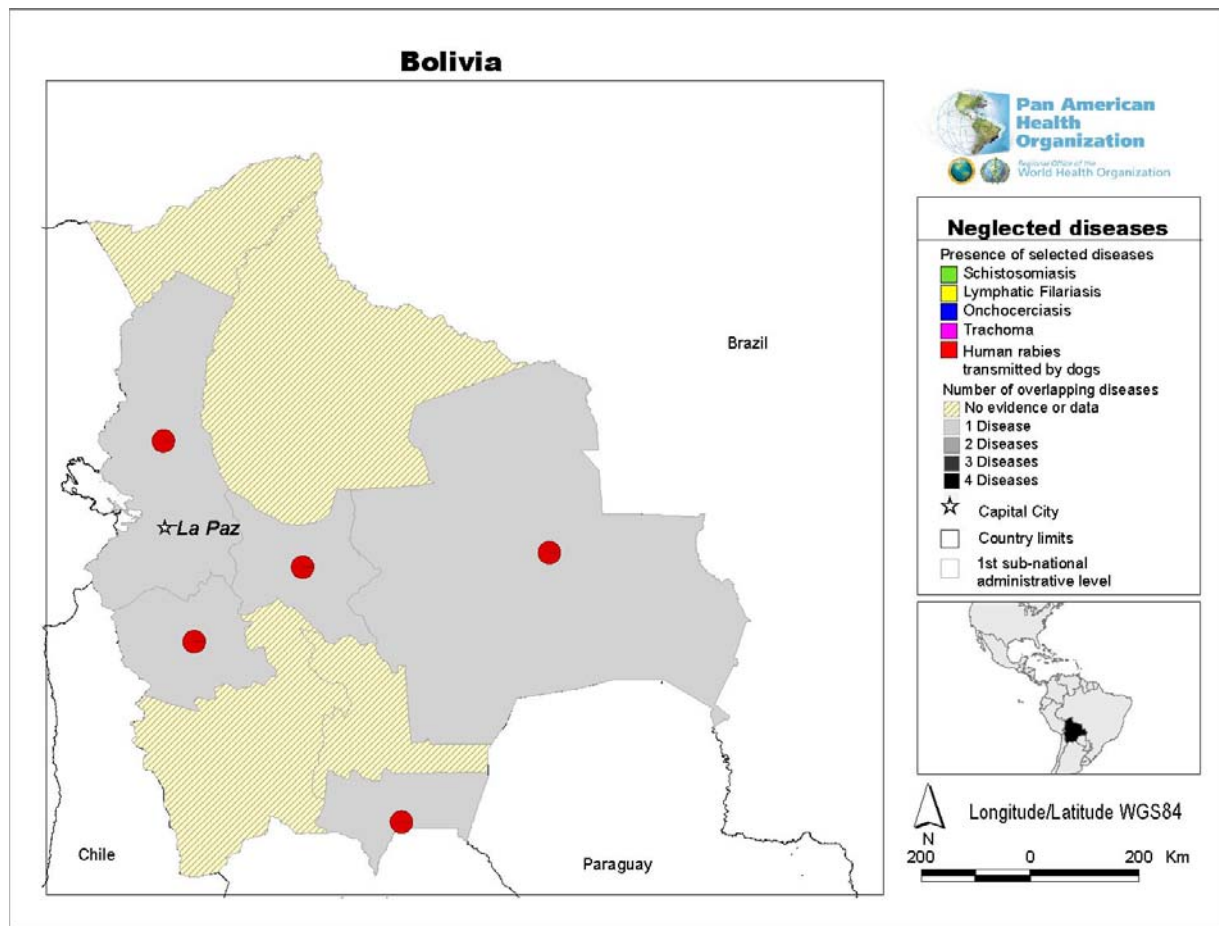
- **Prevalence:** STHs are present at all first subnational levels. Studies with information have been available for the past 10 years that suggest a prevalence range from 4.5% to 65.37%. The available data suggest that most school-age children at risk live in the ecological zones of the Bolivian Amazon and in the Humid Valleys where the prevalence of STHs is 50% or more.
- **Population at risk:** An estimated population of 1.2 million school-age children
- **Areas of major risk or focus:** The Bolivian Amazon and the Humid Valleys.
- **Internal country breakdown:** STHs are present in the entire country.

Control Measures

- **Control programs:** A national program is under consideration; local projects are being carried out by nongovernmental organizations (NGOs).
- **Information available:** Surveys in different places are available through the Ministry of Health.
- **Primary strategies:** Treatment with Mebendazole is provided.
- **Information on coverage:** In 2007, 39,000 children were treated.

Overlapping Diseases

Overlapping diseases present in the country at the first subnational level, Bolivia.



Source: PAHO.

Comments

- Human rabies transmitted by dogs is present in almost half of all Bolivian departments, suggesting that this disease could be a priority among the neglected diseases studied.
- There is no evidence of the presence of the other neglected diseases studied.
- There could be an information gap for others diseases, e.g. trachoma.

Brazil



Core Data

Demographic Indicators

	Data	Year
▪ Total Population (thousands):	191,791	2007
▪ Urban Population (%):	85.2	2007
▪ Life Expectancy at Birth (total number of years):	72.4	2007
▪ Men	68.8	2007
▪ Women	76.1	2007

Socioeconomic Indicators

▪ Literate Population (15+ years old) (total in %):	88.6	1999–2005
▪ Men	88.4	1999–2005
▪ Women	88.8	1999–2005
▪ Gross National Income (US\$ per capita) PPP value:	8,230	2005
▪ Population Below International Poverty Line (%):	7.5	1998–2004
▪ Population Using Improved Sources of Drinking Water (total in %):	90	2004
▪ Population Using Improved Sanitation Facilities (total in %):	75	2004

Mortality Indicators

▪ Infant Mortality Rate (per 1,000 live births):	22.6	2004
▪ Mortality Rate from Communicable Diseases (per 100,000 pop.):	73.3	2000–2004
▪ Ill-Defined and Unknown Causes (%):	12.4	2004

Selected Diseases Present in the Country

<i>Analyzed at First Subnational Level</i>		<i>Analyzed at Country Level</i>	
▪ Lymphatic Filariasis	✓	▪ Soil-Transmitted Helminths	✓
▪ Onchocerciasis	✓	▪ Chagas Disease	✓
▪ Schistosomiasis	✓	▪ Leprosy	✓
▪ Trachoma	✓	▪ Neonatal Tetanus*	
▪ Human Rabies Transmitted by Dogs	✓	▪ Congenital Syphilis	✓

*Present but not as a public health problem.

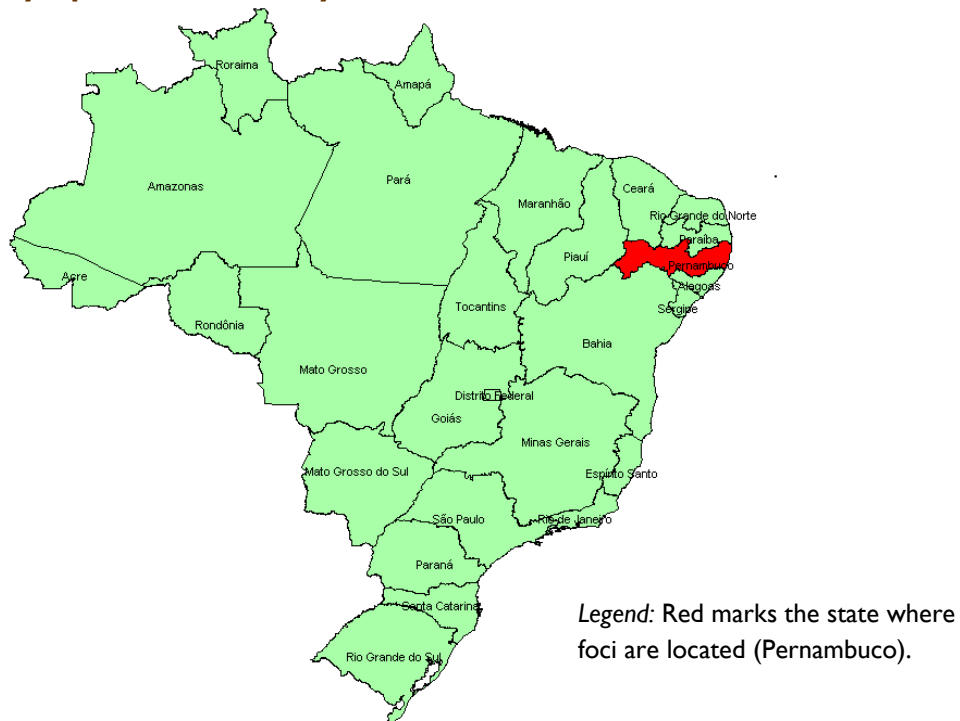
Current Situation of the Disease

Lymphatic Filariasis

Epidemiological Situation

- **Prevalence:** 4.6% Antigenemia (Ag) in the municipality of Jaboatão, Pernambuco state in 2004. The focus in the state of Alagoas has recently been considered eliminated.
- **Population at risk:** 1,700,000.
- **Areas of major risk or focus:** Municipalities of Olinda, Jaboatão, Recife, and Paulista, all in the state of Pernambuco.
- **Internal country breakdown:** See map below.

Presence of lymphatic filariasis by first subnational level, Brazil, 2005–2007.



Source: Brazil. Ministry of Health. Annual Report for the National Program to Eliminate Lymphatic Filariasis for the year 2007. Submitted to the World Health Organization in 2008.

Control Measures

- **Control programs:** Program for the Elimination of Lymphatic Filariasis (PELF) acting through the Unified Health System (SUS), Ministry of Health.
- **Primary strategies:** Mass drug administration with Diethylcarbamazin (DEC) and Albendazole, once a year.
- **Is the strategy being implemented in all the endemic areas?** In endemic municipalities, drugs have only been administered in districts that show a high level of endemicity. In other endemic districts, blood tests are carried out and optional medical care is provided.
- **Information available:** Yes, through the Ministry of Health and PELF.
- **Information on coverage:** In 2007, mass drug administration provided coverage to 112,706 people, equivalent to 7% of the population living in endemic areas.

Onchocerciasis

Epidemiological Situation

- **Population at risk:** The indigenous Yanomami population of 9,987 inhabitants (based on figures for 2007).
- **Prevalence:** 6.5% (in 2007) in the focus in Amazonas state.
- **Areas of major risk or focus** The states of Roraima and Amazonas, in areas which border on Venezuela.
- **Internal country breakdown:** There are five municipalities with onchocerciasis foci of in Brazil.

Areas where onchocerciasis is endemic, Brazil, 2005–2007.



Source: OEPA.

Control Measures

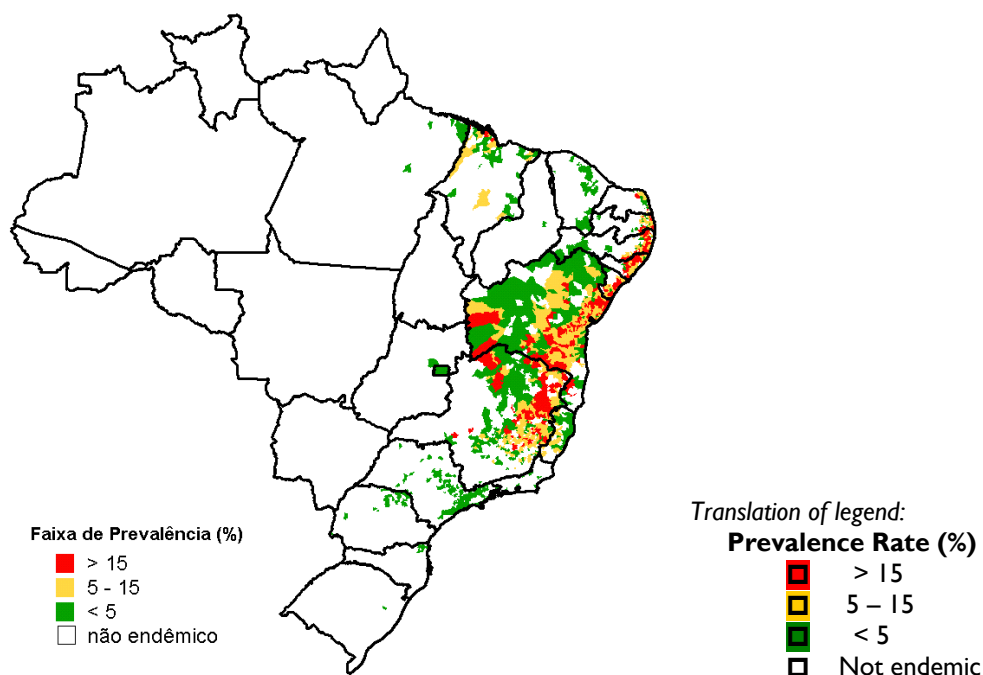
- **Control programs:** National Foundation of Health, Health Ministry of Brazil, acting through the Unified Health System (SUS).
- **Information available:** Yes, from the Ministry of Health and also through WHO's Onchocerciasis Elimination Program for the Americas (OEPA).
- **Primary strategies:** Mass drug administration (MDA) with Mectizan twice a year in affected areas.
- **Information on coverage:** Brazil has been reaching a coverage rate of 85% in treating the risk population over the past few years. In 2007, of the 8,020 people eligible for treatment, coverage reached 91% in the first round of treatment and 94% in the second. Since 2001, Brazil has reached the goal of 2 rounds of coverage above 85% per year in the eligible population.

Schistosomiasis

Epidemiological Situation

- **Number of cases:** 85,893 (2007).
- **Prevalence:** There is a general prevalence rate of 5.63% in endemic states (2007).
- **Population at risk:** Endemic areas in the states of Alagoas, Bahia, Ceará, Espírito Santo, Maranhão, Minas Gerais, Paraíba, Paraná, Pernambuco, Rio Grande do Norte, and Sergipe; foci are present in eight more states.
- **Areas of major risk or focus:** States of Bahia and Minas Gerais.
- **Internal country breakdown:** Present in 19 of the 27 states.

Endemic areas and foci of schistosomiasis, Brazil, 2007.



Source: GT-Esquistossomose /CGVEP/CDTV/CENEPI/FUNASA/MS (National Health Foundation, Ministry of Health of Brazil).

Control Measures

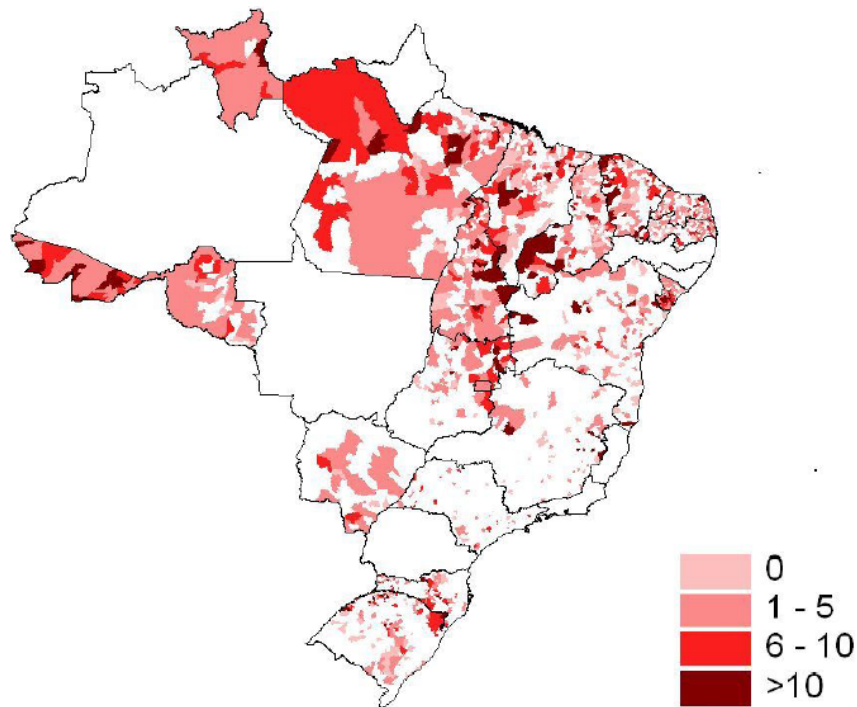
- **Control programs:** *Schistosomiasis mansoni* Control Program (PCE), acting through the Unified Health System (SUS).
- **Information available:** Yes, from the *Schistosomiasis mansoni* Control Program (PCE).
- **Primary strategies:** Medical treatment, investigation of reported cases to detect the source, control of intermediate host, environmental measures, and health education.
- **Information on coverage:** 71,413 cases treated in 2007, which represent 83% of all detected cases.

Trachoma

Epidemiological Situation

- **Population at risk:** A total population of 48, 061,732 people; the population under the age of 10 at risk amounts to 9,323,976 children.
- **Prevalence:** 4.9 % (2002–2007); 8,230 cases were found in 168,125 children tested in major risk areas.
- **Areas of greatest risk:** The Northeast and North show a greater number of municipalities with higher prevalence rates, but all regions present an average prevalence of between 3.8% and 5.4% in school-age children in major risk areas.
- **Internal breakdown:** A national survey was carried out between 2002 and 2007; only for the state of Amazonas was data not available. Within the 26 states surveyed, 10 of them (Acre, Amapá, Ceará, Minas Gerais, Mato Grosso, Pará, Paraná, Santa Catarina, Sergipe, and Tocantins) presented a prevalence rate of 5% or higher, which is considered a public health problem. See map below.

Prevalence of trachoma by municipality: National Survey, Brazil, 2002–2007.



Source: MS/SVS-DEVEP/CGDT/CDTV

Control Measures

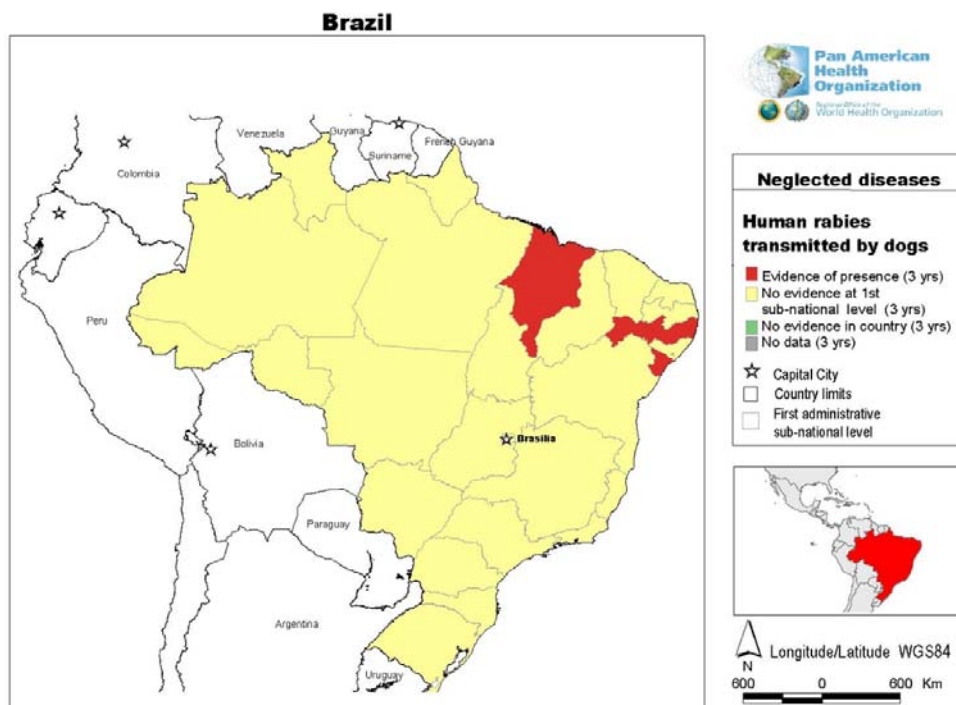
- **Control programs:** National Secretary of Health Surveillance, Ministry of Health of Brazil, acting through the Unified Health System (SUS).
- **Information available:** Yes, from the Ministry of Health of Brazil.
- **Primary strategies:** Surgery is recommended, along with antibiotic treatment, health education (face washing) environmental measures, epidemiological surveillance, and definition of priority intervention areas.
- **Information on coverage:** A search for information is in progress.

Human Rabies Transmitted by Dogs

Epidemiological Situation

- **Number of cases (by state):** 1 case (in Maranhão) in 2007; 6 cases (5 in Maranhão and 1 in Pernambuco) in 2006; 1 case (in Sergipe) in 2005.
- **Population at risk:** About 16 million people who live in an administrative unit at the first subnational level with one or more dog-transmitted human cases in 2005–2007. However, any state where canine rabies is present is considered to be at risk—and this includes a large part of the national territory, with the exception of the Southern region and the states of São Paulo and Rio de Janeiro (which represent 40% of the country's population).
- **Areas of major risk or focus:** The Northeast and the states of Maranhão, Pernambuco and Sergipe. It is also noteworthy that human rabies transmitted by bats is epidemiologically important for the country, mostly in the Amazon region (where 42 human cases occurred in 2005).

Presence of cases of human rabies transmitted by dogs at the first subnational level, Brazil, 2005–2007.



Control Measures

- **Control programs:** National Secretary of Health Surveillance, Health Ministry of Brazil, acting through the Unified Health System (SUS).
- **Information available:** Yes: the country reports any human cases to SIRVERA (the Rabies Epidemiological Surveillance System coordinated by PAHO/PANAFTOSA).
- **Primary strategies:** Mass canine vaccination, free medical care to people at risk (including post-exposure prophylaxis according to WHO guidelines); surveillance and education programs
- **Information on coverage:** Mass canine vaccination around 20 million dogs are vaccinated annually in the years 2003 to 2006 (88% of average coverage), free medical care to around 400,000 people at risk (around 270 received post-exposure prophylaxis / PEP); surveillance (38 laboratories and around 23,000 samples tested).

Soil-Transmitted Helminths

Epidemiological Situation

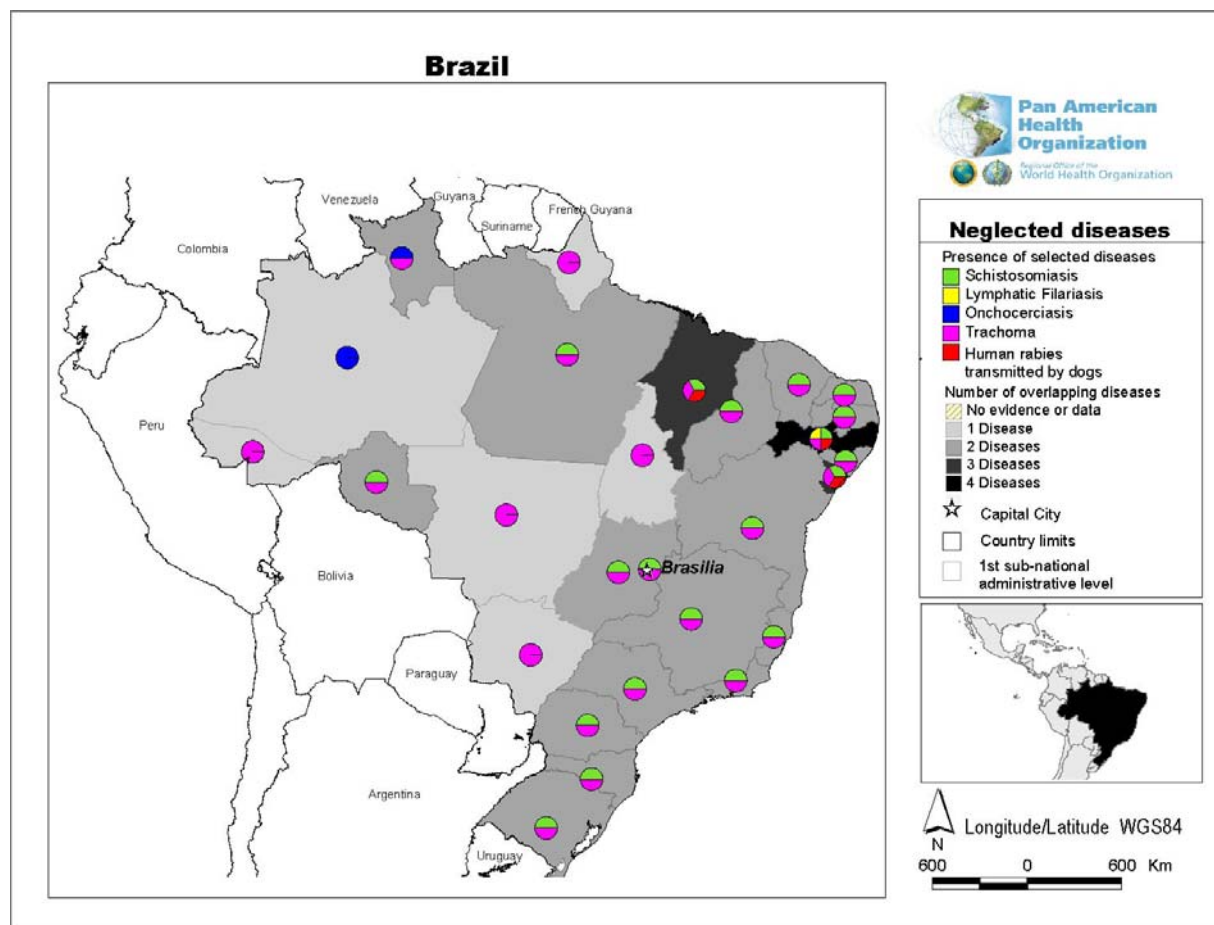
- **Prevalence:** The Schistosomiasis Control Program has developed studies on the prevalence of soil-transmitted helminths in many states, covering a broad number of people surveyed. Estimates from studies developed between 2005 and 2007 show a broad range of prevalence (2% to 36%).
- **Population at risk:** An estimated population of 8.2 million school-age children
- **Areas of major risk:** Available studies show that prevalence is higher in the Northeast.

Control Measures

- **Control programs:** Ministry of Health/Secretary of Health Surveillance, coordinated action by the *Schistosomiasis mansoni* Control Program (PCE), acting through the Unified Health System (SUS). Other control actions are probably being undertaken by different levels of the SUS.
- **Information available:** Yes, for the states where schistosomiasis is present.
- **Primary strategies:** Selective drug administration with Mebendazole, environmental measures, and health education.
- **Information on coverage:** In 2005, 14,100,000 cases were treated.

Overlapping Diseases

Overlapping diseases present in the country at first subnational level, Brazil.



Source: PAHO.

Comments

- All the selected diseases are present in Brazil.
- There is one state where four of five selected diseases are present (Pernambuco).
- There are two other states where three of five selected diseases are present (Maranhão and Sergipe). These three states are considered priority areas for intervention (hot spots).
- There are five states where only trachoma of the selected diseases is present.
- Trachoma is the disease between the analyzed most present, was found with different prevalence in all states surveyed.
- Schistosomiasis is present in 19 of the 27 states.
- Lymphatic filariasis (in 1 state), onchocerciasis (in 2 states in border areas adjacent to Venezuela, Colombia, and Peru), and human rabies transmitted by dogs (in 3 states) were present in only a few states in 2005–2007, suggesting that they are very close to the elimination goal.

Colombia



Core Data

Demographic Indicators	Data	Year
▪ Total Population (thousands):	46,156	2007
▪ Urban Population (%):	73.3	2007
▪ Life Expectancy at Birth (years) total:	72.9	2007
▪ Men	69.2	2007
▪ Women	76.6	2007

Socioeconomic Indicators

▪ Literate Population (15+ years old) (%) total:	90.4	1999-2005
▪ Men	90.1	1999-2005
▪ Women	90.7	1999-2005
▪ Gross National Income (US\$ per capita) PPP value:	7,420	2005
▪ Population Below International Poverty Line (%):	7.0	1998-2004
▪ Population Using Improved Sources of Drinking Water (%) total:	93	2004
▪ Population Using Improved Sanitation Facilities (%) total:	86	2004

Mortality Indicators

▪ Infant Mortality Rate (per 1,000 live births):	15.9	2005
▪ Mortality Rate from Communicable Diseases (per 100,000 pop.):	50.4	2000-2004
▪ Ill-Defined and Unknown Causes (%):	1.7	2005

Selected Diseases Present in the Country

<i>Analyzed at First Subnational Level</i>		<i>Analyzed at Country Level</i>	
▪ Lymphatic Filariasis		▪ Soil-Transmitted Helminths	✓
▪ Onchocerciasis	✓	▪ Chagas Disease	✓
▪ Schistosomiasis		▪ Leprosy*	
▪ Trachoma		▪ Neonatal Tetanus*	
▪ Human Rabies Transmitted by Dogs	✓	▪ Congenital Syphilis	✓

*Present but not as a public health problem

Current Situation of the Disease

Onchocerciasis

Epidemiological Situation

- **Population at Risk:** 1,225 (2007)
- **Number of Cases:** 0 (2006)
- **Prevalence:** 0% prevalence of microfilaria in the anterior chamber of the eye (MfCA) (2006)
- **Areas of major risk or focus:** The municipality of López de Micay, in the department of Cauca.
- **Internal country breakdown:** See map below.

Presence of onchocerciasis, by first subnational level, Colombia, 2005–2007.



Source: OEPA.

Control Measures

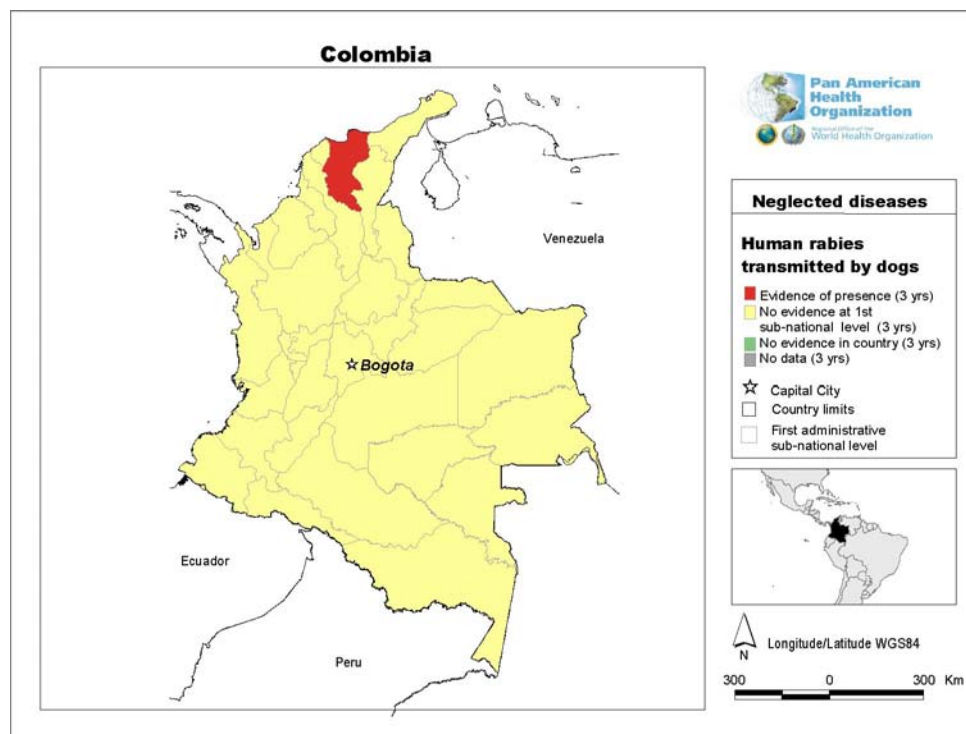
- **Control measures:** Carried out by the Ministry of Social Protection and the National Institute of Health (INS).
- **Information available:** Yes, from the Ministry of Social Protection and also through the Onchocerciasis Elimination Program for the Americas (OEPA).
- **Primary strategies:** Mass drug administration with Mectizan twice a year in affected areas.
- **Information about coverage:** Colombia has been reaching a coverage rate of around 95% in treating the risk population over the past few years in the two annually rounds. In 2007 around 1,000 people received treatment, treatment. Since 1999, Colombia has reached the goal of two rounds of treatment coverage with a rate of over 85% per year among the eligible population.

Human Rabies Transmitted by Dogs

Epidemiological Situation

- **Number of Cases:** 2007 – 2 (Magdalena); 2006 – 2 (Magdalena); 2005 – 0.
- **Population at risk:** About 1.3 million people in the department of Magdalena, living in an administrative unit at the first subnational level with one or more cases in 2005–2007.
- **Areas of major risk or focus:** The Atlantic coast, especially in the department of Magdalena. It is also noteworthy that human rabies transmitted by bats is epidemiologically important for the country, mostly on the Pacific coast (where 17 human cases occurred in 2004).

Presence of cases of human rabies transmitted by dogs at the first subnational level, Colombia, 2005–2007.



Source: PAHO/HSD/CD based on SIRVERA, PAHO, 2008.

Control Measures

- **Control programs:** Carried out by the Ministry of Social Protection.
- **Information available:** The country reports any human cases to SIRVERA (the Rabies Epidemiological Surveillance System coordinated by PAHO/PANAFTOSA). Also canine surveillance is in place.
- **Primary Strategies:** Vaccination of the canine population in the risk areas; post-exposure prophylaxis (PEP) provided to the population exposed to (or at risk of contracting) rabies; surveillance system; education/information/communication (IEC) campaigns to raise awareness about the risks of the disease.
- **Information on coverage:** Canine vaccination campaigns take place only in risk areas, with an average annual coverage below 50%; nationwide, around 28,000 people seek medical attention after a dog bite, around 8,000 received PEP; the country has 9 surveillance laboratories.

Soil-Transmitted Helminths

Epidemiological Situation

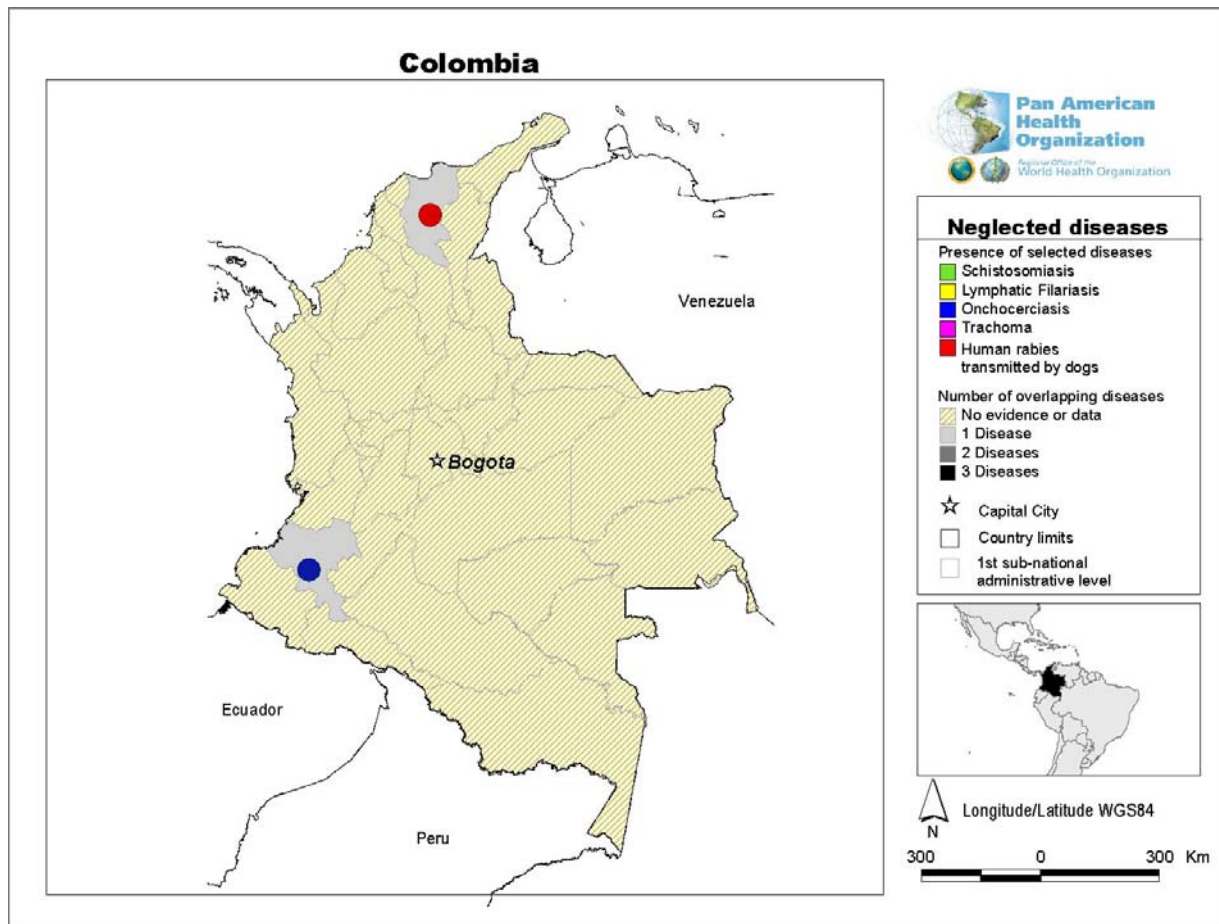
- **Prevalence:** Present in all first subnational levels. Prevalence studies with information available for the last 10 years suggest a range from 10.7% to 49.3%. The available data suggest that one of the high risk areas is the ecological zone of the Colombian Amazon where the prevalence in school-age children is around 50%.
- **Population at risk:** An estimated population of 1.4 million school-age children
- **Areas of major risk or focus:** Not known.
- **Internal country breakdown:** Present throughout the entire country.

Control Measures

- **Control programs:** National program under consideration; municipal-level programs by MetroSalud, Medellín; Global Humanitaria, Nariño; and Operation Blessing International, Cartagena.
- **Information available:** Surveys from the National Institute of Health (INS), the National University of Colombia (*Universidad Nacional de Colombia*), and the University of Antioquia (*Universidad de Antioquia*).
- **Primary strategies:** Treatment with Albendazole and Mebendazole.
- **Information on coverage:** Up to September 2008, 423,200 school-age children were treated.

Overlapping Diseases

Overlapping diseases present in the country at the first subnational level, Colombia.



Source: PAHO.

Comments

- No overlapping diseases: in one department onchocerciasis is present; and in another, human rabies transmitted by dogs.
- This localized distribution could suggest that these two neglected diseases are on the country's unfinished agenda.
- There could be an information gap for other diseases, e.g. trachoma.

Dominican Republic



Core Data

Demographic Indicators

	Data	Year
▪ Total Population (thousands):	9,760	2007
▪ Urban Population (%):	68.2	2007
▪ Life Expectancy at Birth (years) total:	72.2	2007
▪ Men	69.3	2007
▪ Women	75.5	2007

Socioeconomic Indicators

▪ Literate Population (15+ years old) (%) total:	87.0	1999–2005
▪ Men	86.8	1999–2005
▪ Women	87.2	1999–2005
▪ Gross National Income (US\$ per capita) PPP value:	7,150	2005
▪ Population Below International Poverty Line (%):	2.8	1998–2004
▪ Population Using Improved Sources of Drinking Water (%) total:	95	2004
▪ Population Using Improved Sanitation Facilities (%) total:	78	2004

Mortality Indicators

▪ Infant Mortality Rate (per 1,000 live births):	30.6	2006
▪ Mortality Rate from Communicable Diseases (per 100,000 pop.):	85.3	2000–2004
▪ Ill-Defined and Unknown Causes (%):	7.2	2004

Selected Diseases Present in the Country

<i>Analyzed at First Subnational Level</i>		<i>Analyzed at Country Level</i>	
▪ Lymphatic Filariasis	✓	▪ Soil-Transmitted Helminths	✓
▪ Onchocerciasis		▪ Chagas Disease	
▪ Schistosomiasis		▪ Leprosy*	
▪ Trachoma		▪ Neonatal Tetanus*	
▪ Human Rabies Transmitted by Dogs		▪ Congenital Syphilis	✓

*Present but not as a public health problem.

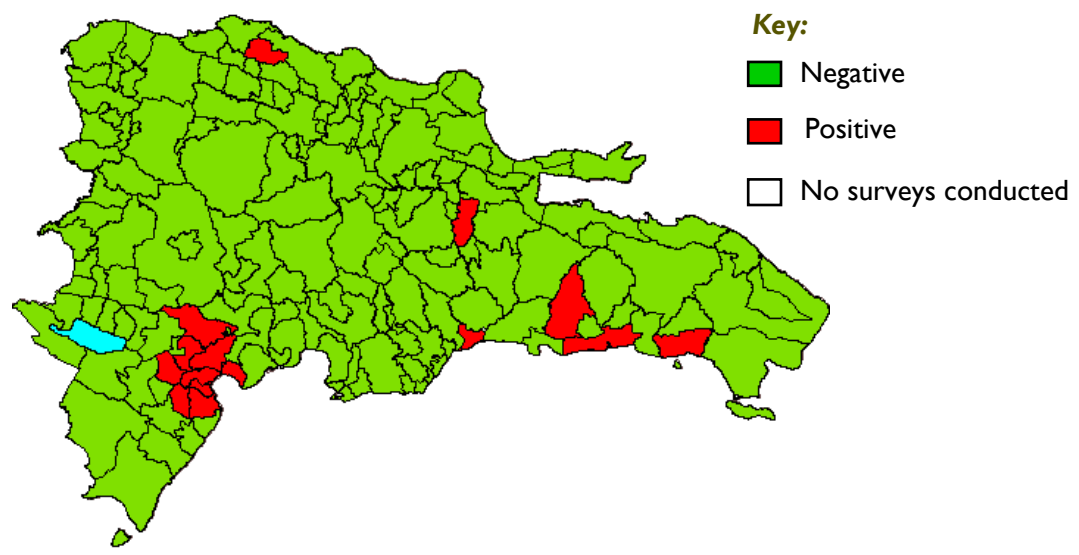
Current Situation of the Disease

Lymphatic Filariasis

Epidemiological Situation

- **Population at risk:** 107,485 people.
- **Prevalence:** An estimated 50,000 individuals are infected. Recent studies have found prevalence rates for blood surveys ranging from 2% and 14%, with rates of 9% and 35% using rapid immunochromatographic card tests.
- **Areas of major risk or focus:** The provinces of Puerto Plata, Sánchez Ramírez, San Pedro de Macorís, and La Altagracia.

National situation of lymphatic filariasis at the municipal level based on surveys, Dominican Republic, 2008.



Source: Centro Nacional de Enfermedades Tropicales de República Dominicana (CENCET), "LF elimination in the Dominican Republic: History, Progress and Achievements." *Octava Reunion de Administradores de Programas de Eliminación de Filariasis Linfática*. Dominican Republic; 2008.

Control Measures

- **Control programs:** Carried out by the Secretary of Public Health and Social Assistance, National Program for the Elimination of Lymphatic Filariasis in collaboration with the National Institute of Dermatology.
- **Primary strategies:** Mass drug administration with DEC/Albendazole.
- **Information on coverage:** Around 70%–85% of all risk areas.

Soil-Transmitted Helminths

Epidemiological Situation

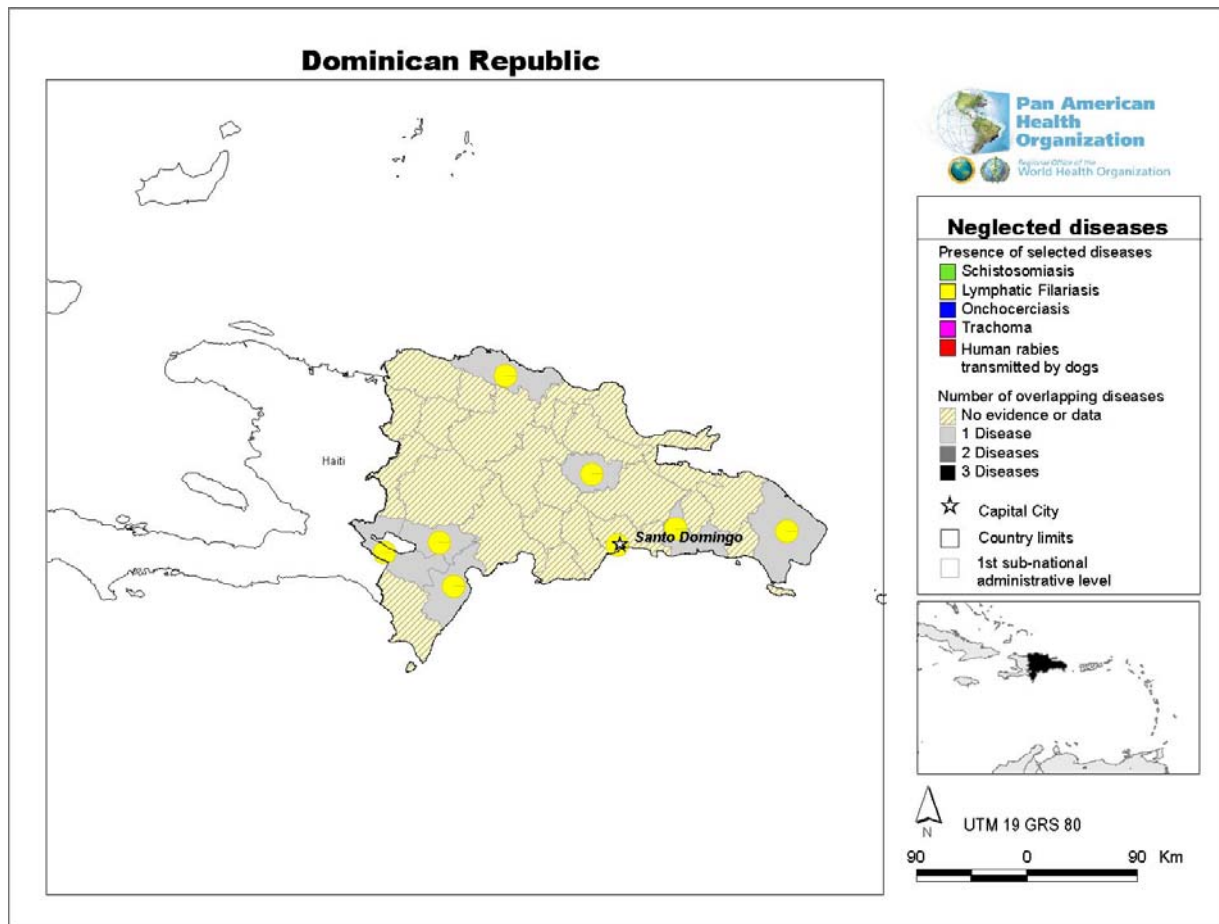
- **Prevalence:** Present in all first subnational levels. Prevalence studies with information available for the last 3 years suggest a range from 5.3% to 55.3% in school-age children. The available data suggest that most school-age children at risk live in the poor areas in Santo Domingo where the prevalence is around 50%.
- **Population at risk:** An estimated population of 453 000 school-age children
- **Areas of major risk or focus:** Not known.
- **Internal country breakdown:** Present throughout the entire country.

Control Measures

- **Control programs:** The Secretary of Public Health and Social Assistance, including the *Vitamin Angels* project in Santo Domingo.
- **Information available:** Surveys in different places.
- **Primary strategies:** Mass drug administration with Albendazole.
- **Information on coverage:** In 2006, national coverage was above 75%, thus reaching the objective of World Health Assembly Resolution WHA54.19 (2001).

Overlapping Diseases

Overlapping diseases present in the country at the first subnational level,
Dominican Republic.



Source: PAHO.

Comments

- Lymphatic filariasis is present in one-third of all first subnational levels in the Dominican Republic, suggesting that this disease could be priority among the neglected diseases studied.
- There could be an information gap for other diseases, e.g. schistosomiasis.

Ecuador



Core Data

Demographic Indicators

	Data	Year
▪ Total Population (thousands):	13,341	2007
▪ Urban Population (%):	63.8	2007
▪ Life Expectancy at Birth (years) total:	75	2007
▪ Men	72.1	2007
▪ Women	78	2007

Socioeconomic Indicators

▪ Literate Population (15+ years old) (%) total:	91	1999-2005
▪ Men	92.3	1999-2005
▪ Women	89.7	1999-2005
▪ Gross National Income (US\$ per capita) PPP value:	4,070	2005
▪ Population Below International Poverty Line (%):	17.7	1998-2004
▪ Population Using Improved Sources of Drinking Water (%) total:	94	2004
▪ Population Using Improved Sanitation Facilities (%) total:	89	2004

Mortality Indicators

▪ Infant Mortality Rate (per 1,000 live births):	22.1	2005
▪ Mortality Rate from Communicable Diseases (per 100,000 pop.):	65.4	2000-2004
▪ Ill-Defined and Unknown Causes (%):	12	2005

Selected Diseases Present in the Country

<i>Analyzed at First Subnational Level</i>		<i>Analyzed at Country Level</i>	
▪ Lymphatic Filariasis		▪ Soil-Transmitted Helminths	✓
▪ Onchocerciasis	✓	▪ Chagas Disease	✓
▪ Schistosomiasis		▪ Leprosy*	
▪ Trachoma		▪ Neonatal Tetanus*	
▪ Human Rabies Transmitted by Dogs		▪ Congenital Syphilis	✓

*Present but not as a public health problem

Current Situation of the Disease

Onchocerciasis

Epidemiological Situation

- **Population at risk:** 25, 285 persons (in 2007).
- **Number of cases:** 0 (in 2006).
- **Prevalence:** 0% (in 2006).
- **Areas of major risk or focus:** Province of Esmeraldas
- **Internal country breakdown:** See map below.

Onchocerciasis-endemic area, Ecuador, 2008.



Source: OEPA..

Control Measures

- **Control programs:** Carried out by the Ministry of Health.
- **Principle strategies:** Mass drug administration twice a year in the affected municipalities.
- **Information on coverage:** Average coverage of around 98% in the two rounds; 21,000 people treated annually. Since 2001, the country has achieved the goal of 85% coverage measured twice a year.

Soil-Transmitted Helminths

Epidemiological Situation

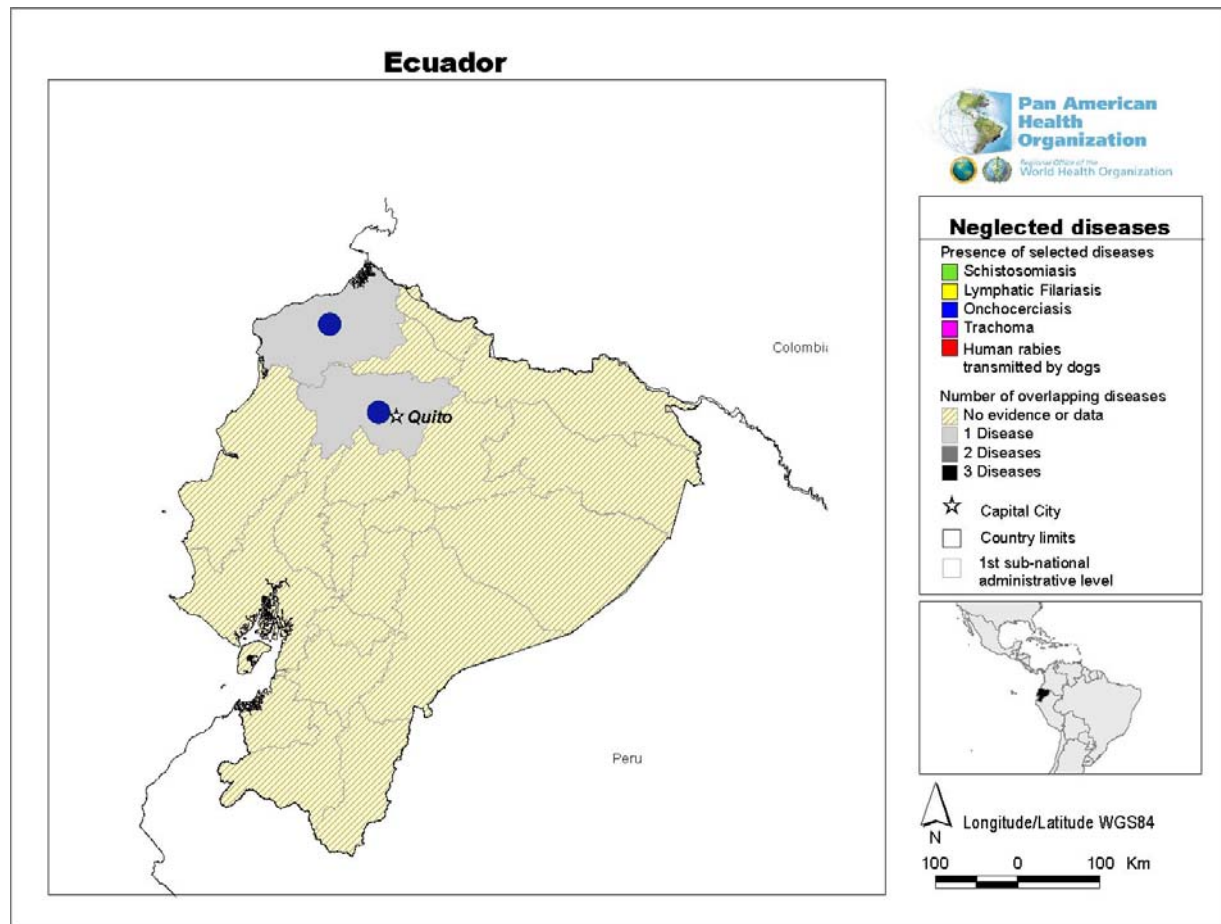
- **Prevalence:** Present at all first subnational levels. Studies have been carried out, mostly on school-age children, with information available for the past 8 years, suggesting a prevalence ranging from 28.5% to 71%.
- **Population at risk:** An estimated population of 300 000 school-age children
- **Areas of major risk or focus:** Unknown.
- **Internal country breakdown:** Present throughout the entire country.

Control Measures

- **Control programs:** National Institute for the Family and Child (INNFA).
- **Information available:** Surveys in different places.
- **Primary strategies:** Mass drug administration with Albendazole.
- **Information on coverage:** In 2006, national coverage was above 75%, thus reaching the objective of World Health Assembly Resolution WHA54.19 (2001).

Overlapping Diseases

Overlapping diseases present in the country at the first subnational level, Ecuador.



Source: PAHO.

Comments

- Onchocerciasis is present in two bordering Ecuadorian departments, the northernmost of which shares an international border with Colombia.
- Analysis of the information available could suggest that this neglected disease is on the country's unfinished agenda.
- There could be an information gap for other diseases, e.g. trachoma.

Guatemala



Core Data

Demographic Indicators

	Data	Year
▪ Total Population (thousands):	13,354	2007
▪ Urban Population (%):	48.1	2007
▪ Life Expectancy at Birth (years) total:	70.3	2007
▪ Men	66.7	2007
▪ Women	73.8	2007

Socioeconomic Indicators

▪ Literate Population (15+ years old) (%) total:	69.1	1999–2005
▪ Men	75.4	1999–2005
▪ Women	63.3	1999–2005
▪ Gross National Income (US\$ per capita) PPP value:	4,410	2005
▪ Population Below International Poverty Line (%):	13.5	1998–2004
▪ Population Using Improved Sources of Drinking Water (%) total:	75	2004
▪ Population Using Improved Sanitation Facilities (%) total:	47	2004

Mortality Indicators

▪ Infant Mortality Rate (per 1,000 live births):	39	1997–2002
▪ Mortality Rate from Communicable Diseases (per 100,000 pop.):	150.9	2000–2004
▪ Ill-Defined and Unknown Causes (%):	10.4	2004

Selected Diseases Present in the Country

<i>Analyzed at First Subnational Level</i>		<i>Analyzed at Country Level</i>	
▪ Lymphatic Filariasis		▪ Soil-Transmitted Helminths	✓
▪ Onchocerciasis	✓	▪ Chagas Disease	✓
▪ Schistosomiasis		▪ Leprosy*	
▪ Trachoma	✓	▪ Neonatal Tetanus*	
▪ Human Rabies Transmitted by Dogs	✓	▪ Congenital Syphilis	✓

*Present but not as a public health problem.

Current Situation of the Disease

Onchocerciasis

Epidemiological Situation

- **Population at risk:** 204,253
- **Prevalence:** 0.4% prevalence of ocular morbidity in the focus of Central, and 0% in the foci of Escuintla, Huehuetenango and Santa Rosa (2007).
- **Areas of major risk or focus:** The primary focus is located in the border zones between the departments of Chimaltenango, Sololá and Suchitepéquez.
- **Internal country breakdown:** See map below.

Onchocerciasis Endemic Areas, Guatemala, 2008.



Source: OEPA.

Control Measures

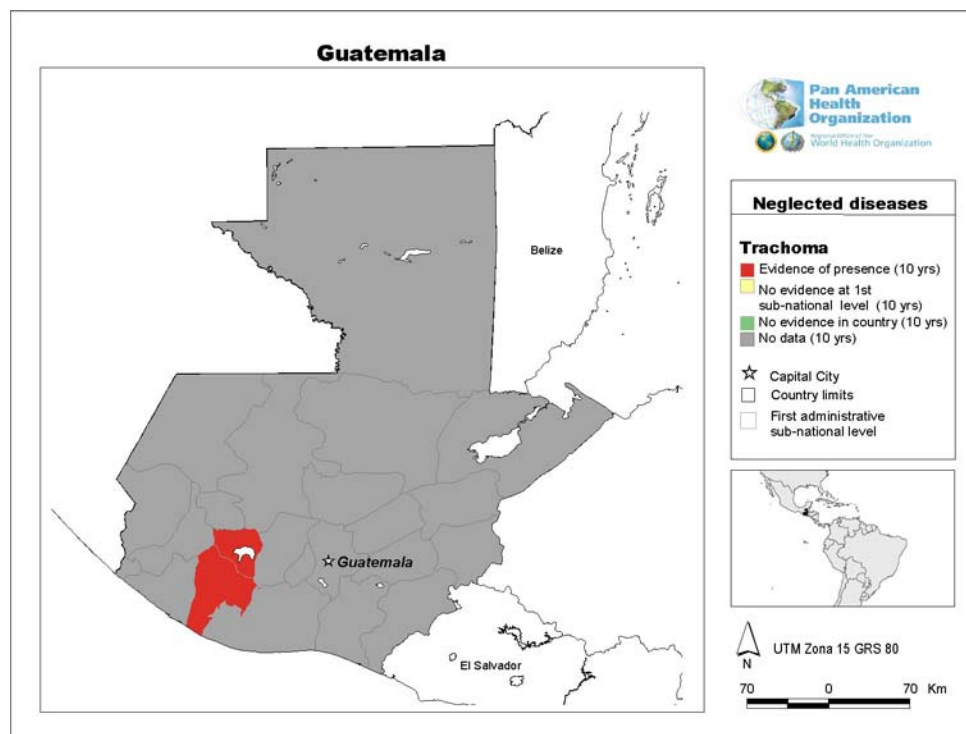
- **Control measures:** The National Onchocerciasis Program.
- **Information available:** Yes, from National Onchocerciasis Program of the Ministry of Health and from the Onchocerciasis Elimination Program for the Americas (OEPA).
- **Primary strategies:** Mass drug administration with Mectizan twice a year in endemic municipalities.
- **Information on coverage:** The coverage rate stands at about 94% over the last 3 years (2005–2007); around 160,000 people have been treated in each round.

Trachoma

Epidemiological Situation

- **Population at risk:** 240,715 people (based on 2003 figures).
- **Number of cases:** In a 2002 study conducted in the state of Sololá, 1,944 cases were found (890 under the age of 8) with trachoma (TF = 1,130; TI = 379; TS = 388; TT = 40; OC = 5).
- **Areas of major risk or focus:** There is information available only for 2 departments, where the disease is known to be present in 92 of the communities of the respective departments.

Presence of trachoma at the first subnational level, Guatemala, 1998–2007.



Source: PAHO/HSD/CD based on Comité prociegos y sordos de Guatemala. *Cuadro de registro de personas con catarata y tracoma por estado, edad y sexo en el área sur-occidental I. 2002.* Unpublished.

Control Measures

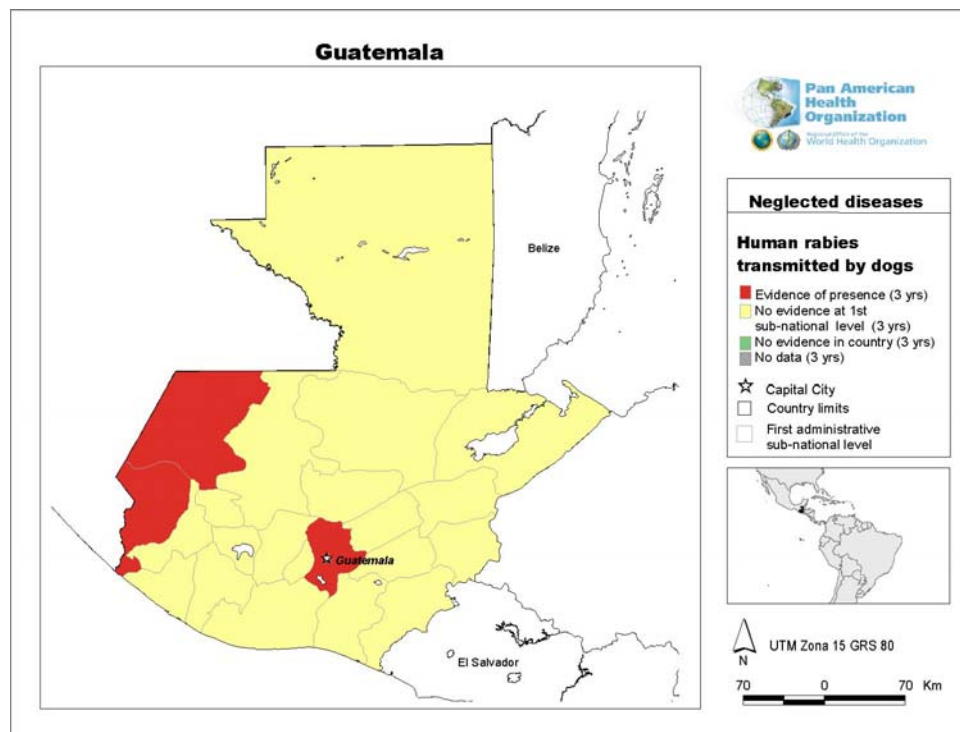
- **Control programs:** The Committee for the Blind and Deaf (*Comité prociegos y sordos de Guatemala*) works in the area under study; for other areas, control measures are unknown.
- **Primary strategies:** Treatment with tetracycline and health education (face washing).
- **Information available:** Only for the project area.
- **Information on coverage:** 7,800 people were examined; 633 cases were detected; 800 tubes of tetracycline were distributed; and 24 educational sessions were held for 1,645 people.

Human Rabies Transmitted by Dogs

Epidemiological Situation

- **Number of cases:** In 2007, 1 case (in the municipality of San Marcos); in 2006, 1 case (in the department and/or municipality of Huehuetenango); in 2005, 1 case (in Guatemala City)
- **Population at risk:** About 4.5 million people (indicating the population living in an administrative unit at the first subnational level with one or more cases in 2005–2007).
- **Areas of major risk or focus:** San Marcos, Huehuetenango, and Guatemala City.
- **Internal country breakdown:** See map below.

Presence of human rabies transmitted by dogs at the first subnational level, Guatemala, 2005–2007.



Source: PAHO/HSD/CD based on SIRVERA, PAHO, 2008.

Control Measures

- **Control programs:** Under the Ministry of Health.
- **Primary strategies:** Canine vaccination, post-exposure prophylaxis (PEP) for people at risk, surveillance, and health education.
- **Information available:** Yes; the country reports any human cases to SIRVERA (the Rabies Epidemiological Surveillance System coordinated by PAHO/PANAFTOSA).
- **Information on coverage:** Canine vaccination stood at a rate of 71.4% in 2003. In the same year, 21.6% of all people attacked by animals and thus at risk for rabies received medical attention. In 2004, Guatemala had one health center with anti-rabies treatment for every 8,711 people. From 2005–2007, the country continued to such control activities as annual mass vaccination and PEP for people at risk.

Soil-Transmitted Helminths

Epidemiological Situation

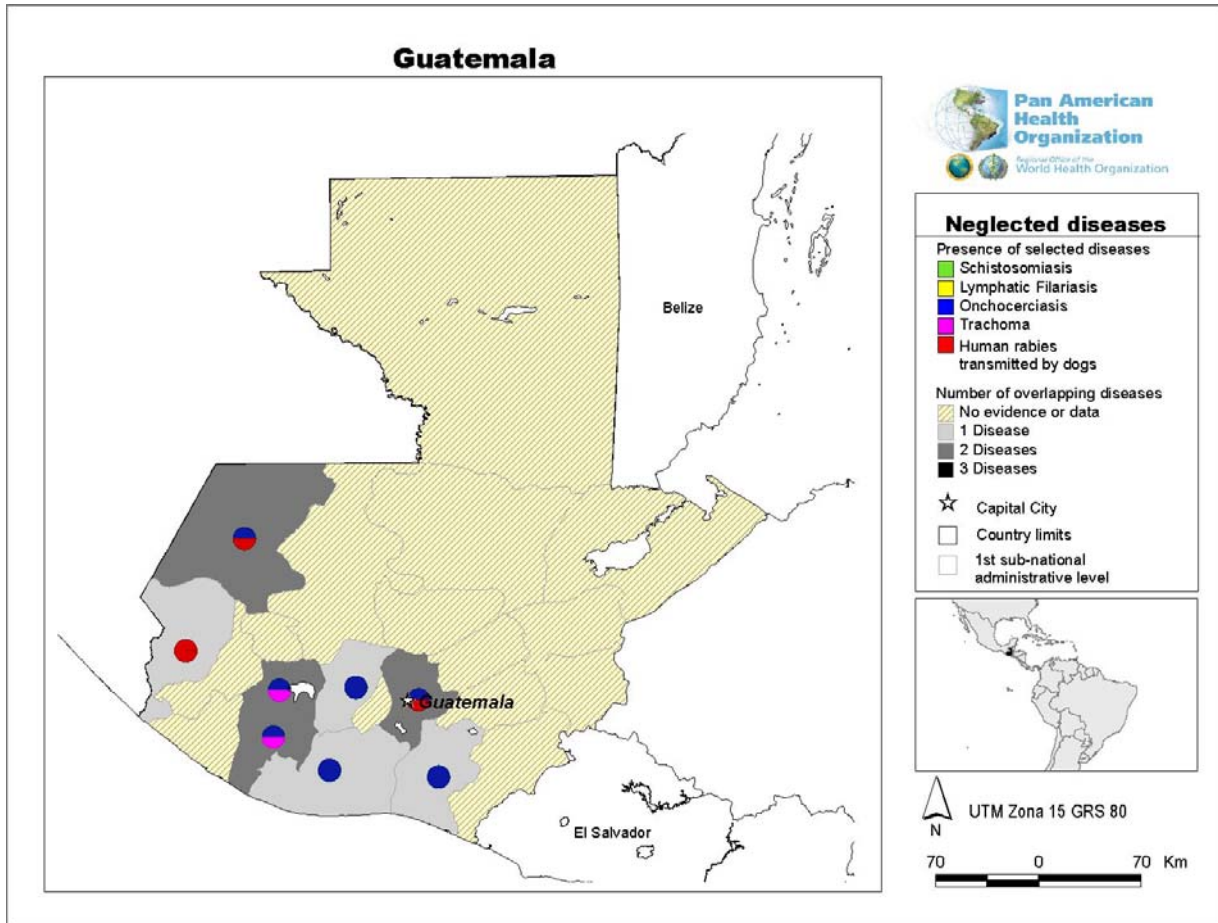
- **Prevalence:** STHs are present at all first subnational levels. Studies carried out mostly on school-age children with information available for the last 8 years suggest a prevalence ranging from 12.7% to 68%.
- **Population at risk:** An estimated population of 1.3 million school-age children
- **Areas of major risk or focus:** Unknown.
- **Internal country breakdown:** Present throughout the entire country.

Control Measures

- **Control programs:** The Government of Guatemala with the World Food Program, Operation Blessing International, Food for the Hungry, WOW Now, and Direct Relief International.
- **Information available:** Surveys in different places.
- **Primary strategies:** Treatment with Albendazole and Mebendazole.
- **Information on coverage:** In 2006, national coverage for school-age children stood at 64%.

Overlapping Diseases

Overlapping diseases present in the country at the first subnational level, Guatemala.



Comments

- Three of the five selected neglected diseases analyzed in this study are present in Guatemala (onchocerciasis, trachoma, and human rabies transmitted by dogs).
- Onchocerciasis overlaps with rabies transmitted by dogs in two departments; and onchocerciasis overlaps with trachoma in two others.
- There could be an information gap for other first subnational levels regarding the presence of trachoma.

Guyana



Core Data

Demographic Indicators	Data	Year
▪ Total Population (thousands):	738	2007
▪ Urban Population (%):	28.3	2007
▪ Life Expectancy at Birth (years) total:	66.8	2007
▪ Men	64.2	2007
▪ Women	69.9	2007

Socioeconomic Indicators

▪ Literate Population (15+ years old) (%) total:	...	...
▪ Men	...	...
▪ Women	...	...
▪ Gross National Income (US\$ per <i>capita</i>) PPP value:	4,230	2005
▪ Population Below International Poverty Line (%):	...	...
▪ Population Below International Poverty Line (%):	83	2004
▪ Population Using Improved Sanitation Facilities (%) total:	70	2004

Mortality Indicators

▪ Infant Mortality Rate (per 1,000 live births):	22	2005
▪ Mortality Rate from Communicable Diseases (per 100,000 pop.):	136.2	2000–2004
▪ Ill-Defined and Unknown Causes (%):	1.2	2003

Selected Diseases Present in the Country

<i>Analyzed at First Subnational Level</i>		<i>Analyzed at Country Level</i>	
▪ Lymphatic Filariasis	✓	▪ Soil-Transmitted Helminths	✓
▪ Onchocerciasis		▪ Chagas Disease	✓
▪ Schistosomiasis		▪ Leprosy*	
▪ Trachoma		▪ Neonatal Tetanus	
▪ Human Rabies Transmitted by Dogs		▪ Congenital Syphilis	✓

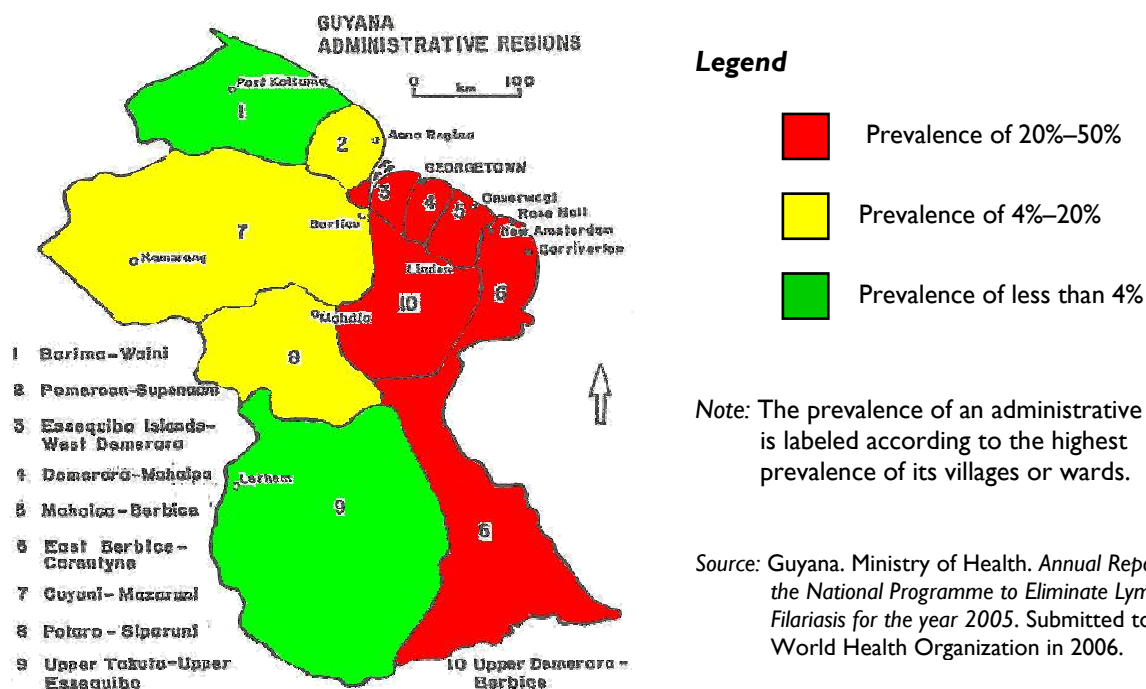
Current Situation of the Disease

Lymphatic Filariasis

Epidemiological Situation

- **Population at risk:** 630, 000 (based on 2007 figures)
- **Number of cases:** 419 new cases reported in 2007; the annual report estimates that a total of 8,126 people suffer from lymphedema or hydrocele in the country because of lymphatic filariasis (LF).
- **Prevalence:** The Program for the Elimination of Lymphatic Filariasis (PELF) tested 2,325 people (out of a total population of 709,506 in Guyana) in 63 wards/villages, of which 9.33% were found to have LF. The survey was carried out in 2005.
- **Areas of major risk or focus:** Essequibo Coast, West Demerara, East Demerara, West Berbice, East Berbice, and Upper Demerara.

Serology prevalence of lymphatic filariasis antigen, Guyana, 2005.



Control Measures

- **Control programs:** Lymphatic Filariasis Elimination Program, Department of Disease Control, Ministry of Health.
- **Primary strategies:** Training physicians to combat LF and establishing and maintaining treatment centers around the country (there are currently 23 active centers).
- **Information available:** Yes, through the Ministry of Health and the Program to Eliminate Lymphatic Filariasis (PELF).
- **Information on coverage:** Not found.

Soil-Transmitted Helminths

Epidemiological Situation

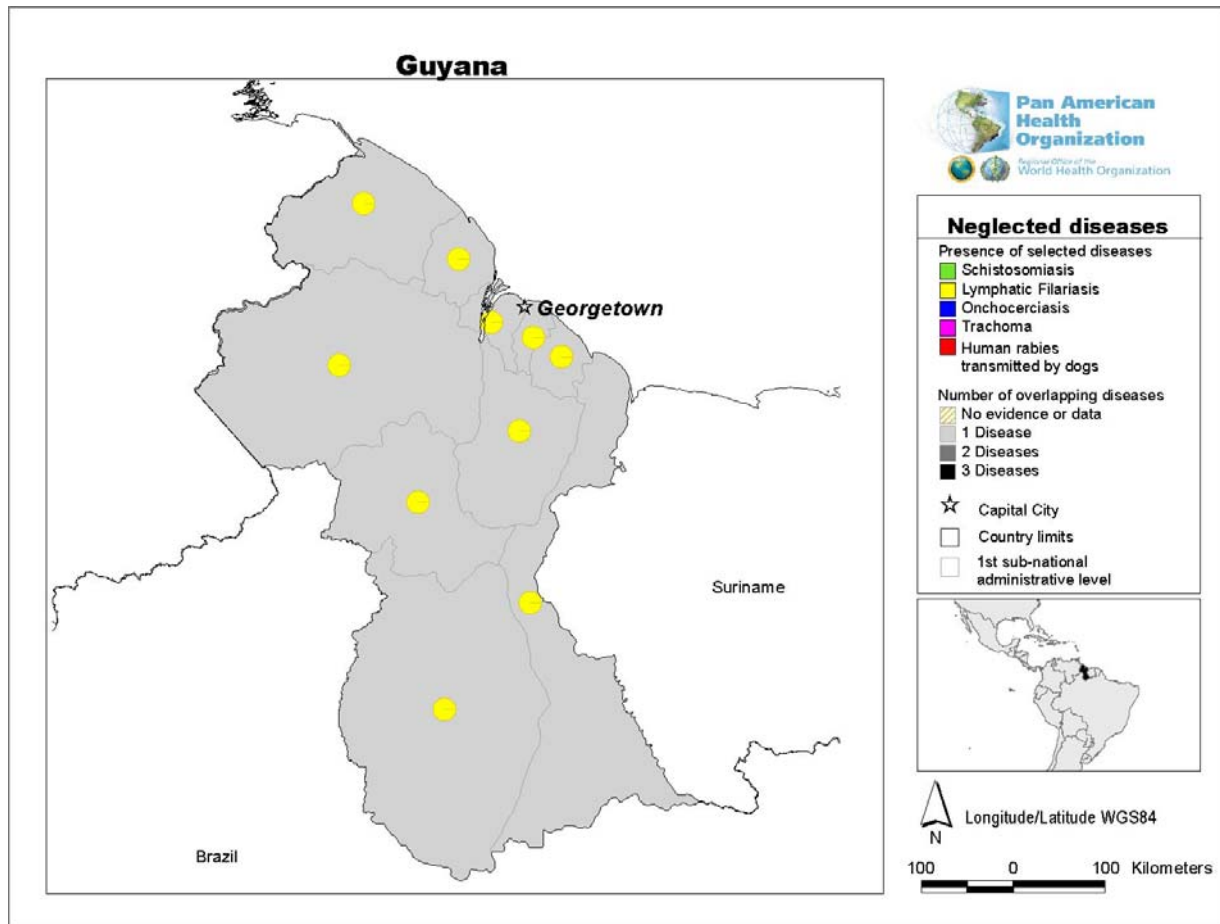
- **Prevalence:** Present at all first subnational levels. Studies carried out mostly in school-age children with information available for the past 10 years suggest a prevalence ranging from 12.3% to 38%.
- **Population at risk:** All school-age children, amounting to a population of around 52,000 in 2007
- **Areas of major risk or focus:** Unknown.
- **Internal country breakdown:** Present throughout the entire country.

Control Measures

- **Control programs:** Ministry of Health, Program for Elimination of Lymphatic Filariasis (PELF), Save the Children.
- **Information available:** Surveys in different places.
- **Primary strategies:** Mass drug administration with Albendazole and Mebendazole.
- **Information on coverage:** In 2005, national coverage of school-age children stood at 68%

Overlapping Diseases

Overlapping diseases present in the country at the first subnational level, Guyana.



Source: PAHO.

Comments

- Lymphatic Filariasis is present at all first subnational levels in Guyana, suggesting that this disease could be priority among the neglected diseases studied.
- There could be an information gap for other diseases, e.g. schistosomiasis.

Haiti



Core Data

Demographic Indicators

	Data	Year
▪ Total Population (thousands):	9,598	2007
▪ Urban Population (%):	40.1	2007
▪ Life Expectancy at Birth (years) total:	60.9	2007
▪ Men	59.1	2007
▪ Women	62.8	2007

Socioeconomic Indicators

▪ Literate Population (15+ years old) (%) total:	55.6	2006
▪ Men	57.2	2006
▪ Women	54.1	2006
▪ Gross National Income (US\$ per capita) PPP value:	1,840	2005
▪ Population Below International Poverty Line (%):	53.9	1998–2004
▪ Population Using Improved Sources of Drinking Water (%) total:	54	2004
▪ Population Using Improved Sanitation Facilities (%) total:	30	2004

Mortality Indicators

▪ Infant Mortality Rate (per 1,000 live births):	57.0	2005–2006
▪ Mortality Rate from Communicable Diseases (per 100,000 pop.):	386.0	2000–2004
▪ Ill-Defined and Unknown Causes (%):	35.2	2004

Selected Diseases Present in the Country

<i>Analyzed at First Subnational Level</i>		<i>Analyzed at Country Level</i>	
▪ Lymphatic Filariasis	✓	▪ Soil-Transmitted Helminths	✓
▪ Onchocerciasis		▪ Chagas Disease	
▪ Schistosomiasis		▪ Leprosy*	
▪ Trachoma		▪ Neonatal Tetanus	✓
▪ Human Rabies Transmitted by Dogs	✓	▪ Congenital Syphilis	✓

*Present but not as a public health problem.

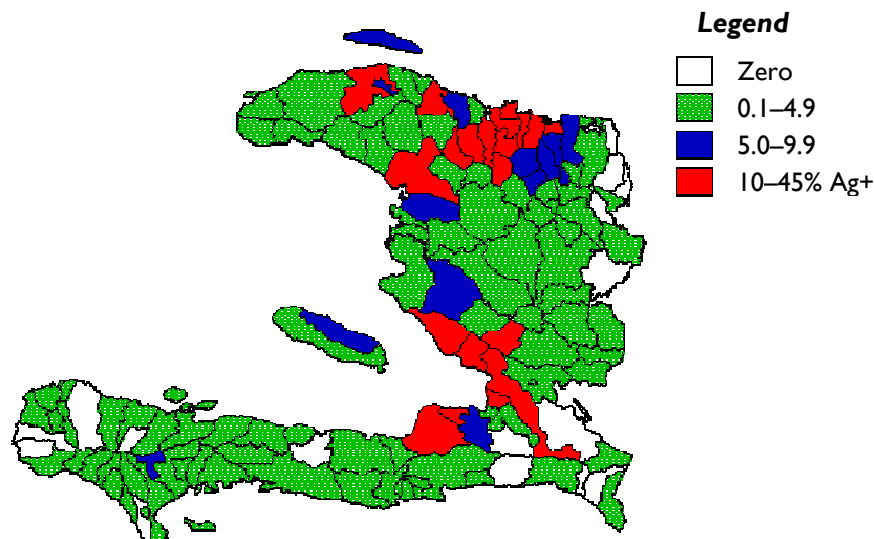
Current Situation of the Disease

Lymphatic Filariasis

Epidemiological Situation

- **Population at Risk:** 9, 598, 000 persons.
- **Prevalence:** Not available. Estimated percent of the population infected is around 5.8%.
- **Internal country breakdown:** The disease is present at all first subnational levels. Of the 128 communities in the country (i.e. second subnational level), 111 are considered endemic, representing 92% of the country's population.
- **Areas of major risk or foci:** There are 33 communities identified as having a very high level of transmission (with a prevalence of 5% or higher), mostly in the departments of Nord and Ouest.

Distribution of lymphatic filariasis, Haiti, 2001.



Source: Annual Report of the National Program to Eliminate Lymphatic Filariasis, 2008.

Control Measures

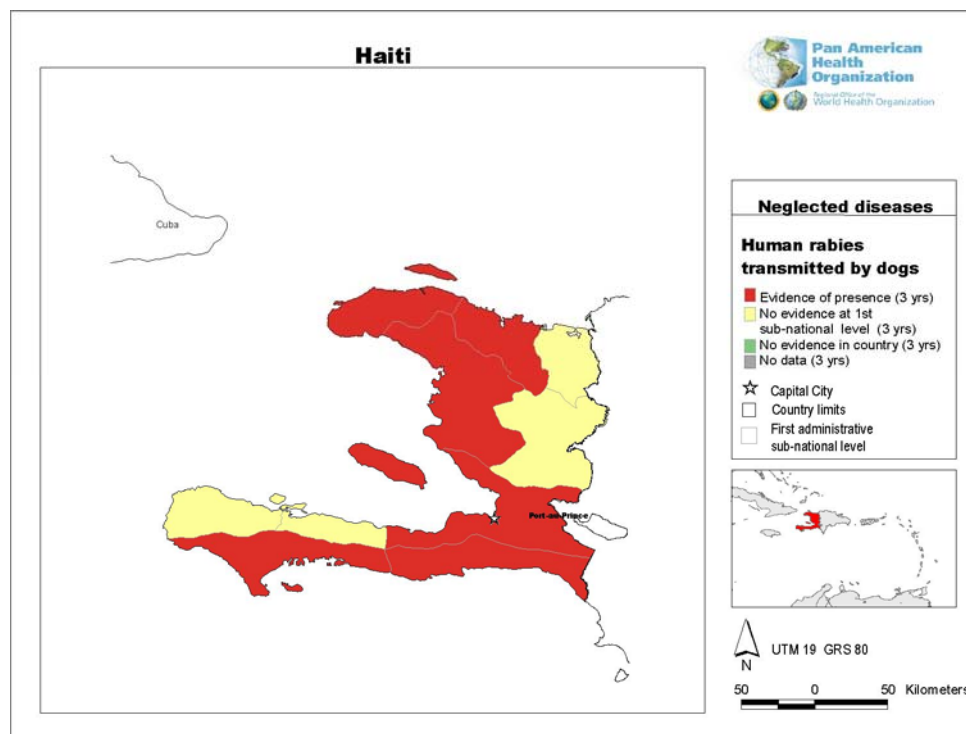
- **Control programs:** Program for the Elimination of Lymphatic Filariasis, Ministry of Public Health and Population; support from the Bill and Melinda Gates Foundation and the USAID Neglected Tropical Diseases (NTD) Program.
- **Information available:** Yes, from the Ministry of Public Health and Population and PELF.
- **Primary strategies:** One annual dose of chemotherapy with DEC and Albendazole using a clinic or community approach; sentinel surveillance; social mobilization; morbidity management.
- **Target population for intervention:** 1,800,000 persons in 2007–2008.
- **Information on coverage:** 61% of the target population (some 1,300,000 people) in 2007.

Human Rabies Transmitted by Dogs

Epidemiological Situation

- **Number of human cases:** Haiti has reported the highest number of human rabies cases transmitted by dogs in Latin America during the last 3 years (with 18 of the 59 reported), for a disease close to elimination in the Region. In 2007 6 cases were reported (mortality rate of 0.07 per 100,000 populations) around 20 times higher than the regional average.
- **Population at risk:** The entire country could be considered at risk, as it is estimated that the rabies virus is circulating among the dog population in all departments. There is no animal surveillance system in place. Six of the nation's 10 first subnational levels reported human cases during the last 3 years.
- **Areas of major risk or focus:** Departments of Ouest, in the outreaches of Port-au-Prince, the national capital, and Carrefour.
- **Internal country breakdown in the last 3 years:** Ouest, 8 cases; Sud-est, 3 cases; Artibonite, 2; Nord, 2; Sud, 2; Nord-ouest, 1.

Presence of cases of human rabies transmitted by dogs at the first subnational level, Haiti, 2005–2007.



Source: PAHO/HSD/CD based on SIRVERA, PAHO, 2008.

Control Measures

- **Control programs:** The Ministry of Agriculture and the Ministry of Public Health and Population developed a combined control plan, supported by PAHO and others countries of the region through a Technical Cooperation Program among Countries (TCC) including vaccine donation from Brazil.
- **Information available:** The country reports any human cases to SIRVERA (the Rabies Epidemiological Surveillance System coordinated by PANAFTOSA/PAHO).
- **Primary strategies:** Nationwide vaccination of the canine population; post-exposure prophylaxis to population exposed to risk; education and communication to raise awareness of the risk of the disease.
- **Information on coverage:** Second semester 2007 and first semester 2008 saw the largest national campaign to be developed in the last decade, when some 500,000 dogs were vaccinated (for a coverage of about 60%). Around 400 people receive post-exposure prophylaxis annually.

Soil-Transmitted Helminths

Epidemiological Situation

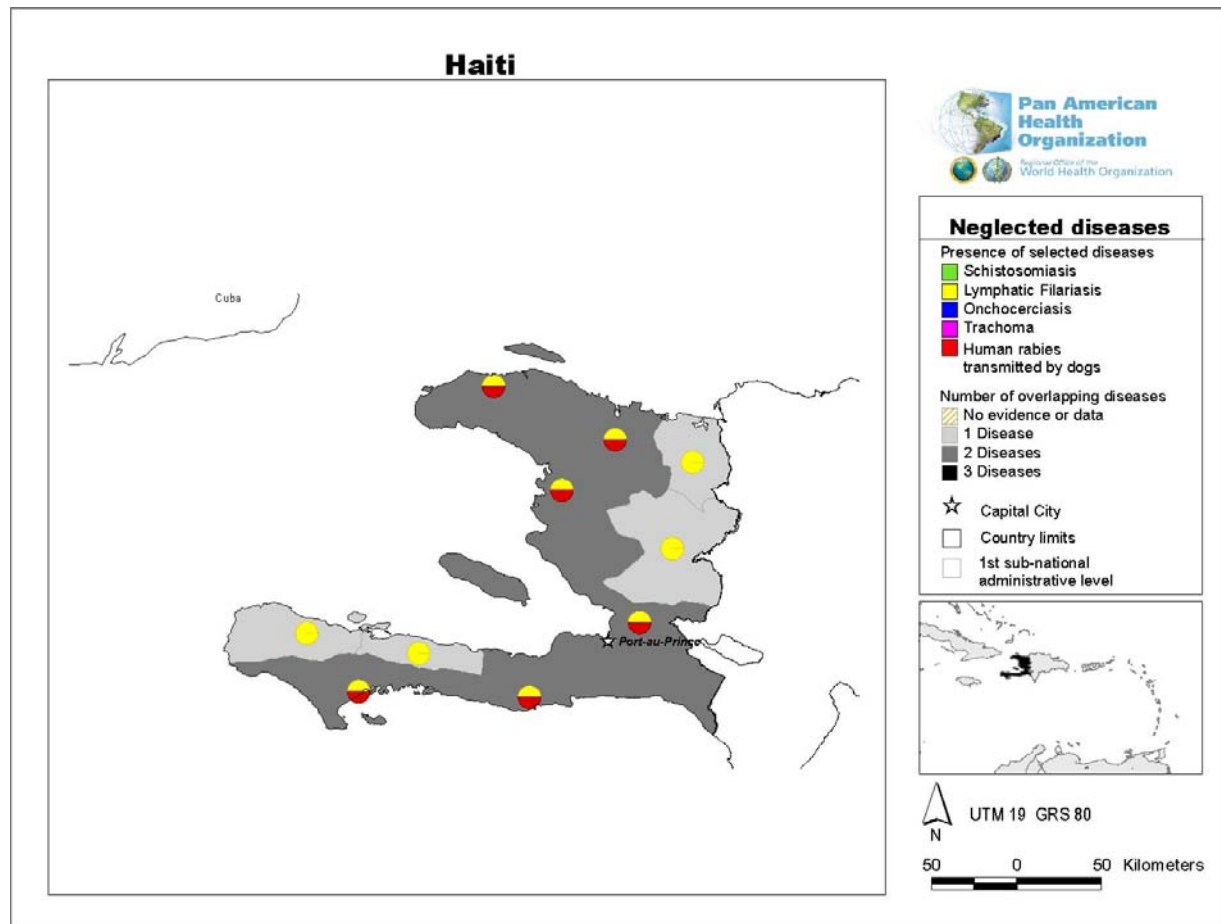
- **Prevalence:** Present at all first subnational levels. Prevalence studies on school-age children with information available for the past 5 years suggest a range from 15% to 87% (10 of 13 surveys show a prevalence higher than 20%). A national survey of around 6,000 children tested showed a prevalence of 27%. The available data suggest that most school-age children are living in areas where prevalence is 20% or more.
- **Population at risk:** An estimated population of 1.6 million school-age children
- **Areas of major risk or focus:** Not known.
- **Internal country breakdown:** Present throughout the entire country.

Control Measures

- **Control programs:** The Ministry of Public Health and Population, including the National Program for the Elimination of Lymphatic Filariasis (PELF).
- **Information available:** Surveys in different places and two national surveys.
- **Primary strategies:** Mass drug administration with Albendazole.
- **Information about coverage:** In 2007, national coverage was above 75%, thus reaching the objective of World Health Assembly Resolution WHA54.19 (2001).

Overlapping Diseases

Overlapping diseases present in the country at the first subnational level, Haiti.



Comments

- Lymphatic filariasis is present at all first subnational levels in Haiti.
- Human rabies transmitted by dogs is present in almost half of the country's provinces.
- Analysis of the information available could suggest that these two diseases could be priority neglected diseases in Haiti.
- There could be an information gap for other diseases, e.g. schistosomiasis.

Honduras



Core Data

Demographic Indicators

	Data	Year
▪ Total Population (thousands):	7,106	2007
▪ Urban Population (%):	47.4	2007
▪ Life Expectancy at Birth (years) total:	70.2	2007
▪ Men	66.9	2007
▪ Women	73.7	2007

Socioeconomic Indicators

▪ Literate Population (15+ years old) (%) total:	80.0	1999–2005
▪ Men	79.8	1999–2005
▪ Women	80.2	1999–2005
▪ Gross National Income (US\$ per capita) PPP value:	2,900	2005
▪ Population Below International Poverty Line (%):	14.9	1998–2004
▪ Population Using Improved Sources of Drinking Water (%) total:	87	2004
▪ Population Using Improved Sanitation Facilities (%) total:	69	2004

Mortality Indicators

▪ Infant Mortality Rate (per 1,000 live births):	23.0	2001–2006
▪ Mortality Rate from Communicable Diseases (per 100,000 pop.):	...	...
▪ Ill-Defined and Unknown Causes (%):	...	...

Selected Diseases Present in the Country

<i>Analyzed at First Subnational Level</i>		<i>Analyzed at Country Level</i>	
▪ Lymphatic Filariasis		▪ Soil-Transmitted Helminths	✓
▪ Onchocerciasis		▪ Chagas Disease	✓
▪ Schistosomiasis		▪ Leprosy*	
▪ Trachoma		▪ Neonatal Tetanus*	
▪ Human Rabies Transmitted by Dogs		▪ Congenital Syphilis	✓

*Present but not as a public health problem.

Current Situation of the Disease

Soil-Transmitted Helminths

Epidemiological Situation

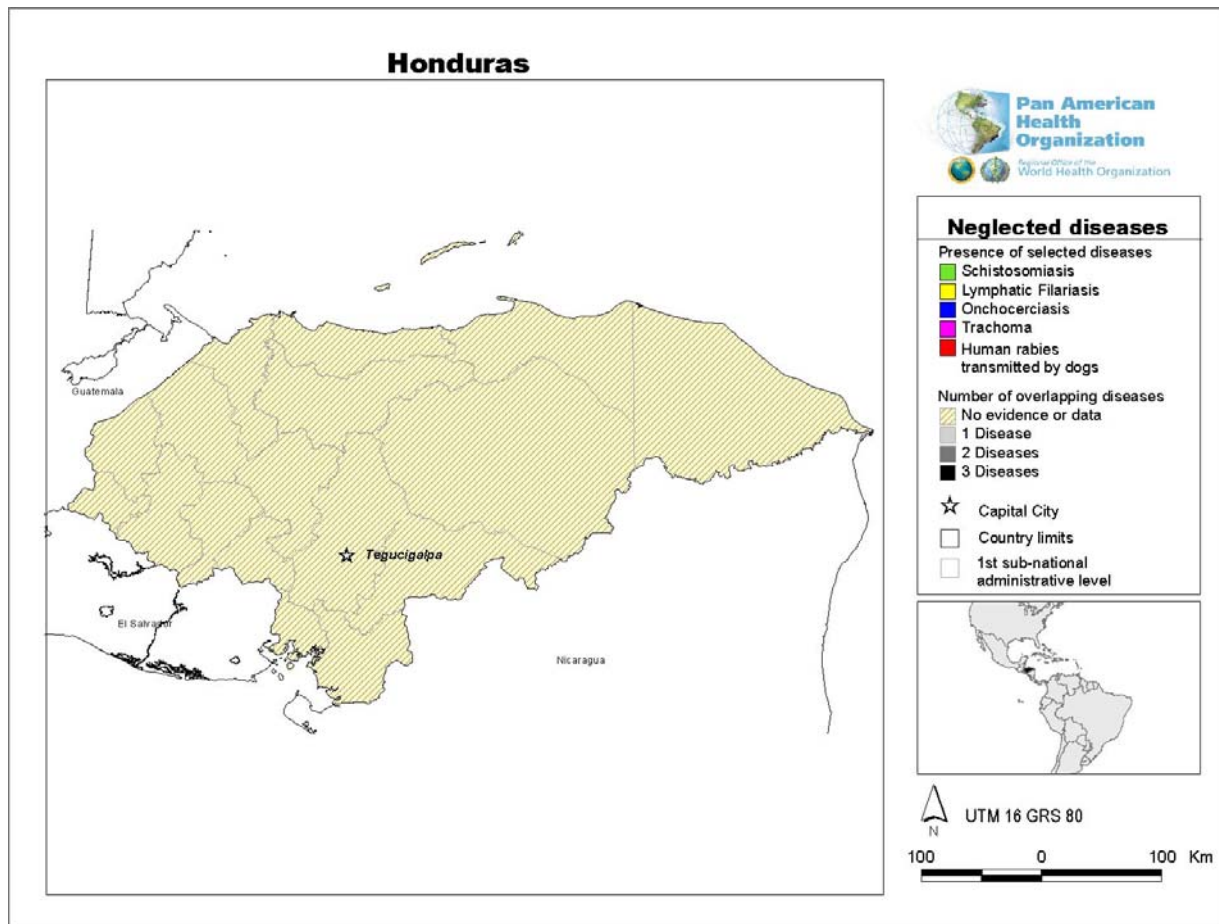
- **Prevalence:** Present at all first subnational levels. Prevalence studies on school-age children with information available for the last 10 years suggest a range from 35% to above 90%. The available data suggest that most school-age children live where the prevalence is 20% or more.
- **Population at risk:** An estimated population of 550 000 school-age children
- **Areas of major risk or focus:** Unknown.
- **Internal country breakdown:** Present throughout the entire country.

Control Measures

- **Control programs:** Secretary of Health, World Food Program, World Vision, Vitamin Angels, Operation Blessing International, and WOW Now.
- **Information available:** Surveys in different places.
- **Primary strategies:** Mass drug administration with Albendazole and, Mebendazole.
- **Information on coverage:** In 2006, national coverage stood at around 61% of all school-age children in Honduras.

Overlapping Diseases

Overlapping diseases present in the country at the first subnational level,
Honduras.



Source: PAHO.

Comments

- In Honduras, there is no evidence of any of the neglected diseases studied.
- There could be an information gap for other diseases, e.g. trachoma.

Mexico



Core Data

Demographic Indicators

	Data	Year
▪ Total Population (thousands):	106,535	2007
▪ Urban Population (%):	76.5	2007
▪ Life Expectancy at Birth (years) total:	76.2	2007
▪ Men	73.7	2007
▪ Women	78.6	2007

Socioeconomic Indicators

▪ Literate Population (15+ years old) (%) total:	91.6	1999–2005
▪ Men	93.2	1999–2005
▪ Women	90.2	1999–2005
▪ Gross National Income (US\$ per capita) PPP value:	10,030	2005
▪ Population Below International Poverty Line (%):	3.0	1998–2004
▪ Population Using Improved Sources of Drinking Water (%) total:	97	2004
▪ Population Using Improved Sanitation Facilities (%) total:	79	2004

Mortality Indicators

▪ Infant Mortality Rate (per 1,000 live births):	18.1	2006
▪ Mortality Rate from Communicable Diseases (per 100,000 pop.):	49.1	2000–2004
▪ Ill-Defined and Unknown Causes (%):	1.9	2005

Selected Diseases Present in the Country

<i>Analyzed at First Subnational Level</i>		<i>Analyzed at Country Level</i>	
▪ Lymphatic Filariasis		▪ Soil-Transmitted Helminths	✓
▪ Onchocerciasis	✓	▪ Chagas Disease	✓
▪ Schistosomiasis		▪ Leprosy*	
▪ Trachoma	✓	▪ Neonatal Tetanus*	
▪ Human Rabies Transmitted by Dogs	✓	▪ Congenital Syphilis	✓

*Present but not as a public health problem.

Current Situation of the Disease

Onchocerciasis

Epidemiological Situation

- **Population at risk:** 159,102 persons (2008).
- **Prevalence:** In the various foci throughout the state of Chiapas, 0.01% prevalence of ocular morbidity in the one in Southern Chiapas in 2007, 0% for the one in Oaxaca in 2008, and 0% in the one in Northern Chiapas in 2008.
- **Areas of major risk or focus:** States of Oaxaca and Chiapas.
- **Internal country breakdown:** The disease is present in two states.

Areas where onchocerciasis is endemic, Mexico, 2007.



Source: OEPA.

Control Measures

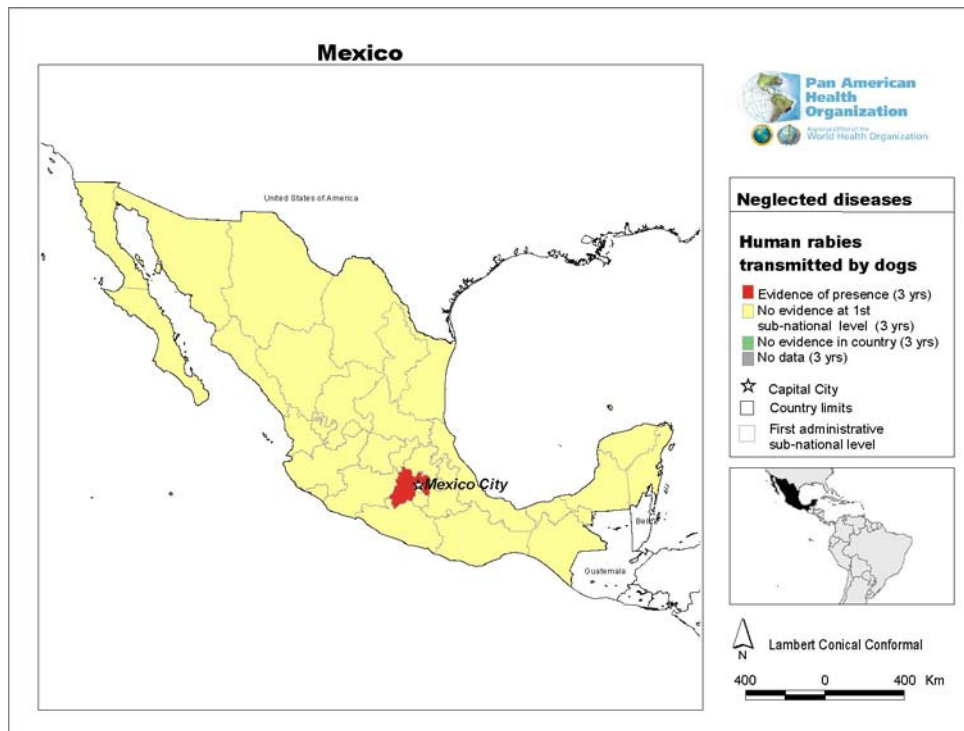
- **Control programs:** These exist through the Secretary of Health, National Center for Epidemiological Surveillance and Disease Control of Mexico (CENAVECE), Department of Onchocerciasis and other vector-borne diseases; and Onchocerciasis Elimination Programs of the States of Oaxaca and Chiapas.
- **Information available:** Available through the Secretariat of Health, CENAVECE, Department of Onchocerciasis and other vector-borne diseases and the Onchocerciasis Elimination Program for the Americas (OEPA).
- **Primary strategies:** Mass drug administration with Mectizan twice a year in endemic communities; Mexico is the only country in the world to administer Mectizan four times a year in 50 communities (in the state of Chiapas); 100% surgical procedures performed for onchocercomas.
- **Information on coverage:** About 135,000 people are treated in each round. This represents a coverage of around 94%.

Human Rabies Transmitted by Dogs

Epidemiological Situation

- **Number of cases:** 2007 – 0 cases; 2006 – 0 cases; 2005 – 2 cases (Estado de México).
- **Population at risk:** About 14 million people (a population living in an administrative unit at the first subnational level with one or more cases in 2005–2007).
- **Areas of major risk or focus:** Estado de México, with the only human cases reported in the last 3 years, and with the largest number of canine rabies cases reported during that period. There have also been 5 or more canine cases in the states of Puebla, Hidalgo, and Yucatán. The southern border of the state of Chiapas contains 18 municipalities with around one million people sharing a common border with a country endemic for canine rabies. In the last three years, no cases of canine rabies were laboratory confirmed, due to a small number of samples, namely because there isn't a negative surveillance system in place to monitor the circulation of the rabies virus.

Presence of cases of human rabies transmitted by dogs at the first subnational level, Mexico, 2005–2007.



Source: PAHO/HSD/CD based on SIRVERA, PAHO, 2008.

Control Measures

- **Control programs:** National Rabies Control Program, Secretary of Health.
- **Information available:** The country reports human cases to Rabies Epidemiological Surveillance System coordinated by PANAFTOSA/PAHO).
- **Primary strategies:** Mass canine vaccination program, medical care to people at risk (including post-exposure prophylaxis [PEP] according to WHO guidelines); surveillance, education programs, and canine and feline sterilization (i.e. spay/neuter).
- **Information on coverage:** The canine vaccination program reached a coverage of 80% in the majority of first subnational administrative levels, with close to 16 million animals vaccinated.

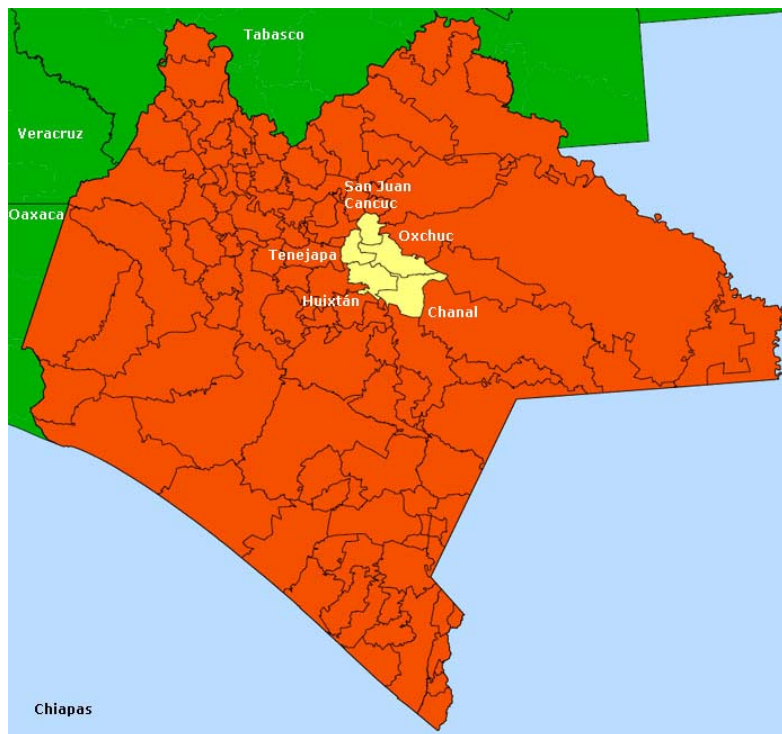
Around 100,000 people received medical care for animal attacks, and about 31% of them received PEP. There are 22 laboratories available for rabies diagnostics in the country.

Trachoma

Epidemiological Situation

- **Population at risk:** 143,380 people (based on 2005 figures).
- **Number of cases and prevalence:**
Number of cases: 101 active trachoma TF/TI (in 2008);
Prevalence: TF = 0.2, TI = 0.0, TC = 0.5, TT = 0.1, OC = 0.01.
- **Areas of major risk:**
Five communities in Chiapas: Cancuc, Chanal, Huixtán, Oxchuc, and Tenejapa.

Areas Endemic for Trachoma, Chiapas, Mexico, 2005.



Source: Mexico. Secretary of Health. Trachoma Prevention and Control Program.

Control Measures

- **Control programs:** Carried out by the State Program for the Prevention and Control of Trachoma, Sub-Directorate of Epidemiological Surveillance, Institute of Health, State of Chiapas (ISECH).
- **Information available:** Yes, from the Secretary of Health, CENAVECE, State Program for the Prevention and Control of Trachoma, Institute of Health, State of Chiapas (ISECH).
- **Primary strategies:** Active surveillance following a strategy of house-by-house searches in all communities in endemic areas, in addition to applying the SAFE Strategy. In 2008, coverage was 76%, compared to 82% in 2007.

Soil-Transmitted Helminths

Epidemiological Situation

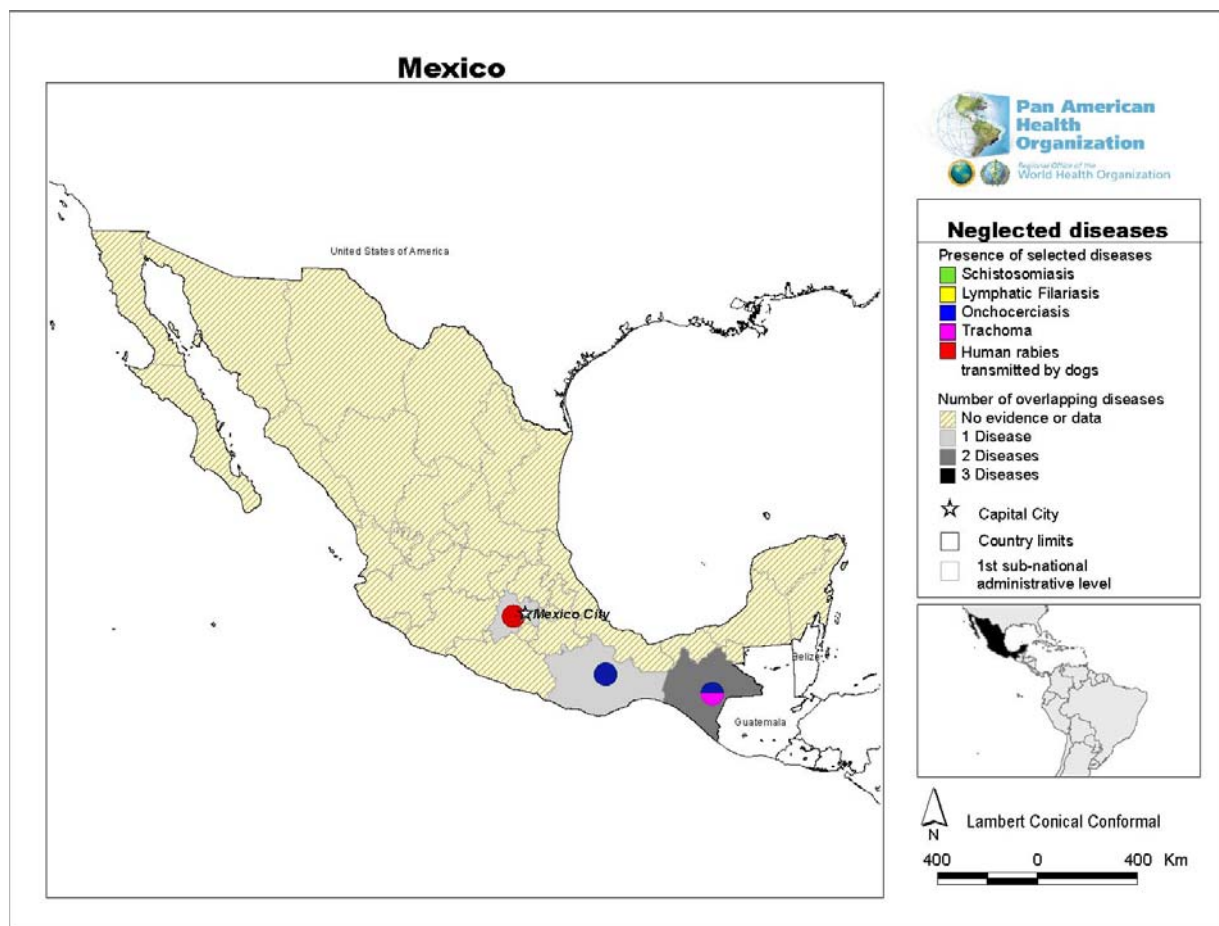
- **Prevalence:** Present at all first subnational levels. Information available for the last 10 years suggests a prevalence range in school-age children from 0.01% to 16.3%.
- **Population at risk:** An estimated population of 4.4 million school-age children
- **Areas of major risk or focus:** Unknown.
- **Internal country breakdown:** Present throughout the entire country.

Control Measures

- **Control programs:** Secretary of Health, Department of Epidemiological Surveillance.
- **Information available:** Surveys in different places.
- **Primary strategies:** Treatment with Albendazole.
- **Information on coverage:** In 2006, national coverage stood at 60% for all school-age children in Mexico.

Overlapping Diseases

Overlapping diseases present in the country at the first subnational level, Mexico.



Source: PAHO.

Comments

- Onchocerciasis is present in two bordering states (Oaxaca and Chiapas, the latter on the Guatemalan border).
- Trachoma is present in one Mexican state (Chiapas) and human rabies transmitted by dogs in another (Estado de México, or Mexico state).
- Onchocerciasis and trachoma overlap in one state (Chiapas, which borders with Guatemala).
- Analysis of the information available could suggest that these three neglected diseases are on the country's unfinished agenda.

Nicaragua



Core Data

Demographic Indicators	Data	Year
▪ Total Population (thousands):	5,603	2007
▪ Urban Population (%):	59.8	2007
▪ Life Expectancy at Birth (years) total:	72.5	2007
▪ Men	69.9	2007
▪ Women	76.0	2007

Socioeconomic Indicators

▪ Literate Population (15+ years old) (%) total:	76.7	1999–2005
▪ Men	76.8	1999–2005
▪ Women	76.6	1999–2005
▪ Gross National Income (US\$ per capita) PPP value:	3,650	2005
▪ Population Below International Poverty Line (%):	45.1	1998–2004
▪ Population Using Improved Sources of Drinking Water (%) total:	79	2004
▪ Population Using Improved Sanitation Facilities (%) total:	47	2004

Mortality Indicators

▪ Infant Mortality Rate (per 1,000 live births):	31.0	1996–2001
▪ Mortality Rate from Communicable Diseases (per 100,000 pop.):	68.0	2000–2004
▪ Ill-Defined and Unknown Causes (%):	3.5	2005

Selected Diseases Present in the Country

<i>Analyzed at First Subnational Level</i>		<i>Analyzed at Country Level</i>	
▪ Lymphatic Filariasis		▪ Soil-Transmitted Helminths	✓
▪ Onchocerciasis		▪ Chagas Disease	✓
▪ Schistosomiasis		▪ Leprosy*	
▪ Trachoma		▪ Neonatal Tetanus*	
▪ Human Rabies Transmitted by Dogs		▪ Congenital Syphilis	✓

*Present but not as a public health problem.

Current Situation of the Disease

Soil-Transmitted Helminths

Epidemiological Situation

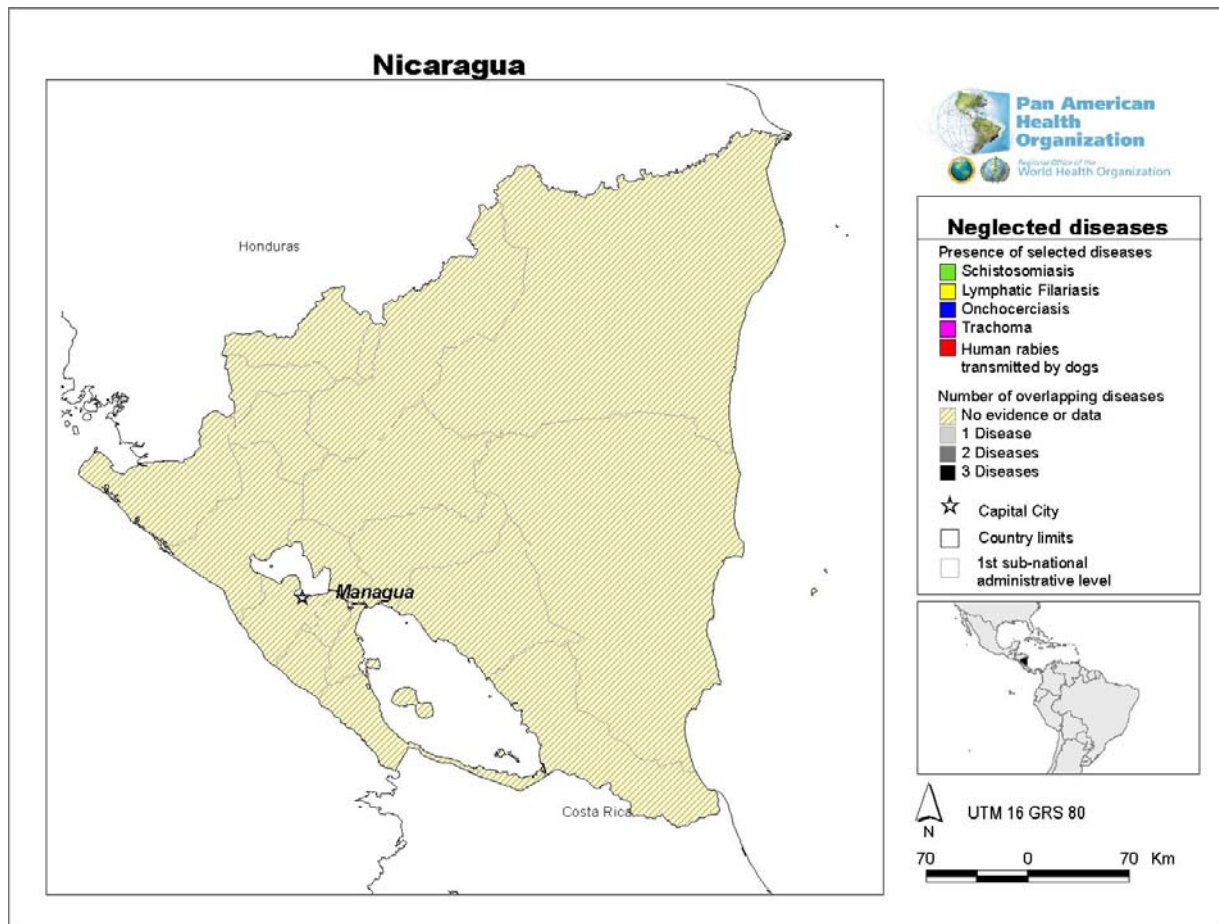
- **Prevalence:** Present at all first subnational levels. Prevalence studies in school-age children with information available for 2005 suggest a range from 27% to above 80%.
- **Population at risk:** An estimated population of 730,000 school-age children
- **Areas of major risk or focus:** Unknown.
- **Internal country breakdown:** Present throughout the entire country.

Control Measures

- **Control programs:** Ministry of Health, World Vision, Vitamin Angels, Food for the Hungry, and WOW Now.
- **Information available:** Surveys in different places.
- **Primary strategies:** Mass drug administration with Albendazole and Mebendazole.
- **Information on coverage:** In 2007, national coverage was above 75%, thus reaching the objective of World Health Assembly Resolution WHA54.19 (2001).

Overlapping Diseases

Overlapping diseases present in the country at the first subnational level, Nicaragua.



Source: PAHO.

Comments

- In Nicaragua, there is no evidence of the presence of any of the neglected diseases studied.
- There could be an information gap for other diseases, e.g. trachoma.

Saint Lucia



Core Data

Demographic Indicators

	Data	Year
▪ Total Population (thousands):	165	2007
▪ Urban Population (%):	27.7	2007
▪ Life Expectancy at Birth (years) total:	73.7	2007
▪ Men	71.9	2007
▪ Women	75.6	2007

Socioeconomic Indicators

▪ Literate Population (15+ years old) (%) total:	...	...
▪ Men	...	...
▪ Women	...	...
▪ Gross National Income (US\$ per <i>capita</i>) PPP value:	5,980	2005
▪ Population Below International Poverty Line (%):	...	...
▪ Population Using Improved Sources of Drinking Water (%) total:	98	2004
▪ Population Using Improved Sanitation Facilities (%) total:	89	2004

Mortality Indicators

▪ Infant Mortality Rate (per 1,000 live births):	15.0	2005
▪ Mortality Rate from Communicable Diseases (per 100,000 pop.):	41.7	2000–2004
▪ Ill-Defined and Unknown Causes (%):	9.8	2002

Selected Diseases Present in the Country

<i>Analyzed at First Subnational Level</i>		<i>Analyzed at Country Level</i>	
▪ Lymphatic Filariasis		▪ Soil-Transmitted Helminths	✓
▪ Onchocerciasis		▪ Chagas Disease	
▪ Schistosomiasis	✓	▪ Leprosy*	
▪ Trachoma		▪ Neonatal Tetanus	
▪ Human Rabies Transmitted by Dogs		▪ Congenital Syphilis	...

* Present but not as a public health problem.

... No data available.

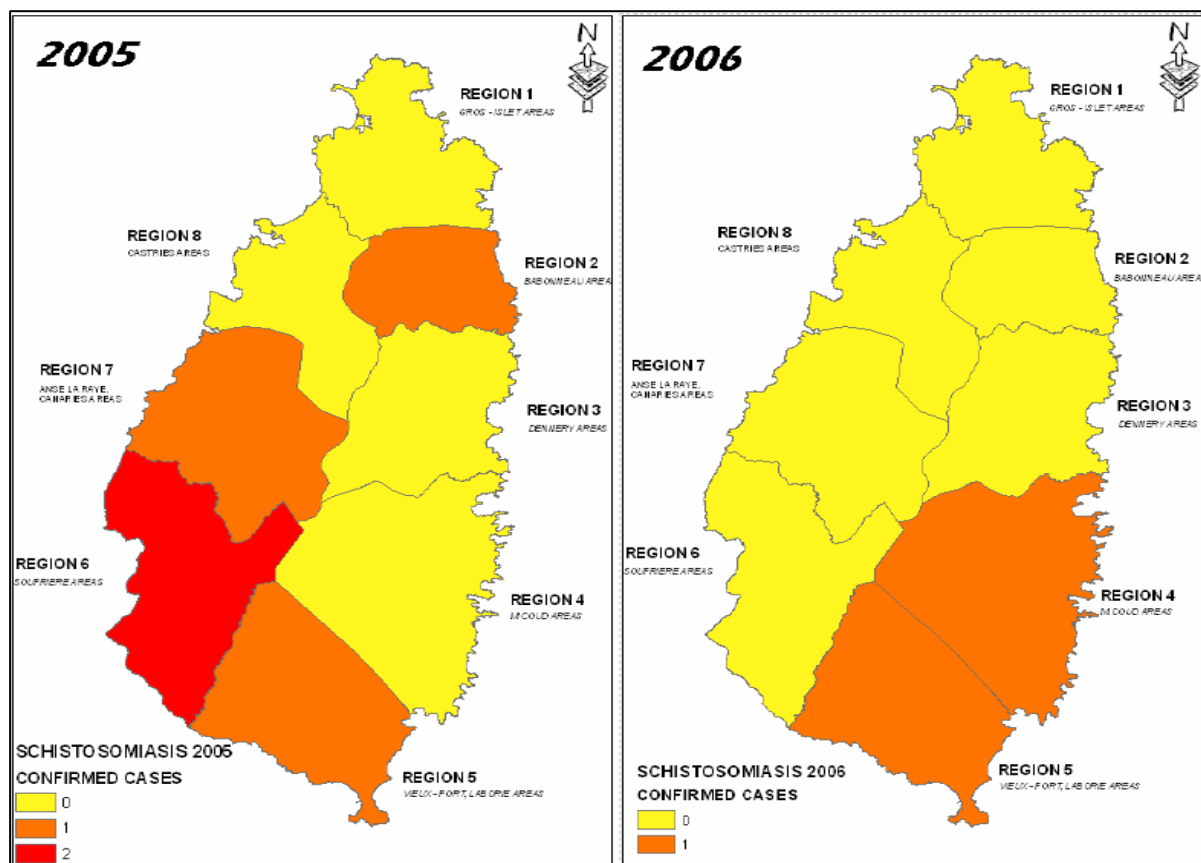
Current Situation of the Disease

Schistosomiasis

Epidemiological Situation

- **Population at risk:** The entire population.
- **Number of cases:** 10 cases were reported in 2007, with an incidence of 6 cases per 100,000 inhabitants (2007).
- **Areas of major risk:** Regions 2, 4, 5, 6, and 8 (five of the eight regions).
- **Internal country breakdown:** See map below.

Confirmed cases of schistosomiasis in Saint Lucia, 2005–2006.



Source: Saint Lucia. Ministry of Health. *Schistosomiasis in Saint Lucia*. PAHO/WHO Preparatory Meeting on Epidemiological Data Needed to Plan Elimination of Schistosomiasis in the Caribbean. Grenada: PAHO/WHO; December 2007.

Control Measures

- **Control programs:** Carried out by the Ministry of Health.
- **Primary strategies:** All confirmed cases are reported. Several measures are taken, such as an epidemiological investigation and monitoring of the infected person's family. Also, an inspection is conducted of the living environment and sanitary conditions of the infected person's dwelling. Monitoring continues for 3 to 6 months.

Soil-Transmitted Helminths

Epidemiological Situation

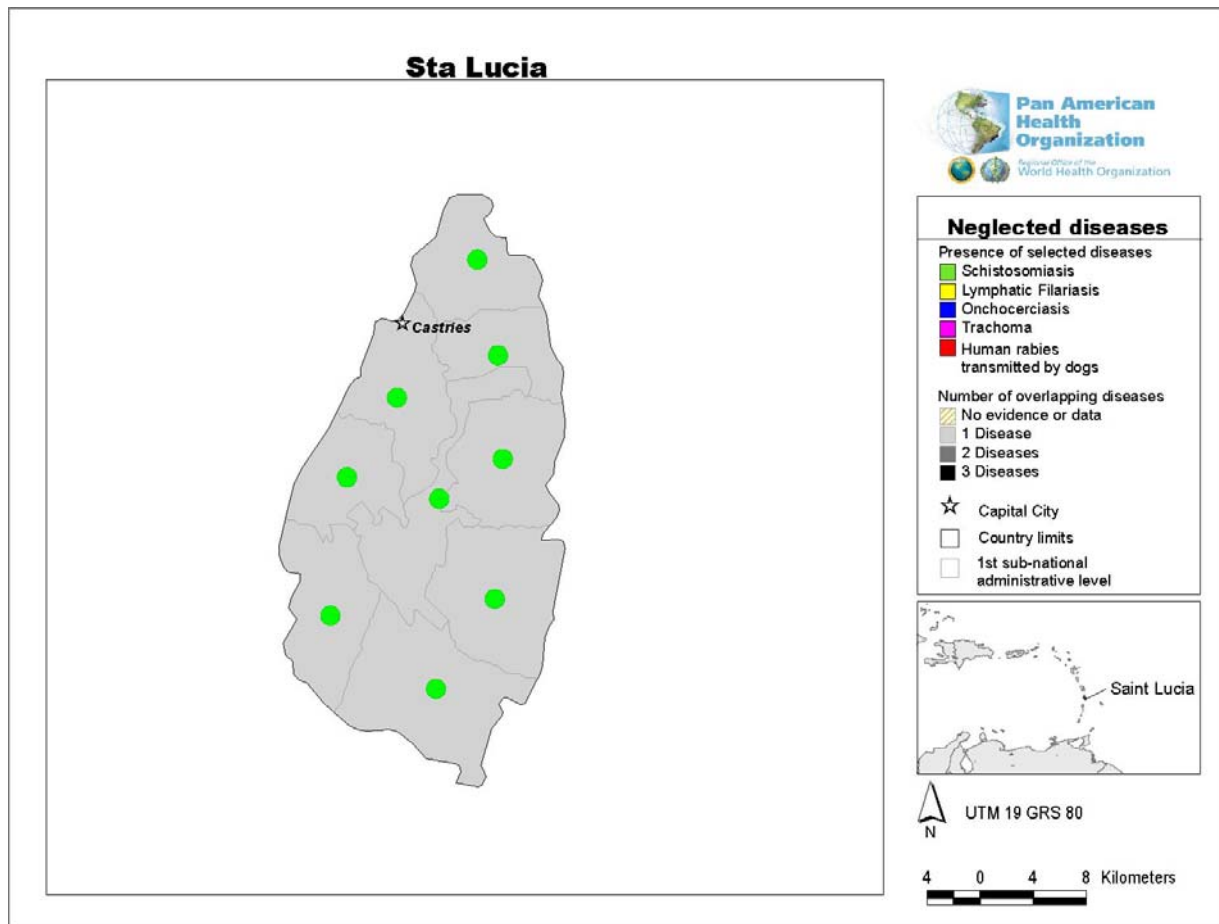
- **Prevalence:** Present at all first subnational levels. Prevalence studies with information available for the last six years suggest a range from 35% to above 45%.
- **Population at risk:** An estimated population of 3 300 school-age children
- **Areas of major risk or focus:** Unknown.
- **Internal country breakdown:** Present throughout the entire country.

Control Measures

- **Control programs:** Carried out by the Ministry of Health.
- **Information available:** Surveys in different places collaborating with the International American University, College of Medicine, Saint Lucia.
- **Primary strategies:** Unknown.
- **Information on coverage:** No data reported.

Overlapping Diseases

Overlapping diseases present in the country at the first subnational level, Saint Lucia.



Source: PAHO.

Comments

- Schistosomiasis is present at all first subnational levels in Saint Lucia, suggesting that this disease could be the priority neglected disease for this country among the five diseases studied.

Suriname



Core Data

Demographic Indicators

	Data	Year
▪ Total Population (thousands):	458	2007
▪ Urban Population (%):	74.6	2007
▪ Life Expectancy at Birth (years) total:	70.2	2007
▪ Men	67.0	2007
▪ Women	73.6	2007

Socioeconomic Indicators

▪ Literate Population (15+ years old) (%) total:	89.6	1999–2005
▪ Men	92.0	1999–2005
▪ Women	87.2	1999–2005
▪ Gross National Income (US\$ per <i>capita</i>) PPP value:	...	...
▪ Population Below International Poverty Line (%):	...	...
▪ Population Using Improved Sources of Drinking Water (%) total:	92	2004
▪ Population Using Improved Sanitation Facilities (%) total:	94	2004

Mortality Indicators

▪ Infant Mortality Rate (per 1,000 live births):	19.2	2004
▪ Mortality Rate from Communicable Diseases (per 100,000 pop.):	90.1	2000–2004
▪ Ill-Defined and Unknown Causes (%):	...	...

Selected Diseases Present in the Country

<i>Analyzed at First Subnational Level</i>		<i>Analyzed at Country Level</i>	
▪ Lymphatic Filariasis		▪ Soil-Transmitted Helminths	✓
▪ Onchocerciasis		▪ Chagas Disease	✓
▪ Schistosomiasis	✓	▪ Leprosy*	
▪ Trachoma		▪ Neonatal Tetanus	
▪ Human Rabies Transmitted by Dogs		▪ Congenital Syphilis	...

* Present but not as a public health problem.

... No data available.

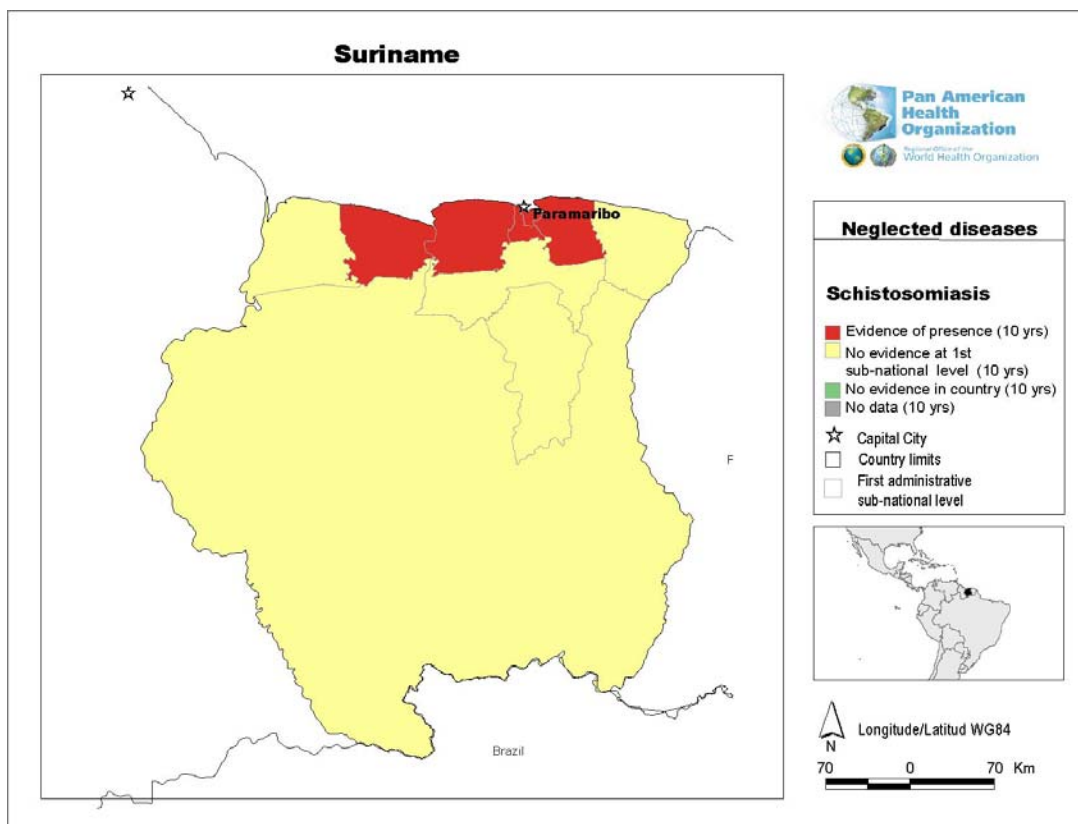
Current Situation of the Disease

Schistosomiasis

Epidemiological Situation

- **Prevalence:** In studies carried out between 1997 and 2001, a prevalence ranging between 0.3% and 4.7% was found in the populations surveyed in schools in the states of Saramacca, Commewijne, Paramaribo, Wanica, and Coronie.
- **Population at risk:** Not found.
- **Areas of major risk or focus:** Coastal areas.

Areas where schistosomiasis is present, Suriname, 1998-2007.



Source: PAHO/HSD/CD based on Suriname. Bureau of Public Health. *Schistosomiasis in Suriname: PAHO/WHO Preparatory Meeting on Epidemiological Data Needed to Plan Elimination of Schistosomiasis in the Caribbean*. Grenada: PAHO/WHO; December 2007.

Control Measures

- **Control programs:** No information was found.

Soil-Transmitted Helminths

Epidemiological Situation

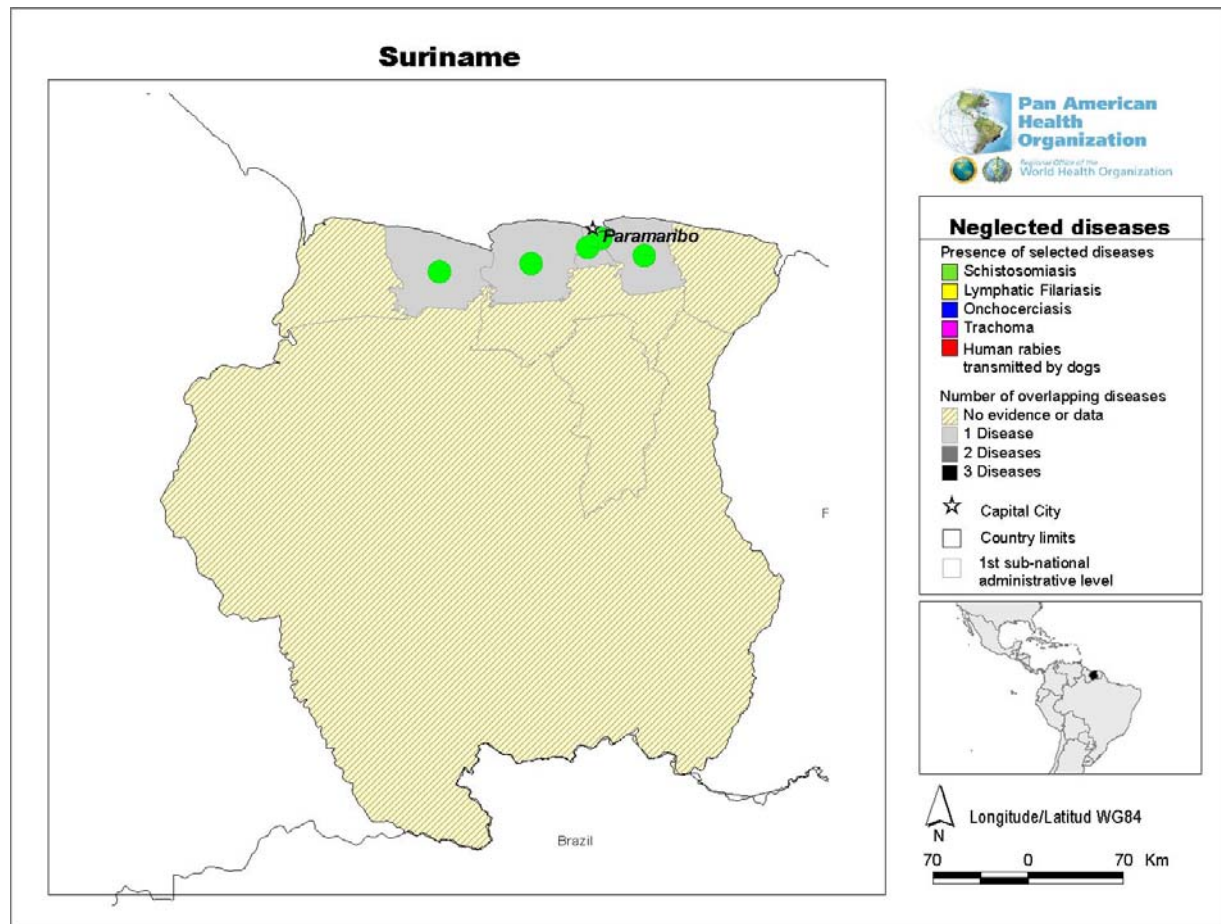
- **Prevalence:** Present at all first subnational levels. Prevalence studies with information available for the last 13 years suggest a range from 36% to above 43%.
- **Population at risk:** An estimated population of 6 000 school-age children
- **Areas of major risk or focus:** Unknown.
- **Internal country breakdown:** Present throughout the entire country.

Control Measures

- **Control programs:** Office of Public Healthcare (*Bureau voor Openbare Gezondheidszorg/BOG*)
- **Information available:** Surveys in different places.
- **Primary strategies:** Not known.
- **Information about coverage:** No data reported.

Overlapping Diseases

Overlapping diseases present in the country at the first subnational level, Suriname.



Source: PAHO.

Comments

- Schistosomiasis is present at the first subnational level in the coastal areas of Suriname.
- There was no evidence found of the presence of any of the other neglected diseases studied, suggesting this disease could be a priority neglected disease in the country among the five diseases studied.
- There could be an information gap for other neglected diseases or other areas of the country.

Venezuela



Core Data

Demographic Indicators

	Data	Year
▪ Total Population (thousands):	27, 657	2007
▪ Urban Population (%):	94.0	2007
▪ Life Expectancy at Birth (years) total:	73.7	2007
▪ Men	70.9	2007
▪ Women	76.8	2007

Socioeconomic Indicators

▪ Literate Population (15+ years old) (%) total:	93.0	1999–2005
▪ Men	93.3	1999–2005
▪ Women	92.7	1999–2005
▪ Gross National Income (US\$ per <i>capita</i>) PPP value:	6,440	2005
▪ Population Below International Poverty Line (%):	18.5	1998–2004
▪ Population Using Improved Sources of Drinking Water (%) total:	83	2004
▪ Population Using Improved Sanitation Facilities (%) total:	68	2004

Mortality Indicators

▪ Infant Mortality Rate (1,000 live births):	15.5	2005
▪ Mortality Rate from Communicable Diseases (100,000 pop.):	58.7	2000–2004
▪ Ill-Defined and Unknown Causes (%):	0.8	2004

Selected Diseases Present in the Country

<i>Analyzed at First Subnational Level</i>		<i>Analyzed at Country Level</i>	
▪ Lymphatic Filariasis		▪ Soil-Transmitted Helminths	✓
▪ Onchocerciasis	✓	▪ Chagas Disease	✓
▪ Schistosomiasis	✓	▪ Leprosy*	
▪ Trachoma		▪ Neonatal Tetanus*	
▪ Human Rabies Transmitted by Dogs	✓	▪ Congenital Syphilis	✓

* Present but not as a public health problem.

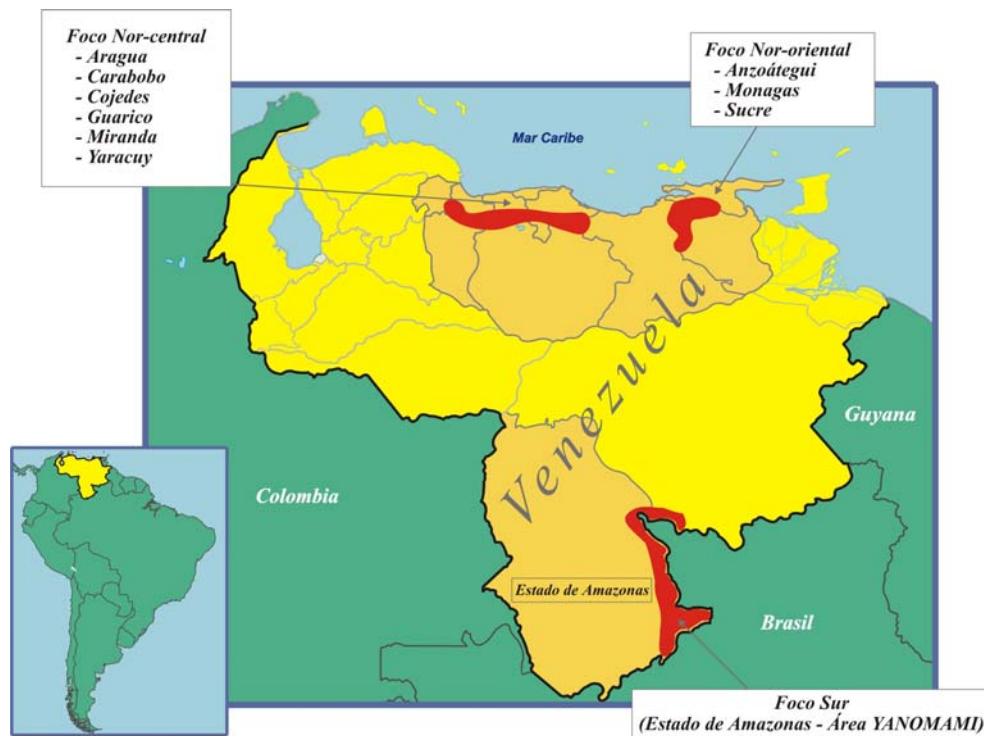
Current Situation of the Disease

Onchocerciasis

Epidemiological Situation

- **Population at risk:** 103,784 persons (based on 2007 figures).
- **Prevalence:** In 2001, 24.4% prevalence of ocular morbidity in the southern focus of Sur (to be reevaluated in 2008); in 2006, 4.0% prevalence in the northeastern focus of Nororiental; and in 2005, 1.7% prevalence in the north-central focus of Norcentral.
- **Areas of major risk or focus:** There are three foci: South, Northeast, and North-Central. In the Northeastern foci, 87% of the population is at risk in a region made up of the states of Sucre, Monagas, and Anzoátegui.
- **Internal country breakdown:** See map below.

Areas where onchocerciasis is endemic, Venezuela, 2007.



Source: OEPA.

Control Measures

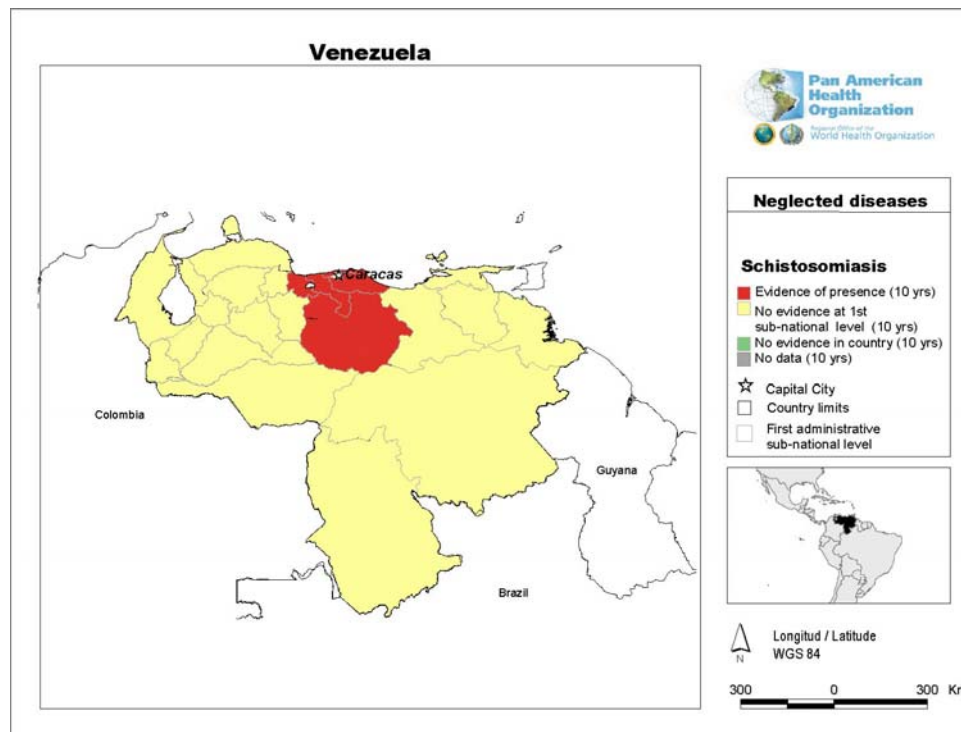
- **Control measures:** Venezuelan Program for the Elimination of Onchocerciasis, Ministry of Health and Social Development (MSDS).
- **Primary strategies:** Mass drug administration twice a year with Mectizan in endemic areas.
- **Information available:** Yes, through the Venezuelan Onchocerciasis Elimination Program and also from the Onchocerciasis Elimination Program for the Americas (OEPA).
- **Information on coverage:** Coverage stands at around 95% in the two rounds, with about 100,000 people treated. Since 2003, the country has achieved the goal of 85% coverage treated twice a year.

Schistosomiasis

Epidemiological Situation

- **Prevalence:** 13.5% in the areas surveyed (six communities in the states of Vargas , Aragua and Carabobo in 1998-2000)
- **Population at risk:** None was found.
- **Areas of major risk or focus:** A region of 15, 000 km², including parts of the states of Aragua, Carabobo, Guárico, Miranda, and Vargas.
- **Internal country breakdown:** See map below.

Areas where schistosomiasis is present, Venezuela, 1998-2007.



Source: PAHO/HSD/CD based on Alarcon de Noya, B. et al. *Schistosomiasis mansoni* in Areas of Low Transmission: Epidemiological Characterization of Venezuelan Foci. *Memórias do Instituto Oswaldo Cruz*. Rio de Janeiro; 2002; 91(1): 5-10.

Control Measures

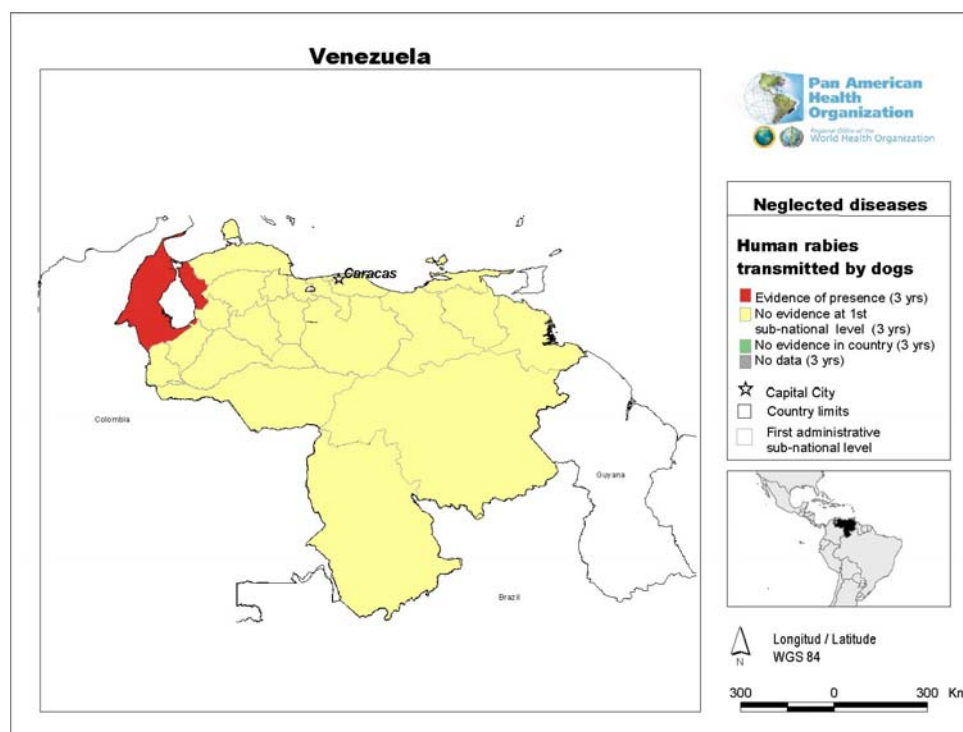
- **Control programs:** National Program for the Prevention and Control of Intestinal Parasites and Schistosomiasis, Ministry of Health and Social Development.
- **Information available:** Yes, from the National Program for the Prevention and Control of Intestinal Parasites and Schistosomiasis, Ministry of Health and Social Development.
- **Primary strategies:** Individual case treatment with Praziquantel.
- **Information on coverage:** No information found.

Human Rabies Transmitted by Dogs

Epidemiological Situation

- **Number of cases:** 2007 – 0 cases; 2006 – 1 case (Zulia); 2005 – 0 cases.
- **Population at risk:** About 3 million people (population living in an administrative unit at the first subnational level with one or more cases from 2005 to 2007).
- **Areas of major risk or focus:** The state of Zulia, in the western part of the country.

Presence of cases of human rabies transmitted by dogs at the first subnational level, Venezuela, 2005–2007.



Source: PAHO/HSD/CD based on SIRVERA, PAHO, 2008.

Control Measures

- **Control programs:** Carried out by the Ministry of Health and Social Development.
- **Information available:** The country reports any human cases to SIRVERA (the Rabies Epidemiological Surveillance System coordinated by PAHO/PANAFTOSA). Canine surveillance is also in place, with 13 cases reported in Zulia in 2007.
- **Primary strategies:** Vaccination of the canine population in the risk area; post-exposure prophylaxis (PEP) provided to the population exposed to (or at risk of contracting) rabies; surveillance system.
- **Information on coverage:** Around 56,000 people sought medical care due to dog bites, and around 8,000 received PEP. There are three laboratories for surveillance.

Soil-Transmitted Helminths

Epidemiological Situation

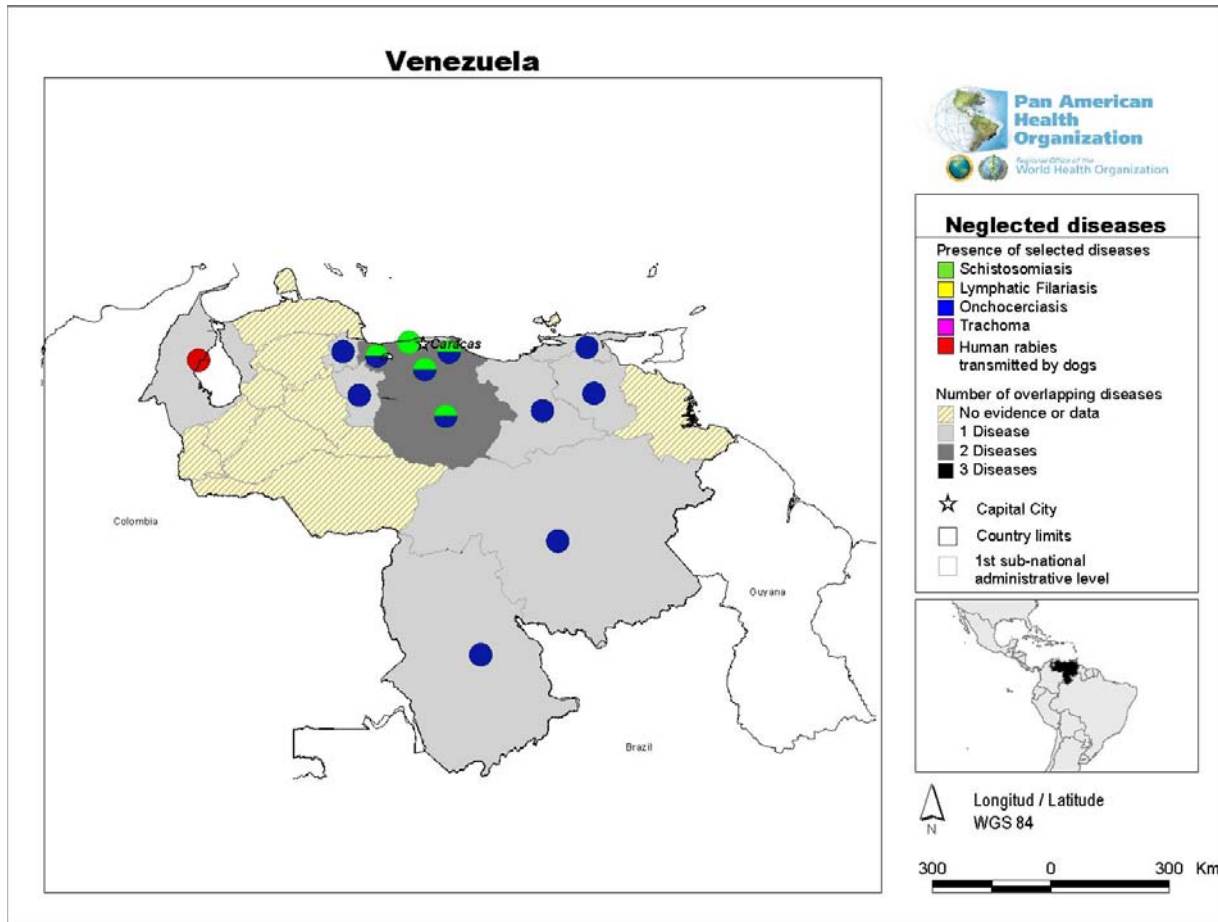
- **Prevalence:** Present at all first subnational levels. Prevalence studies with information available for the last six years suggest a range from 3% to above 19%.
- **Population at risk:** An estimated population of 1.7 million school-age children
- **Areas of major risk or focus:** Unknown.
- **Internal country breakdown:** Present throughout the entire country.

Control Measures

- **Control programs:** National Program for the Prevention and Control of Intestinal Parasites and Schistosomiasis, Ministry of Health and Social Development.
- **Information available:** Surveys in different places.
- **Primary strategies:** Individual case treatment with Albendazole and Pyrantel Pamoate.
- **Information about coverage:** In 2006, 102,000 school-age children were treated.

Overlapping Diseases

Overlapping diseases present in the country at the first subnational level, Venezuela.



Source: PAHO.

Comments

- Onchocerciasis is present in almost half of all first subnational levels in Venezuela, suggesting that this is a priority neglected disease for the country.
- Schistosomiasis is present at the first subnational level in coastal areas, overlapping with onchocerciasis in three departments.
- Human rabies transmitted by dogs is present in one department, suggesting that this disease is on the country's unfinished agenda.
- There could be an information gap for other neglected diseases or other areas of the country.

Final Comments

- In this study, we included diseases that are considered as being ‘neglected’ in the WHO global list. As mentioned in the methodology section of this document, “neglected” can be considered as associated with poverty but not necessarily neglected in terms of action taken by decision-makers. For some of these diseases and for some countries, considerable efforts have been made; and this study suggests that it is possible, according to the goals established, to eliminate these diseases as a public health problem—or at the very least to control them at reasonable levels throughout the Region.
- For the five selected diseases with information available at the first subnational level (states/departments/provinces), the following was found: lymphatic filariasis is present in four countries (29 administrative units); onchocerciasis is present in six countries (25 administrative units); Schistosomiasis is present in four countries (39 administrative units); trachoma is present in three countries (29 administrative units); human rabies transmitted by dogs is present in ten countries (20 administrative units). Considering the approximately 570 administrative units at the first subnational level that exist in the Region, the analysis by disease suggests that, with the information available, the five above-mentioned neglected diseases are not widespread and can be considered as an unfinished agenda.
- If the presence of one or more of all of the above five selected diseases is considered, the final count of the administrative units in which they are present is 102 at first subnational level, in which about 230 million people reside (almost half of the Region’s population).
- In the overlapping analysis (identification of hot spots) of these five diseases, 14 countries were included with a total of 275 administrative units.
 - ➔ One unit presented four of the five selected diseases. Two other units showed a presence of three of the five selected diseases (all in Brazil), in a total area with a population of 16 million people.
 - ➔ Thirty-three administrative units have two of the five diseases, with a total population of about 164 million.
 - ➔ Sixty-six of the 275 reported only one of the selected neglected diseases, with around 50 million people living in those areas.
- The analysis suggests that many subnational units exist with more than one of the selected diseases, implying that these localities could be considered as priority areas where it may be possible to apply an integrated approach. It should also be taken into consideration that only five diseases were chosen for the overlapping study, but that the other neglected diseases—such as soil-transmitted helminths, which are present all over the Region—would also be considered when creating an integrated approach, once further epidemiological data is collected on those diseases. PAHO is developing database on soil-transmitted helminths, disaggregated at the first subnational level which in the future could be included in the overlapping analysis as part of an integrated approach.
- A considerable amount of information from secondary data sources exists for most of the diseases studied, particularly those for which there are established elimination targets (e.g. onchocerciasis, lymphatic filariasis and human rabies transmitted by dogs). When the goal is total elimination, the presence of one or more cases provides sufficient information. However, for diseases with goals of achieving prevalence levels that are no longer considered as public health problems, or for establishing major areas for intervention, further epidemiological data is

needed. For most of these diseases, there is an important need for information to more precisely estimate the burden of disease, as well as a baseline for possible intervention projects. These data need to use standardized criteria, disaggregated within the countries by subnational level and periodically updated. Some examples are, that to establish priority areas for fighting soil-transmitted helminths, studies could be carried out to ascertain which administrative units have a prevalence of above 20% (based on the criteria recommended by WHO); or, for congenital syphilis, where an incidence of greater than 0.5 per 1000 live births exists.

- When analyzing the map of the Region and comparing the data on the presence of several diseases in international border areas where there is no evidence of the same disease in the bordering countries (for example, trachoma), this could suggest there may be a sizable information gap with regard to neglected diseases in the Region. Surveys could be suggested to confirm that these diseases are not present. The lack of presence of certain diseases also needs to be confirmed, as is the case with schistosomiasis in countries where the disease was present in past decades, e.g. in the Caribbean.
- Additionally, when viewing the Regional map, it is evident that there are several opportunities for cross-border technical cooperation, such as is the case with lymphatic filariasis between Haiti and the Dominican Republic and with onchocerciasis between Brazil and Venezuela.
- For other diseases with more complex epidemiological situations—such as Chagas disease, with its various modes of transmission and diverse vectors—where a considerable amount of information is available that could show important achievements in the Region, data on active transmission of the disease by subnational level is more difficult to present in a summarized study. This information is available in the subregional meeting reports and could be presented by the countries in a future study. However, continual support for control activities is very important.
- Diseases like human rabies transmitted by dogs and neonatal tetanus, with their easily identifiable symptoms, have had information systems for several decades where information is available on all countries (with cases reported by subnational level). The priority areas for intervention are known, but there is a strong need for strong support of these activities in order to achieve the elimination goal.
- For diseases with chronic symptoms where prevalence is more difficult to measure—such as Chagas disease, soil-transmitted helminths and trachoma—the information for the estimation of the burden of disease is more complex, often requiring surveys to compliment the notification systems.
- Regarding foci distribution of some diseases, the location of said foci and the risk population are known, such as is the case with onchocerciasis, lymphatic filariasis and schistosomiasis. Most of the information available is on intervention coverage, but there is much on disease prevalence and post-intervention impact.
- With regard to PAHO's priority countries, information is available on LF and rabies for Bolivia, Guyana, and Haiti in terms of the five diseases analyzed at the first subnational level. Of these five, there was no evidence of presence in Honduras or Nicaragua. Further studies may be suggested in the priority countries to confirm that other diseases such as trachoma are not present.
- A disparity exists in the availability of this information online through the official ministry of health websites in the Region. Some governments, such as Brazil and Mexico, present more online information than do others. Horizontal cooperation among these countries could be suggested to support the priority countries on improving their surveillance system and their systems for disseminating information to the public.

- When analyzing the primary strategies for the selected diseases, it could be observed that, in order to control these diseases, mass drug administration, vaccination and screening tests will be needed, most of which are then carried out through primary health care as a basic strategy. Most of the above-mentioned strategies are now integrated and are currently being carried out by local health systems in conjunction with their respective national systems.
- Intersectoral and interprogrammatic approaches need to be taken into consideration both at national level and below. Among the primary strategies considered for some of the selected diseases are water and sanitation improvement, information/communication/education, and others.
- The information analyzed on the country profiles for the six selected diseases (lymphatic filariasis, onchocerciasis, schistosomiasis, trachoma, human rabies transmitted by dogs, and soil-transmitted helminths) suggests that the countries are developing control actions for these diseases. However, these activities need to be intensified in order to achieve the established control or elimination goals.
- Furthermore, at the country level, a major analysis of the main target groups (e.g. school-age children, women of child-bearing age, and entire populations) could be done to identify which combined measures could best be applied at the local level according to the diseases present in that locality.
- Future studies on the possible social determinants of neglected diseases could be designed and analyzed using secondary information sources, if these are indeed available in the countries at subnational levels.
- This phase of the study was to lay out a preliminary approach to the situation of the selected diseases and the information available on them. Further analysis with subnational data could be conducted with other diseases related to poverty.
- The next phase will be provide support to the individual countries' plans on neglected diseases and other infectious diseases related to poverty, as the countries go about preparing their subnational-level studies and defining their priorities.

References

- Alarcón de Noya, B. et al. *Schistosomiasis mansoni* in Areas of Low Transmission. Epidemiological Characterization of Venezuelan Foci. *Memórias do Instituto Oswaldo Cruz*. Rio de Janeiro; 2002; 91(1): 5-10.
- Asociación Latinoamericana y Caribeña para el control de las Infecciones de Transmisión Sexual (ALAC – ITS) Encuesta 2007.
- Bolivia, Ministerio de Salud y Deportes/Organización Panamericana de la Salud. Situación de Salud: *Indicadores Básicos 2003*. La Paz: 2003.
- Brasil. Ministerio da Saúde. Secretaria de Vigilância em Saúde. DATASUS. Available from <http://tabnet.datasus.gov.br/cgi/deftohtm.exe?sinan/pce/cnv/pce.def>. Accessed September 2007.
- Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. *Guia de vigilância epidemiológica*. 6. ed. Brasília : Ministério da Saúde, 2005. Available from: http://portal.saude.gov.br/portal/arquivos/pdf/hantaviroses_gve.pdf. Accessed on 1 December 2008.
- Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Presentation: *III Mostra de estratégias de Saúde da Família. Tracoma: Aspectos clínicos epidemiológicos e gerencias*. 8 August 2008. Available from: http://dtr2004.saude.gov.br/dab/docs/publicacoes/cadernos_ab/abcad21.pdf Accessed November 1, 2008.
- Brasil. Ministério da Saúde. Tracoma. Available from: http://portal.saude.gov.br/SAUDE/visualizar_texto.cfm?idtxt=21926. Accessed 6 November 2008.
- Brazil. Ministry of Health. *Annual Report for the National Programme to Eliminate Lymphatic Filariasis (PELF) for the year 2007*. Submitted to the World Health Organization in 2008.
- Carter Center. *Final Report of the Conference on the Eradicability of Onchocerciasis*. Atlanta: Carter Center, 2002. Available from: <http://www.cartercenter.org/documents/1047.pdf> Accessed 29 October 2008.
- Centers for Disease Control and Prevention. *Lymphatic Filariasis in the Americas: An epidemiologic history*. Atlanta: CDC/DHHS; 2002.
- Centers for Disease Control and Prevention. Global Disease Elimination and Eradication as Public Health Strategies. *Morbidity and Mortality Weekly Report*, December 31, 1999/ Vol.48 / Supplement, U.S. Department of Health and Human Services, CDC Atlanta, 2000.
- Centers for Disease Control and Prevention. Recommendations of the International Task Force for Disease Eradication. *Morbidity and Mortality Weekly Report*, 1993, 42(RR-16):1-38.
- Centro Nacional de Centro de Enfermedades Tropicales de República Dominicana (CENCET). "LF elimination in the Dominican Republic - History, Progress and Achievements " *Octava Reunion de Administradores de Programas de Eliminación de Filariasis Linfática*. República Dominicana; 2008.
- Comisión Económica para América Latina y el Caribe. *Panorama social de América Latina 2007*. CEPAL, Santiago, 2007. Available from: <http://www.eclac.cl/cgi-bin/getProd.asp?xml=/publicaciones/xml/9/30309/P30309.xml&xsl=/dds/tpl-i/p9f.xsl&base=/tpl/top-bottom.xslt> Accessed March 2008.
- Comité prociegos y sordos de Guatemala. *Cuadro de registro de personas con catarata y tracoma por estado, edad y sexo en el área sur-occidental I*. 2002. Unpublished.
- Costa Rica. Ministerio de Salud. *Interrupción de la transmisión de la Filariasis bancrofti en la ciudad de Puerto Limón*. San José: Ministerio de Salud de Costa Rica, 2003 (*Serie de Documentos Técnicos No. 3*).
- De Quadros CA, Silveira CM. Control del tétanos neonatal. Definición de áreas de alto riesgo: la experiencia de las Américas. *EPI Newsletter* 1991; 12(4):3-5.
- Dominican Republic. Ministry of Health. *Annual Report for the National Programme to Eliminate Lymphatic Filariasis (PELF) for the year 2006*. Submitted to the World Health Organization in 2007.
- Dowdle, W.R. and Hopkins, D.R., eds. *The Eradication of Infectious Diseases*. New York: John Wiley and Sons, 1998.
- Economic Commission for Latin America and the Caribbean. *The Millennium Development Goals: A Latin American and Caribbean Perspective*. ECLAC, Santiago, 2005.
- Ehrenberg, John P, comp. *An epidemiological overview of Geohelminth and Schistosomiasis in the Caribbean*. Washington, D.C.: PAHO; 2003.

- Emerson, Paul M., et al. *The SAFE Strategy for Trachoma Control: Using Operational Research for Policy, Planning and Implementation*. Available from: <http://www.who.int/bulletin/volumes/84/8/05-028696.pdf>. Accessed on 6 November 2008.
- Goldschmidt P, et al. Chlamydia trachomatis in the conjunctiva of children living in three rural areas in Mexico. *Rev Panam Salud Publica*. 2007;22(1):29–34.
- Goodman RA, Foster KL, Trowbridge FL, Figueroa JP, eds. Global disease elimination and eradication as public health strategies. *Bull World Health Organ*. 1998; 76 (2):1– 162.
- Guyana. Ministry of Health. *Annual Report for the National Programme to Eliminate Lymphatic Filariasis (PELF) for the year 2005*. Submitted to the World Health Organization in 2006.
- Haiti. Ministry of Health. *Annual Report for the National Programme to Eliminate Lymphatic Filariasis (PELF) for the year 2007*. Submitted to the World Health Organization in 2008.
- Haïti. Ministère de la Santé Publique et de la population / Organisation Panaméricaine de la Santé. *Situation de Santé - Indicateurs de Base*. Haïti; 2002.
- Heymann, David, ed. *Control of Communicable Diseases Manual*. Washington, D.C.: American Public Health Association; 2004.
- Hotez PJ; et al. The Neglected Tropical Diseases of Latin America and the Caribbean: A Review of Disease Burden and Distribution and a Roadmap for Control and Elimination. *PLoS Neglected Tropical Disease*. 2008; 2(9).
- Hunt, Paul. *Promotion and Protection of all Human Rights, Civil, Political, Economic, Social and Cultural Rights. Report of the Special of the Special Reporter on the right of everyone to the enjoyment of the highest attainable standard of physical and mental health*. 31 January 2008. Available from: http://www2.essex.ac.uk/human_rights_centre/rth/docs/A-HRC-7-11.doc Accessed March 2008.
- International Labor Organization/Pan American Health Organization. *Overview of the Exclusion of Social Protection in Health in Latin America and the Caribbean*. Report presented at the ILO Tripartite Regional Meeting with the collaboration of PAHO on Extension of Social Protection in Health to Excluded Groups in Latin America and the Caribbean. Mexico, 29 November–1 December, 1999.
- Jamison D et al.eds. *Disease Control Priorities in Developing Countries*. The Word Bank and Oxford University Press, 2006.
- Jamriska, Patricio. *Informe de asesoría al CLAP/SMR OPS (2008) sobre prevalencia de sífilis congénita, basado en información de fuentes de los Ministerios de Salud*.
- Jones TS. Use of tetanus toxoid to prevent neonatal tetanus in developing countries. In Halsey NA, de Quadros CA (eds.). *Recent advances in immunization: a bibliographic review*. Washington, D.C.: Pan American Health Organization; 1983 (*Scientific Publication No. 451*).
- Lammie PJ, Lindo JF, Secor WE, Vasquez J, Ault SK, et al. Eliminating lymphatic filariasis, onchocerciasis, and schistosomiasis from the Americas: breaking a historical legacy of slavery. *PLoS Negl Trop Dis*. 2007;1(2).
- México, Secretaría de Salud. *Zona endémica de tracoma, Chiapas, 2005*. Available from: <http://www.mex.ops-oms.org/contenido/tracoma/sitmex.htm>. Accessed 1 December 2008.
- México, Secretaría de Salud / Organización Panamericana de Salud. *Situación de Salud en México 2006: Indicadores Básicos*. 2006.
- Onchocerciasis Elimination Program of the Americas. *OEPA 2008*. Available from: www.oepa.net. Accessed 29 October 2008.
- Organización Panamericana de la Salud. *Estrategia contra el Tracoma*. Available from: www.mex.ops-oms.org/contenido/tracoma/. Accessed October 2008.
- Organización Panamericana de la Salud / Organización Mundial de la Salud México. *Acerca del Tracoma*. <http://www.mex.ops-oms.org/default.htm>. Accessed November, 2008.
- Organización Panamericana de la Salud. *Situación de salud en las Américas: Indicadores Básicos*. Washington DC: OPS, 2007.
- Organización Panamericana de la Salud. *Propuesta del Plan Estratégico 2008-2012*. OPS, Documento Oficial No. 328, Washington DC; 2007.
- Organización Panamericana de la Salud. *Estimación cuantitativa de la enfermedad de Chagas en las Américas*. Montevideo: OPS, 2006 (OPS/HDM/CD/425.06).
- Organización Panamericana de la Salud. *Situación de Salud Ecuador -2006*. OPS; 2006.
- Organización Panamericana de la Salud. *Medicina transfusional en los países del Caribe y Latinoamérica, 2000-2003*. Washington, DC: OPS, 2005 (THS/EV 2005/005 E).

- Organización Panamericana de la Salud. Reunião Internacional sobre Vigilância e Prevenção da Doença de Chagas na Amazônia. Implementação da Iniciativa Intergovernamental de Vigilância e Prevenção da Doença de Chagas na Amazônia. *Rev.Soc.Brasileira Med.Tropical*, 2005,38(1):82-89.
- Organización Panamericana de la Salud. Área de Prevención y Control de Enfermedades. Unidad de Salud Pública Veterinaria. *Eliminación de la rabia humana transmitida por perros en America Latina año 2004*. Washington, DC; OPS, 2005. Available from: <http://www.paho.org/spanish/ad/dpc/vp/rabia-sit.pdf> Accessed 6 November 2008.
- Organización Panamericana de la Salud, Secretaria de Salud de México. *Taller nacional de Vigilancia Epidemiológica, prevención y control de la Enfermedad de Chagas en México*. OPS/SS México, Huatulco, 2003.
- Organización Panamericana de la Salud, Programa Especial de Análisis de Salud. *Indicadores Básicos Centroamérica y Republica Dominicana 2002*. Washington D.C. 2002.
- Organización Panamericana de la Salud. *Informe de la IX Reunión de Directores Nacionales de Rabia (REDIPRA)*. Santa Cruz de la Sierra: OPS, 2002.
- Organización Panamericana de la Salud. Libro de resúmenes. *Municipios: mejorando los servicios de inmunización. XV Reunión del grupo técnico asesor de la OPS sobre enfermedades prevenibles por vacunación*. Washington, DC: OPS; 2002.
- Organización Panamericana de la Salud. *Informe final (Conclusiones y recomendaciones). Inmunizaciones: panamericanismo y equidad en acción. XIV Reunión del grupo técnico asesor de la OPS sobre enfermedades prevenibles por vacunación*. Washington, DC: OPS; 2000.
- Organización Panamericana de la Salud. *Reunión de la Iniciativa de los Países Andinos de Control de la Transmisión Vectorial y Transfusional de la Enfermedad de Chagas*. Santa Fe de Bogotá, Colombia: OPS, 1997.
- Organización Panamericana de la Salud. *Reunión sobre vectores de enfermedad de Chagas en los países de Centroamérica*. Tegucigalpa: OPS, 1997.
- Organización Panamericana de la Salud. *Reunión de la Comisión Intergubernamental del Cono Sur para la Eliminación de T. infestans y la Interrupción de la Transmisión Transfusional de la Tripanosomiasis Americana*. Ed.OPS, OPS.PNSP/92.18, Buenos Aires; 1992.
- Organización Panamericana de la Salud. *Estrategias y plan de acción para la eliminación de la rabia humana transmitida por el perro en los grandes centros urbanos de Latinoamérica para el final de la década 1980*. 1983. Available from: <http://www.paho.org/cdmedia/hdmvp01/docs.rabia/1%20documento%201980.pdf>. Accessed 6 November 2008.
- Organización Mundial de la Salud, Fondo de las Naciones Unidas para la Infancia. *Atención Primaria en Salud. Informe de la Conferencia Internacional sobre Atención Primaria en Salud. OMS y UNICEF, Alma-Ata, URSS, 6-12 de septiembre 1978*. Available from: <http://whqlibdoc.who.int/publications/9243541358.pdf>. Accessed March 2008.
- Pan American Health Organization. Area of Health Surveillance and Disease Management, Veterinary Public Health/PANAFTOSA. *Regional Epidemiological Surveillance System for Rabies in the Americas (SIRVERA)*. Available from: <http://siepi.panaftosa.org.br/Painel.aspx> Accessed November 2008. Accessed 1 December 2008.
- Pan American Health Organization. *Toward the elimination of onchocerciasis (River Blindness) in the Americas. (CD48/10)*. XLVIII Directing Council of the Pan American Health Organization. Washington, DC: PAHO; 2008. Available from: <http://www.paho.org/english/gov/cd/CD48-10-e.pdf> Accessed 29 October 2008.
- Pan American Health Organization. Area of Health Surveillance and Disease Management, Communicable Diseases Project; *Soil-Transmitted Helminths Prevalence Database* [unpublished] November 2008.
- Pan American Health Organization. *Comprehensive Family Immunization, Area of Family and Community Health. Country reports through the PAHO-WHO/UNICEF Joint Reporting Forms (JRF), 2005-2007*, FCH-IM/PAHO. Available from www.paho.org/immunization.
- Pan American Health Organization. *Comprehensive Family Immunization. Family and Community Health. Immunization in the Americas: 2008 Summary*.
- Pan American Health Organization. *Elimination of Congenital Syphilis in Latin American and the Caribbean: An Attainable Objective*. Available from: http://www.paho.org/Spanish/AD/FCH/AI/sifilis_cong_hi.pdf. Accessed 1 December 2008.
- Pan American Health Organization. PAHO 48th Directing Council: Provisional Agenda Item 4.6 CD48/10. PAHO; 2008. Available from: <http://www.paho.org/english/gov/cd/CD48-10-e.pdf>. Accessed 29 October 2008.
- Pan American Health Organization. *Health in the Americas: 2007*. Washington, DC: PAHO, 2007; 2v. (PAHO Scientific and Technical Publication No. 622).
- Pan American Health Organization. *Hacia una estrategia de salud para la equidad, basada en la atención primaria. Declaración de Buenos Aires. De Alma Ata a la Declaración del Milenio*. Buenos Aires, Agosto 2007. Available from: <http://www.paho.org/Spanish/D/declaracion-final-BuenosAires30-15.pdf> Accessed March 2008.

- Pan American Health Organization. *Supply of blood for transfusion in the Caribbean and Latin American countries in 2005: Base line data for the Regional Plan of Action for Transfusion Safety 2006-2010*. Washington, DC: PAHO; 2007.
- Pan American Health Organization. *Report of the Control of Soil-Transmitted Helminth Infections in the English-and French-Speaking Caribbean Meeting, May 15-17, 2007*. Available from <http://www.paho.org/English/AD/DPC/CD/psit-sth-jamaica.htm> Accessed 10 November 2008.
- Pan American Health Organization. *Report: PAHO/WHO Preparatory Meeting on Epidemiological Data Needed to Plan Elimination of Schistosomiasis in the Caribbean*. PAHO; 2007. Available from: <http://www.paho.org/Spanish/AD/DPC/CD/psit-schisto-mtg-07.htm> Accessed 5 November 2008.
- Pan American Health Organization/World Health Organization. *América contra la rabia. Plan de acción para la prevención y control de la rabia en las Américas: etapa 2005-2009*. Río de Janeiro; 2007. Available from: http://www.panaftosa.org.br/Comp/Zoonoses/Raiva/doc/plan_rabia_05-09.pdf. Accessed 1 December 2008.
- Pan American Health Organization. *Health of the Indigenous Population in the Americas*. 138th Session of the Executive Committee, Document CE138/13. PAHO, Washington, D.C., 12 June 2006.
- Pan American Health Organization. *Report of the 10th Meeting of Directors of the National Programs for Control of Rabies in Latin America. 14th Inter-American Meeting at the Ministerial Level, on Health and Agriculture*. Provisional RIMS14/INF/1. Mexico City D.F: PAHO, 2005. Available from: <http://bvs.panaftosa.org.br/textoc/rimsa14-inf1-e.pdf> Accessed on: 29 October 2008.
- Pan American Health Organization. *Eliminación de la rabia humana transmitida por perros en America Latina*. PAHO; 2005. Available from: <http://www.paho.org/spanish/ad/dpc/vp/rabia-sit.pdf>. Accessed 6 November 2008.
- Pan American Health Organization. *Neonatal Tetanus Elimination: Field Guide*. 2nd Ed. Washington, D.C., 2005.
- Pan American Health Organization. *Status of Leprosy in the Region of the Americas*. 2005. Available from: <http://www.paho.org/English/AD/DPC/CD/lep-americas.pdf> Accessed 6 November 2008.
- Pan American Health Organization. *Final report (conclusions and recommendations). A culture of prevention: a model for control of vaccine-preventable diseases. XVI Meeting of the Technical Advisory Group on Vaccine-preventable Diseases*. Washington, D.C.: PAHO; 2004.
- Pan American Health Organization. PAHO 45th Directing Council. Resolution CD45.R3. *Millennium Development Goals and Health Targets*. PAHO, Washington DC: 27 September -1 October 2004.
- Pan American Health Organization. *Lymphatic Filariasis in the Americas. 5th Regional Program Manager's Meeting. Paramaribo, Suriname, 26-29 October 2004.* Available from <http://www.paho.org/English/AD/DPC/CD/psit-lf-rpt-2004.pdf>. Accessed 10 November 2008.
- Pan American Health Organization. PAHO 38th Directing Council: CD38R8. PAHO; 1995. Available from: http://www.paho.org/english/gov/cd/ftcd_38.htm#R8. Accessed on 1 December 2008.
- Pan American Health Organization. Resolutions. (CD35/14) XXXV Directing Council of the Pan American Health Organization. Washington, DC: PAHO, 1991. Available from: http://www.paho.org/english/gov/cd/ftcd_35.htm. Accessed on: 29 October 2008.
- Pan American Health Organization. Resolutions. 116th Meeting of the Executive Committee; XXXVIII Meeting of the Directing Council of the Pan American Health Organization. Washington, DC: PAHO, 1991. Available from: http://www.paho.org/english/gov/cd/ftcd_38.htm. Accessed 1 December 2008.
- Pan American Health Organization. PAHO 35th Directing Council: Provisional Agenda Item 124 CD35/14; 1991. Available from: http://www.paho.org/english/gov/cd/ftcd_35.htm. Accessed on: 29 October 2008.
- República Bolivariana de Venezuela, Ministerio de Sanidad y Asistencia Social. *Situación de Salud en Venezuela: Indicadores Básicos*. 1999.
- Roses Periago, M. *An achievable dream: Eliminating some Diseases from the Region*. Article from the Director. Washington, D.C., February 25, 2008. Available from: http://www.paho.org/English/D/RosesArticle_DiseaseE_eng.htm. Accessed March 2008.
- Roses Periago, M. *Servir a nuestros pueblos esperanzados y luchadores que aspiran a mejores condiciones de vida y de salud es la razón de nuestros esfuerzos*. Discurso de Aceptación. 27.a. Conferencia Sanitaria Panamericana; 59.a Sesión del Comité Regional. Washington DC, Octubre 3, 2007. Available from: http://www.paho.org/Spanish/D/AcceptanceSpeech_Oct07_spa.htm. Accessed March 2008.
- Roses Periago, M. Dr. Mirta Roses' Inaugural Address as Director of the Pan American Health Organization. Washington DC, February 1, 2008. Available from http://www.paho.org/English/D/D_InaugSpeech_F08_eng.htm. Accessed March 2008.

- Saint Lucia. Ministry of Health. *Schistosomiasis in Saint Lucia. PAHO/WHO Preparatory Meeting on Epidemiological Data Needed to Plan Elimination of Schistosomiasis in the Caribbean*. Grenada: PAHO/WHO; December 2007.
- Schmind, GP et al. The Need and Plan for Global Elimination of Congenital Syphilis. *Sx Transm Ds* 2007; 34 (7):S5-10.
- Schneider MC, Belotto A, Adé MP, Hendrickx, Leanes LF, Rodrigues MJF at al. Current status of human rabies transmitted by dogs in Latin America. *Cad. Saúde Pública*. 2007;23(9): 2049-2063.
- Suriname. Bureau of Public Health. *Schistosomiasis in Suriname. PAHO/WHO Preparatory Meeting on Epidemiological Data Needed to Plan Elimination of Schistosomiasis in the Caribbean*. Grenada: PAHO/WHO; December 2007.
- United Nations. United Nations Millennium Declaration. General Assembly. Resolution GA55/2. UN, New York, September 2000.
- University of Puerto Rico School of Medicine. *Surveillance systems for schistosomiasis in formerly endemic countries: The case of Puerto Rico*. PAHO/WHO Preparatory Meeting on Epidemiological Data Needed to Plan Elimination of Schistosomiasis in the Caribbean. Grenada: PAHO/WHO; December 2007.
- World Bank. *Global Monitoring Report 2008: MDGs and the Environment: Agenda for Inclusive and Sustainable Development*. World Bank Publications; 2008. Available from: <http://go.worldbank.org/j20HF0QLL0>. Accessed December 2008.
- World Bank. *World Development Report: Investing in Health*. New York; World Bank, 1993.
- World Health Organization. *Database of Soil-Transmitted Helminths*. WHO; 2008.
- World Health Organization. *Schistosomiasis*. Available from: <http://www.who.int/topics/schistosomiasis/en/>. Accessed 29 October 2008.
- World Health Organization. *Soil-transmitted Helminths*. Available from: http://www.who.int/intestinal_worms/en/. Accessed 29 October 2008.
- World Health Organization. Global Leprosy Situation, Beginning of 2008. *Weekly Epidemiological Record*. 2008. Available from: <http://www.who.int/wer/2008/wer8333.pdf>. Accessed 6 November 2008.
- World Health Organization, Global Alliance for the Elimination of Blinding Trachoma. *GET 2020 Database*. Available from: <http://www.who.int/globalatlas/pgrms/trachoma>. Accessed October 2008.
- World Health Organization. Rabies factsheet. 2008. Available from: <http://www.who.int/mediacentre/factsheets/fs099/en/index.html>. Accessed 6 November 2008.
- World Health Organization, *Vision 2020. Trachoma*. Available from: <http://www.v2020.org/page.asp?section=0001000100020003> Accessed 6 November 2008.
- World Health Organization. *Leprosy*. Available from: <http://www.who.int/lep/leprosy/en/index.html>. Accessed on 6 November 2008.
- World Health Organization: *Vision 2020. Global initiative for the elimination of avoidable blindness: Action Plan 2006-2011*. Geneva. 2007.
- World Health Organization. Onchocerciasis Elimination Program for the Americas. *Weekly Epidemiological Record*. WHO; 2007; 82: 309-316.
- World Health Organization. Global programme to eliminate lymphatic filariasis. *Weekly Epidemiological Record*, 19 October 2007, 42(82): 361–380. <http://www.who.int/wer/2007/wer8242.pdf>.
- World Health Organization. Meeting of the International Task Force for Disease Eradication – 11 January 2007. *Wkly Epidemiol Rec*. 2007, 82 (22/23):197–208.
- World Health Organization. Global Programme to Eliminate Lymphatic Filariasis: Progress report on mass drug administration for 2007. *Weekly Epidemiological Record*. 2007;(83): 333-348.
- World Health Organization. *Global Plan to Combat Neglected Tropical Diseases 2008-2015*. (WHO/CDS/NTD/2007.3) Geneva: WHO, 2007. Available from: http://whqlibdoc.who.int/hq/2007/WHO_CDS_NTD_2007.3_eng.pdf. Accessed 10 November 2008.
- World Health Organization. Onchocerciasis (river blindness). Report from the sixteenth InterAmerican Conference on Onchocerciasis, Antigua Guatemala, Guatemala. *Wkly Epidemiol Rec*. 2007; 82(35):314-16.
- World Health Organization. Global Leprosy Situation, Beginning of 2007. *Weekly Epidemiological Record*. 2007. Available from: <http://www.who.int/wer/2007/wer8225.pdf>. Accessed 6 November 2008.
- World Health Organization. *Trachoma Control: A Guide for Program Managers*. Geneva: WHO, 2006 Available from http://www.who.int/blindness/publications/tcm%20who_pbd_get_06_1.pdf Accessed on 6 November 2008.
- World Health Organization 117th Executive Board Session. EB 117/8. *Prevention and Control of Sexually Transmitted Infections: Draft Global Strategy*. Geneva: WHO; 2006.

- World Health Organization. 59th World Health Assembly. WHA59.19. *Prevention and Control of Sexually Transmitted Infections: Global Strategy*. Geneva: World Health Organization; 2006.
- World Health Organization. Global Leprosy Situation, Beginning of 2006. *Weekly Epidemiological Record*. 2006. Available from: <http://www.who.int/wer/2006/wer8132.pdf>. Accessed 6 November 2008.
- World Health Organization Commission on Social Determinants of Health. *Action on the Social Determinants of Health: Learning from Previous Experiences*. WHO, Geneva, 2005.
- World Health Organization. Global Leprosy Situation, Beginning of 2005. *Weekly Epidemiological Record*. 2005. Available from: <http://www.who.int/wer/2005/wer8034.pdf>. Accessed 6 November 2008.
- World Health Organization. *Monitoring and epidemiological assessment of the programme to eliminate lymphatic filariasis at implementation unit level*. Geneva: WHO; 2005.
- World Health Organization. 57th World Health Assembly. WHA57.12. *Reproductive health: draft strategy to accelerate progress towards the attainment of international development goals and targets*. Geneva, 2004. Available from: http://www.who.int/gb/ebwha/pdf_files/WHA57/A57_R12-en.pdf.
- World Health Organization. *Schistosomiasis and soil-transmitted helminth infections*. 54th World Health Assembly. WHA54.19. Geneva: WHO, 2001. Available from: http://ftp.who.int/gb/archive/pdf_files/WHA54/ea54r19.pdf. Accessed 29 October 2008.
- World Health Organization. *Worm Control*. WHO; 2001. Available from: http://whqlibdoc.who.int/hq/2001/WHO_CDS_CPE_SMT_2001.8.pdf. Accessed 29 October 2008.
- World Health Organization. 54th World Health Assembly. WHA54.19. *Schistosomiasis and Soil-Transmitted Helminth Infections*. Geneva: WHO; 2001. Available from: http://ftp.who.int/gb/archive/pdf_files/WHA54/ea54r19.pdf. Accessed 29 October 2008.
- World Health Organization. *Certification of Elimination of Human Onchocerciasis: Criteria and procedures. Guidelines*. WHO; 2001.
- World Health Organization. *Criteria for certification of elimination of human onchocerciasis. Report of a meeting*. WHO; Geneva; 2000.
- World Health Organization. *International training workshop on the assessment and management of Trachoma*. 1998. Available from: http://www.who.int/pbd/publications/trachoma/en/workshop_cambridge.pdf. Accessed 6 November 2008.
- World Health Organization. 51st World Health Assembly. WHA51.11. *Global elimination of blinding trachoma*. Geneva; 1998. Available from: http://www.who.int/pbd/publications/wha_eb/wha51_11/en/index.html. Accessed 29 October 2008.
- World Health Organization. *Global disease elimination and eradication as public health strategies*. Proceedings of a conference held in Atlanta, GA, 23-25 February 1998. *Bulletin of the World Health Organization*, 1998, 76 (2): 22–25.
- World Health Organization. 51st World Health Assembly. WHA51.14. 1998. Available from: <http://www.paho.org/English/ad/dpc/cd/dch-wha51-14-eng.pdf>. Accessed 29 October 2008.
- World Health Organization. *Prospects for elimination. Chagas disease, leprosy, lymphatic filariasis and onchocerciasis*. Geneva: WHO, 1997.
- World Health Organization. *Toward the Elimination of Onchocerciasis (River Blindness) in the Americas*. (WHA50.29). 50th World Health Assembly. Geneva: WHO, 1997. Available from: <http://www.paho.org/English/AD/DPC/CD/psit-lf-wha50-29-eng.pdf> Accessed 29 October 2008.
- World Health Organization. 50th World Health Assembly. WHA50.29. *Toward the Elimination of Onchocerciasis (River Blindness) in the Americas*. Geneva; 1997. Available from: <http://www.paho.org/English/AD/DPC/CD/psit-lf-wha50-29-eng.pdf>. Accessed 29 October 2008.
- World Health Organization. *Report of the Global Scientific Meeting on Future Approaches to Trachoma Control*. Geneva: WHO; 1996. p. 4-7.
- World Health Organization. 44th World Health Assembly. WHA44.9. *Elimination of leprosy*. Geneva: WHO; 1991.