

# Pan American Health Organization's Regional Strategic Framework for addressing neglected diseases in neglected populations in Latin America and the Caribbean

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*The neglected diseases (NDs) need to be placed much higher on the agendas of the Ministries of Health and other organizations which are capable of effective action. Pan American Health Organization's plan seeks to strengthen surveillance, prevention, and control systems for NDs, with expected positive collateral benefits to other surveillance and control programs in Ministries of Health. Multi-disease, integrated, inter-sectoral, and inter-programmatic approaches need to be field-tested with pilot projects in communities. If the pilot projects are successful, these approaches will help optimize the use of scarce financial and human resources for communicable disease control in countries of the Region. Increased awareness of the importance and impact of the NDs in countries of the Region should help create or consolidate space and resources for these ND programs to continue into the future. Community-based projects should count with an ample number of local partners (non-governmental development organizations, church and community groups, local politicians) and perhaps other international partners to secure the continuance of prevention and control activities into the future. Cost and cost-effectiveness analysis of the data resulting from the pilot projects will be necessary to evaluate the multi-disease, inter-programmatic and/or inter-sectoral and integrated interventions and their resulting synergies; if economically successful they should encourage investment by the private and public sector to address NDs in marginalized populations.*

Key words: Pan American Health Organization's Regional Strategic Framework - neglected diseases - neglected populations - Latin America - the Caribbean

We enter the XXI century with a global population of more than 6 billion persons; within developing countries alone an additional 2 billion people are expected to be added to this total by 2030. A slow but steady global population growth is expected through at least the next 50 years, though by the middle of this century some analysts believe that continuing natural resource depletion and resource competition between richer and poorer countries make this type of trend analysis less certain. Other analysts note that the gap between rich and poor countries, and rich and poor populations in any one country, will generally continue to widen in many geographic areas. Global climate change will further compound the scenarios for trend analysis for the remainder of the XXI century.

Of today's 6.5 billion people on the planet, about 5.2 billion live in the less developed countries. However about 1.1 billion people or nearly 20% of the planet (nearly 1 in 5 persons) live in *extreme poverty* (defined by the World Bank/IMF as living on less than US\$ 1.00/day) in 2005. Dr Jeffrey Sachs, special United Nations (UN) advisor on poverty, has named this "the poverty that

kills [as it is] the poverty where those in the household ...cannot meet basic needs for survival [and are] ...chronically hungry, unable to get health care, lack safe drinking water and sanitation, cannot afford education for their children and perhaps lack rudimentary shelter... and basic articles of clothing, like shoes.... Currently, more than 8 million people around the world die each year because they are too poor to stay alive". The harsh reality of all poverty today is that more people are being born into poverty and deprivation each year than are born into non-deprived circumstances.

In response to these trends and the problems and risks that accompany them, the UN member states have established ambitious Millennium Development Goals (MDGs) to be reached by 2015, key among them the goal to halve extreme poverty and hunger by this date. *Health* is also a major part of the MDGs, and health goals include: reducing under-five mortality by two-thirds, reducing maternal mortality by three-quarters, and reversing the spread of HIV/AIDS, malaria, and tuberculosis (TB). Other MDGs address the specific needs of neglected or marginalized populations, by seeking to achieve universal primary education, promote gender equality and empower women, and ensure environmental sustainability including special attention to improving the quality of life of at least 100 million slum-dwellers (those living in *favelas*, *asentamientos*, *turgurias* or *barrios pobres*) by the year 2020. To reach these goals adequate funding is required, thus another MDG is to develop global partnerships for development, with targets for improving aid and trade and debt relief.

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Globally and regionally World Health Organization (WHO) and Pan American Health Organization (PAHO) are addressing the Unfinished Agenda in Primary Health Care (dating from Alma Ata 1978), to provide adequate primary health care to all citizens (part of health as a basic human right), and reduce inequities in health services distribution and delivery by governments. Within the Region of the Americas, PAHO provides technical cooperation to all countries in the Region, and it is enhancing its attention to support five key countries: Bolivia, Guyana, Haiti, Honduras, and Nicaragua. However, depending on the disease or health issue, other countries are also being given heightened attention to address local health inequities.

Additionally PAHO is working with a focus on the health and well-being of specific neglected or vulnerable populations (synonyms: neglected, at-risk, poor, deprived, marginalized, excluded, fragile, anonymous or invisible populations) such as indigenous communities and slum-dwellers, and which may be divided into two dimensions: (a) by a gender/demographic dimension, reflecting vulnerability - They are usually (but not exclusively) female, or young children, adolescent girls, or disabled or disfigured persons; (b) by an ethnic/community dimension, reflecting victims of poverty - They are usually (but not exclusively) the shanty-town and slum-dwellers, poor blacks, poor rural residents, seasonal economic migrants (farm workers, plantation workers, miners), poor fisher communities, prisoners, and the homeless.

In Latin America and the Caribbean (LAC) over 210 million people (> 38%) live below the poverty line, and most suffer from a series of *neglected diseases* (NDs) also referred to as forgotten diseases or diseases of the poor. These diseases are termed neglected because they affect the poor and powerless, they are generally not subject to compulsory reporting in most countries in the Region, and are therefore not perceived as major public health burdens (as compared to cancers, cardiovascular diseases, HIV/AIDs, malaria, and TB). They are commonly physically disabling, disfiguring and/or socially stigmatizing, and often limit physical growth and educational opportunities for children and adolescents and employment opportunities and longevity of adults. Often an individual is afflicted with more than one of these diseases at the same time, increasing individual vulnerability. At times the NDs also cause or lead to death. They contribute directly to underemployment and unemployment and indirectly to family food insecurity. In addition to the NDs, the marginalized populations are often simultaneously affected by other serious infectious diseases such as malaria, tuberculosis, dengue or HIV/AIDS, which adds to the total burden of disease they carry [Ehrenberg JP & Ault SK 2005. Debate. Neglected diseases of neglected populations: Thinking to reshape the determinants of health in Latin America and the Caribbean. *BMC Public Health* 5: 119 (open access paper)].

The NDs are often but not entirely limited geographically to the tropics. Refer to the draft amplified list of NDs in the Region (Table I).

The burden of NDs in disadvantaged populations have emerged in this decade as an issue in the current global disease debate led by WHO and the international development banks on health inequalities and the distribution of the burden of disease, and is a reminder of the Unfinished Agenda and the need to move forward more rapidly to meet the MDGs by 2015.

TABLE I

Tentative list of neglected<sup>a</sup> tropical diseases of importance in Latin America and the Caribbean

Bacterial
Leprosy or Hansen's disease ( <i>Mycobacterium leprae</i> )
Trachoma ( <i>Chlamydia trachomatis</i> )
Plague ( <i>Yersinia pestis</i> )
Buruli ulcer ( <i>Mycobacterium ulcerans</i> )
Leptospirosis ( <i>Leptospira</i> spp.)
Bartonellosis ( <i>Bartonella bacilliformis</i> )
Congenital syphilis/Yaws/Pinta complex <sup>b</sup> ( <i>Treponema pallidum</i> subspp.) - under discussion
Parasitic protozoa
Chagas disease ( <i>Trypanosoma cruzi</i> ) - not considered neglected in some countries
Visceral leishmaniasis ( <i>Leishmania donovani</i> complex including <i>L. chagasi</i> in the Americas)
American cutaneous leishmaniasis ( <i>Leishmania braziliensis</i> complex)
Parasitic nematodes (round worms)
Lymphatic filariasis ( <i>Wuchereria bancrofti</i> ), i.e. filariasis and elephantiasis
Onchocerciasis ( <i>Onchocerca volvulus</i> ), i.e. river blindness
Geohelminth infections (soil-transmitted helminthiasis), principally caused by <i>Ascaris lumbricoides</i> ; <i>Trichuris trichiura</i> ; hookworms ( <i>Ancylostoma braziliense</i> , <i>Necator americanus</i> i.e. the uncinarias)
Trichinosis ( <i>Trichinella spiralis</i> )
Toxocariasis ( <i>Toxocara canis</i> ), i.e. visceral larva migrans
Enterobiasis ( <i>Enterobius vermicularis</i> ), i.e. pin worm
Parasitic trematodes (flat worms)
Schistosomiasis ( <i>Schistosoma mansoni</i> )
Fascioliasis ( <i>Fasciola hepatica</i> )
Paragonimosis ( <i>Paragonimus westermani</i> )
Parasitic cestodes (tape worms)
Cysticercosis/Taeniasis (esp. <i>Taenia solium</i> )
Echinococcosis/Hydatid cyst ( <i>Echinococcus granulosus</i> )
Hymenolepsis ( <i>Hymenolepis nana</i> )
Parasitic fungi and ectoparasitic arthropods
Superficial mycoses (Tinea and other fungal infections)
<i>Tunga</i> flea, <i>Sarcoptes</i> mite, myiasis from fly larvae, head and body lice, ticks
Viral
Viral hemorrhagic diseases (other than dengue/DHF) - under discussion

<sup>a</sup>: Brazil does not consider any infectious disease in its territory as neglected, but does recognize the existence of diseases of poverty within its boundaries; <sup>b</sup>: the endemic (non-venereal) treponematoses are yaws (*T. pallidum* subsp. *pertenue*), endemic syphilis (*T. pallidum* subsp. *endemicum*), and pinta (*T. carateum*).

## Who are the neglected populations in the LAC Region?

The UN has taken as its definition of NDs those that “affect almost exclusively poor and powerless people living in rural parts of low-income countries” (DFID 2004). Where are these people, and what do we know about the epidemiology of the NDs among them?

In LAC about 78 million *rural people* live in poverty, and of these some 48 million live in extreme poverty. They are principally small farmers, fishers, plantation workers, and include poor rural communities of African descent. However 75% of the LAC region is now urbanized. In the period 2000-2001, of the approximately 513,285,000 people in LAC approximately 32.3% of these people (127,438,000 persons) lived in impoverished, deprived *urban or peri-urban* communities (*The Challenge of Slums*, UN-Habitat 2003, Table A.1). These are known in the Region by various names: *turgúrias*, *favelas*, *asentamientos informales*, *áreas periféricas*, *barrios pobres*, *invasiones*, and are associated principally with the informal sector of workers. Therefore this framework extends the boundary of NDs to include impoverished urban and peri-urban populations.

In the Americas (Canada to Argentina) about 45 million out of 891 million people (5%) are identified by PAHO as *indigenous*, that is, one in 20 individuals; and are comprised of about 400 different ethnic groups in 24 countries (PAHO data). The World Bank has noted a strong relationship between rural poverty and ethnicity: “The majority of the indigenous peoples (80% of some 19-34 million) – (Note the discrepancy in the count of the number of indigenous peoples between PAHO and the World Bank), found mainly in rural Mexico, Peru, Colombia, Bolivia, Ecuador, and Guatemala, are poor”.

Other neglected populations in the Region include the *migrant agricultural laborers*, of which there are at least 900,000 in the US alone, but remain largely uncounted in the rest of the Region. Some one-half million *itinerant gold miners* are estimated to migrate and work in the Amazonia region alone. Of the *prisoners* incarcerated in jails and other penal facilities, there are at least 0.55 million in LAC. There appear to be no good estimates of the number of *homeless* people living in LAC.

## Where are the NDs in the Region?

The NDs are clearly association with populations living in poverty, but this diverse group of more than 20 communicable diseases vary in their distribution and whom they principally afflict (Table II).

Fig. 1 shows the rank order of a selected set of 14 NDs and other selected communicable diseases in 27 countries of the Region. Figs 2 and 3 are the percentage and the absolute number, respectively, of a selected set of 14 NDs and other selected communicable diseases in 27 countries of the Region. Additional NDs such as trachoma will be added as data is collated. One may observe that a very large and geographically diverse country like Brazil has ten or more of the NDs diseases, while smaller countries or those with limited geographic diversity have fewer. Fig. 4 shows the relative presence of 14 NDs found in PAHO's five Key Countries: Bolivia, Guyana, Haiti, Honduras, and Nicaragua.

TABLE II

Partial list of neglected tropical diseases in the Latin America and Caribbean region by community of occurrence

Common in shanty-towns and slums
Lymphatic filariasis (including elephantiasis; found in four countries)
Weil's disease (leptospirosis)
Common in rural and agricultural areas of several countries
Schistosomiasis (snail fever or blood fluke)
Fascioliasis (liver fluke)
Leprosy or Hansen's disease
Leishmaniasis (kala-azar, cutaneous leishmaniasis)
Chagas disease (American trypanosomiasis)
Cysticercosis and trichinosis (from pork)
Plague
Trachoma
Common in some indigenous communities
Onchocerciasis (river blindness)
Parasitic skin diseases (scabies, sand fleas, and Tinea fungi)
Common in most impoverished populations
Soil-transmitted helminths (hookworms, roundworms, whipworms)

The neglected tropical diseases are part of the diseases of poverty of which several can be eliminated altogether in the Region (e.g., onchocerciasis, lymphatic filariasis, leprosy, trachoma) while others may be eliminated locally (Chagas disease) or controlled to a level where they do not cause severe illness or community burden.

## Why a focus now on the NDs?

In the last decade, the development of new drugs and diagnostic tools, and strong evidence-based pharmaceutical and epidemiological studies have clearly demonstrated successes and resulted in a new or expanded set of tools to address the NDs. Prices of the production of key drugs against NDs have in many cases fallen sharply (e.g., one albendazole tablet costs as little as one to two cents (US), and one praziquantel tablet less than ten cents (US), and new drugs have been developed (e.g., miltfosine for kala-azar). For leprosy, MDT has been available since 1981. For geohelminths and schistosomiasis there are proven-safe drugs (e.g., albendazole, mebendazole, praziquantel) that can be successfully delivered through MDA (mass drug administration) to high-risk populations including pregnant women and children over one year of age. For lymphatic filariasis there are new diagnostic kits and proven safe combinations of drug treatments [e.g., albendazole plus diethylcarbamazine (DEC) or albendazole plus ivermectin for lymphatic filariasis], plus new protocols for managing severe lymphoedema and hydrocoele and for enabling home-based skin and limb care. These drug treatments, when administered as recommended by WHO, can spare future generations from severe, disabling, and subtle morbidity including the irreversible sequelae in adulthood, such as liver fibrosis and damage to the urinary tract due to schistosomiasis; or hydrocele, lymphoedema, and elephantiasis from lymphatic filariasis.

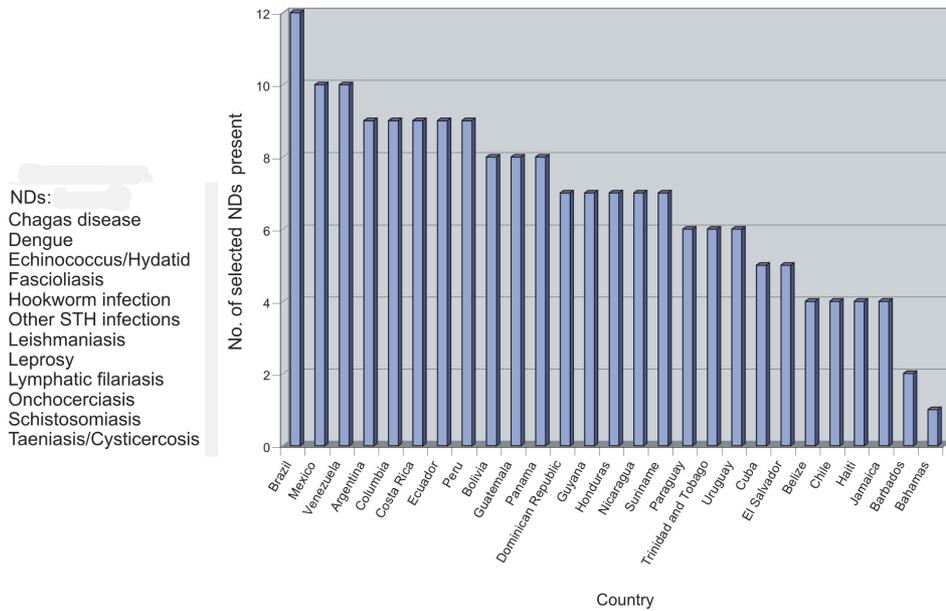


Fig. 1: neglected diseases (NDs) in Latin American and the Caribbean.

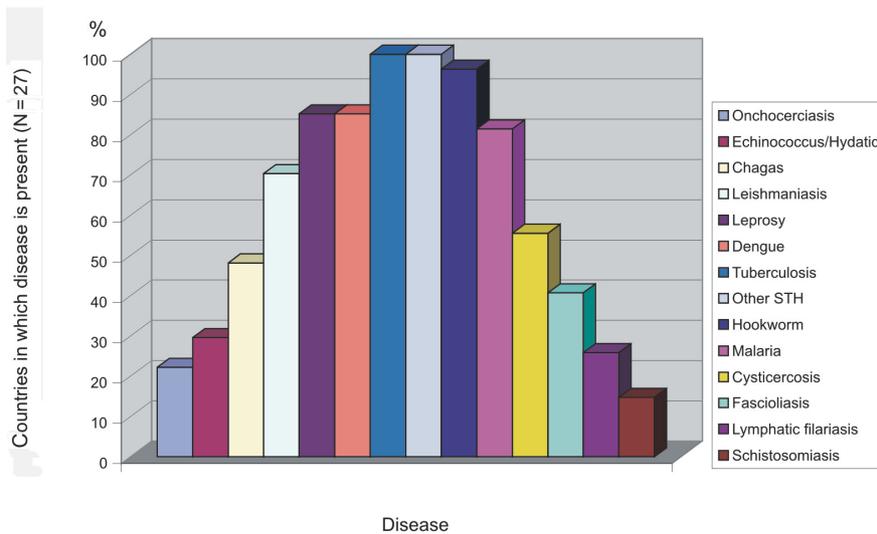


Fig. 2: neglected diseases and other selected communicable diseases in Latin America and the Caribbean.

There are new and free or inexpensive tools (e.g., WHO’s HealthMapper, CDC’s EpiMap) for mapping disease distribution and community treatment information. These new tools and other advances enable the public health workers to do more, more efficiently, faster, and reach a wider population – the opportunity is here, and the time is here to move forward rapidly.

Coupled with, and in some cases as a result of these advances, regional and global disease control or elimination programs now exist for several of the NDs, and

the World Health Assembly has passed Resolutions committing WHO and its member-states to eliminate lymphatic filariasis, onchocerciasis, and leprosy as public health problems. Blinding trachoma is also targeted for elimination. WHO and the Partners for Parasite Control are coordinating a global program to control geohelminths and schistosomiasis in at least 75% of all school-age children at risk of morbidity (by use of risk mapping, regular chemotherapy, education, environmental improvements). Partnerships and alliances exist at the

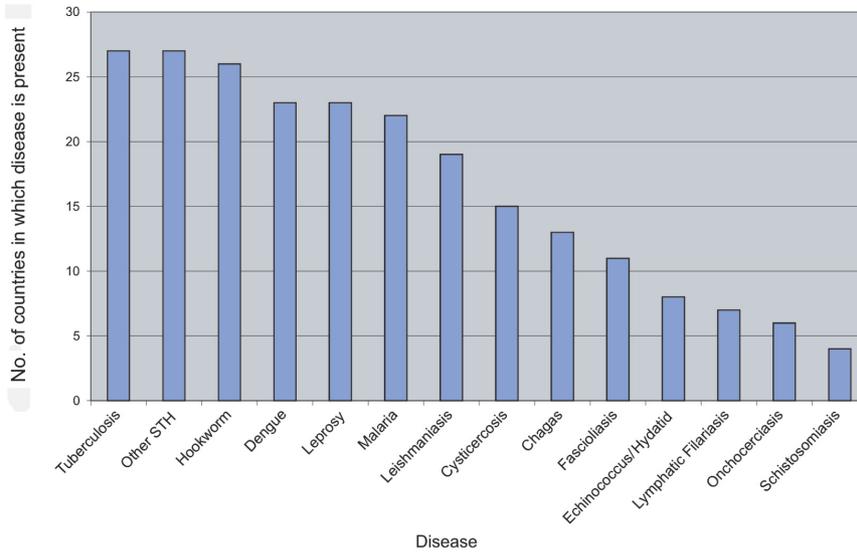


Fig. 3: neglected diseases and other selected communicable diseases in Latin America and the Caribbean.

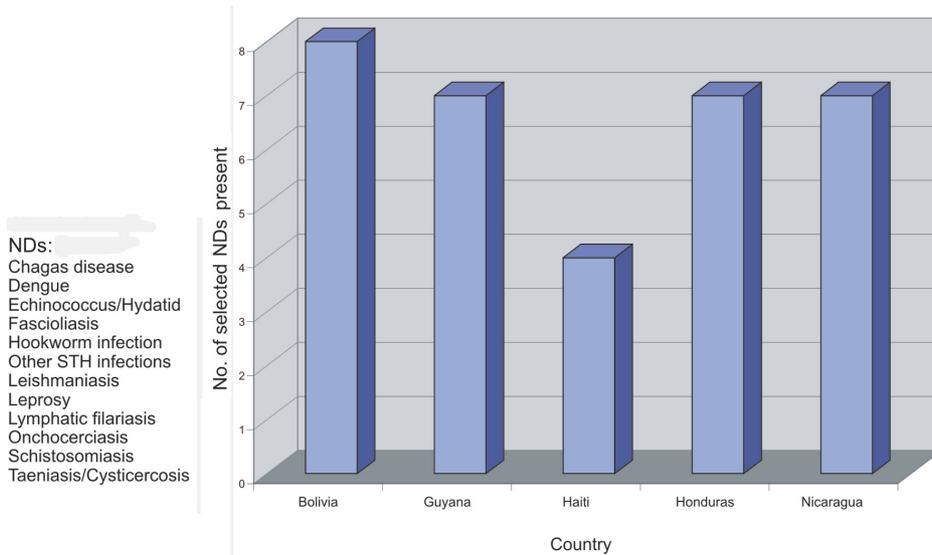


Fig. 4: neglected diseases (NDs) in Pan American Health Organization's five priority countries.

global level to support these efforts, involving substantial commitments from major pharmaceutical companies and philanthropic foundations and non governmental organizations (NGOs), among others. At the Regional level, PAHO is also implementing a plan for interruption of Chagas disease vector transmission and blood bank safety, and elimination of leprosy as a public health problem.

Several countries have made and continue to make significant advances against the NDs. Brazil has reduced the foci of transmission of lymphatic filariasis to two

small areas out of 11 known foci. All onchocerciasis-endemic countries have recently been able to meet their full treatment goals, leprosy prevalence in the Region is declining, and some countries are slowly expanding their geohelminth control programs (e.g., Argentina, Ecuador, and Nicaragua) with an expected reduction in morbidity.

The distribution and burden of the NDs in neglected populations are not merely a reflection of geographic and ecological circumstances but also a reflection of the level of government political commitment and in-

vestment of resources (human, financial) for their prevention and control in these vulnerable populations and the geographic spaces where they live. Thus progress is slow in preventing, eliminating or controlling the NDs in some countries of the Region, faster in other countries such as Costa Rica. Few health care systems can guarantee full access and delivery of the essential medicines for all patients and populations at risk. Most countries have not yet taken full advantage of the new tools and protocols available for prevention, elimination, and control. As well, some production capacity problems exist for diagnostic tools such as rapid ICT detection cards for detection of lymphatic filariasis parasite antigen. In order to develop an operative strategy for the prevention and control of NDs, there is a need to organize our public health resources, as suggested next.

### **Organization for prevention, elimination, and control within the health sector**

The NDs have been grouped into three strategic areas for the implementation of the regional framework through the health sector. Epidemiological surveillance and mapping should accompany each of the three strategic areas, where resources permit. These strategic areas target: (1) the eliminatable NDs, i.e. those eliminatable in practice by mass preventive or targeted chemotherapy alone; (2) the NDs controllable by mass preventive or targeted chemotherapy and intensified, improved, early case detection and management; and (3) the NDs which require improved transmission control through better use of vector control, behavioral interventions, emergency preparedness, and environmental sanitation and management.

For the eliminatable diseases (leprosy, lymphatic filariasis, onchocerciasis, trachoma), we have good diagnostic and treatment tools, cheap and effective treatment which either does not require direct clinical services for chemotherapy (lymphatic filariasis, onchocerciasis) or which require only limited reliance on fixed health service units (leprosy, eyelid surgery in trachoma). Elimination of these diseases is supported by Resolutions of the World Health Assembly and/or Global and Regional Alliances.

For the diseases which are controllable by mass preventive chemotherapy (geohelminthiasis, schistosomiasis), targeted chemotherapy, or other basic curative measures (Chagas disease) but are not readily eliminatable, we pursue improved, early and intensified case detection and management. We have relatively cheap and effective treatments for them which either does not normally require clinical services for treatment (geohelminthiasis, schistosomiasis) or which may require only basic health services (Chagas disease). Their widespread epidemiological pattern in endemic countries makes elimination unlikely at the present except for certain limited settings (e.g., the potential to locally eliminate schistosomiasis in the Caribbean countries). Elimination of these diseases is supported by Resolutions of the World Health Assembly and global alliances (geohelminths and schistosomiasis) or by PAHO's governing body and a Regional Alliance (Chagas disease).

Other NDs require improved transmission control through better use of vector control, behavioral interventions, environmental change management, emergency preparedness, environmental sanitation, and management; along with attention at the secondary or tertiary health levels as needed. Among these NDs are: leishmaniasis, fascioliasis, cysticercosis/taeniasis, echinococcus/hydatidosis, hydatidiasis, congenital syphilis/yaws complex, plague, bartonellosis, superficial mycoses, Buruli ulcer, leprosy, and viral hemorrhagic diseases. We have limited diagnostic tools, and limited efficacy to treat many of these diseases. Treatment is sometimes accompanied by secondary reactions needing medical attention and health services involvement. These diseases are generally focal in distribution but complicated by the fact that many are zoonoses and/or vector-borne, and require close coordination between communicable disease, vector control, and veterinary public health officers. Global and regional alliances and supporting resolutions are non-existent or very limited. Their prevention and control require greater efforts, advocacy, and investments.

Surveillance for NDs is the responsibility of national and local health authorities. However given the reality that most health care systems do not yet prioritize surveillance of NDs (with some exceptions such as those with potential for large outbreaks or epidemics like plague), surveillance outreach is needed to extend to and involve cooperating hospitals, polyclinics, and clinics, and health posts; networks of specialist physicians (e.g. dermatologists, GI specialists, ophthalmologists), nurses and environmental health officers; and neighborhoods and communities which can organize themselves for surveillance (e.g. home-based surveillance by family members for Chagas disease vectors, domestic rodent infestations, and rodent, bird, and livestock die-offs) (Table III).

At the Regional level a rank order of the relative importance of the NDs is difficult to propose. Rankings could be made based on criteria such as: presence of global or regional mandates for elimination, extent of geographic distribution, trends in distribution, and estimated burden of disease (morbidity/disability, stigma, mortality). However, disease burden in particular is challenging to establish due to lack of surveillance data for many NDs. In any particular country or sub-region it will be necessary to prioritize which of the NDs will be the most important to intensify attention based on local prevalence, disease burden, populations at risk, geographic distribution, and the commitment to equity in health care for the country's citizens (coverage and health services goals).

In the strategic lines of action to be developed under this framework, a *multi-disease, inter-programmatic, and inter-sectoral approach* will be taken wherever scientifically and logistically possible and economically rational, and will actively seek *community involvement* with the aim of local empowerment. In this way, this framework *differs* from many conventional public health plans due to the focus of implementation through work with partnerships with multiple sectors and multiple health programs.

TABLE III  
Three approaches to target neglected diseases prevention, control, and elimination within the health sector

Strategic approach in health sector	Nomenclature	Objectives	List of diseases
1	Mass preventive or targeted chemotherapy alone	Can eliminate as a public health problem (regular treatment to interrupt transmission; control morbidity)	Leprosy (Hansen's disease), lymphatic filariasis, onchocerciasis, blinding trachoma
2	Mass preventive or targeted chemotherapy, and improved and intensified case detection and management	Regular treatment to reduce parasite burden and morbidity (geohelminths, schistosomiasis). Improved, early and intensified case detection and management (schistosomiasis, Chagas)	Geohelminths, schistosomiasis, Chagas
3	Transmission control. Better use of vector control, behavioral interventions, environmental change management, emergency sanitation and management	Reduce biological, behavioral and environmental risk factors for transmission and replication, for example: (i) integrated vector management and pest management, including insecticide resistance monitoring; (ii) use of COMBI and other behavioral interventions; health education (IEC); (iii) prevention, mitigation, and management of major environmental and ecological disruptions (deforestation, uncontrolled urbanization and peri-urbanization) which enable or enhance disease transmission; (iv) emergency preparedness for natural disasters and cyclic zoonoses (e.g. leptospirosis and plague outbreaks, respectively) with infectious diseases, civil defense, and veterinary public health cooperation; (v) environmental sanitation and management	Visceral leishmaniasis, American cutaneous, leishmaniasis, fascioliasis, cysticercosis, hydatidosis, plague, ectoparasites, superficial mycoses, Buruli ulcer, leptospirosis, bartonellosis, congenital syphilis/yaws complex, viral hemorrhagic fevers

#### GOAL AND OBJECTIVES OF THE STRATEGIC FRAMEWORK

The development goal stemming from the strategic framework is to contribute to improving the health status and quality of life of more vulnerable populations by reducing the burden of neglected tropical diseases. The immediate objective or purpose of the strategic framework is to strengthen sectoral and intersectoral capacity and empower communities to prevent, control, and even eliminate neglected tropical diseases in more vulnerable populations by year 2020.

The strategic framework for NDs is expected to result in:

1. A shift in the paradigm from single-disease to multi-disease and integrated approaches to the prevention and control of neglected tropical diseases. We expect to conduct pilot projects using integrated, multi-disease, inter-programmatic, and/or inter-sectoral interventions to demonstrate feasibility (proof of principle in several countries in the Region: (i) development of special proxy indicators capable of capturing meaning-

ful impacts of these multiple interventions (e.g., increased labor productivity, improved well-being, improved school attendance, reduced anemia); (ii) costing and/or cost-effectiveness analysis incorporated from the outset of the each pilot project.

2. An increase in the number of families who know and apply individual and familial prevention practices and correct hygiene behaviors in the participating communities.

3. The development and dissemination of a framework and packages of best practices suggested for use in the countries of the Region.

4. Integrated and enhanced attention to NDs in the framework of primary health care, such as (a) improved access to regular chemotherapy and other health treatments (to reduce prevalence and disease burden) for people infected with schistosomiasis, geohelminthiasis, trachoma, and leprosy; and (b) improved public health surveillance systems for decision-making for NDs in the Ministries of Health of the participating countries and communities, with a focus on developing multi-disease based surveillance systems and use of GIS in planning and monitoring, risk assessment, and impact assessment.

### Activities and supporting actions

The framework's activities will focus on several lines of action:

1. Surveillance of NDs, community-based where possible.
2. Strengthening access to regular health services for NDs at community level.
3. Systematic treatment of the NDs in categories 1 and 2: (a) infection treatment; (b) morbidity control of disease and its sequelae.
4. Prevention through health education and IEC.
5. Working with other sectors.

In the strategic lines of action to be developed under this framework, we approach each ND, country and at-risk population individually, as there is no universal mold for all. However, as noted above, the lines of action will take a *multi-disease, inter-programmatic and inter-sectoral approach* wherever scientifically and logistically possible and economically rational, and will actively seek *community involvement* with the aim of local empowerment. We will focus on the *interaction of the health sector with five other key sectors*: Sustainable Development and Poverty Reduction, Environment, Agriculture and Livestock, Nutrition and Food Security, and Education; however other sectors will be involved as needed.

As well, various supporting actions for each ND or group of NDs can be implemented depending on the specific needs of each country and population at risk. These consist of two groups, those supporting actions from within the health sector, and those which are normally outside the health sector.

Within the health sector, supporting actions may include:

1. Promotion of multi-disease, integrated, inter-sectoral and/or inter-programmatic actions in all participating countries.
2. Training in integrated, multi-disease, inter-programmatic and inter-sectoral interventions.
3. Expanded and targeted health education and social communication for schools and communities.
4. Community-focused health surveillance.
5. Integrated Vector Management (IVM).
6. Laboratory participation and strengthening.
7. Forming networks of specialists on NDs.
8. Development of managerial and technical guidelines.
9. Advocacy campaigns for NDs.

Outside the health sector, important supporting actions which should be considered as part of a package of intersectoral approaches may include:

1. Establishing intersectoral technical committees and virtual networks.
2. Improved water supply and sanitation (WS&S) directed to high-risk communities.
3. Strengthening links between veterinary public health and the agriculture and livestock sectors.
4. Advocacy and communication with affected communities and key external stakeholders (municipality, Ministry, professional associations, private sector, academic sector) on the environmental and socioeconomic determinants of health and well-being.

5. Community mobilization and participation.
6. Partnerships.
7. Environmental education.
8. Community economic development.

### Designing interventions and identifying entry points

How can we design interventions to work in a multi-disease, inter-programmatic, inter-sectoral and/or integrated manner? For a multi-disease approach, for example, Table IV shows some opportunities for synergy in disease prevention and control by listing the general geographic overlap of a set of selected neglected tropical diseases and some other key infectious disease in PAHO's Five Priority Countries. In designing interventions for the enhanced prevention, control, and/or elimination of the NDs, we may look at four types of design options. We may consider simply *Combining* intervention A and B (in time and place) such as deworming and insecticide-treated nets (ITN) distribution or ITN retreatment; *Piggy-backing* a new intervention on top of an existing successful routine program intervention (e.g., micronutrient supplementation); *Integration* of two or more interventions within the primary health care system or higher levels of care and operations; or *Synergism* where the combination of two or more interventions gives results which are greater than the simple sum of their individual effects, for example, combining deworming with vitamin A supplementation.

What are the possible entry points for addressing the NDs in a multi-disease, inter-programmatic, inter-sectoral and/or integrated manner? Within PAHO/WHO, programs from other areas and units such as the Health of the Indigenous Peoples of the Americas Initiative, IMCI, Primary Environmental Care (PEC), Healthy

TABLE IV

Opportunities for synergy in disease prevention and control: a draft list of selected neglected tropical diseases and some other key infectious diseases in PAHO's five priority countries

Diseases	Bolivia	Guyana	Haiti	Honduras	Nicaragua
Chagas disease	+	+		+	+
Dengue <sup>a</sup>	+	+	+	+	+
Fascioliasis	+				
Hookworms <sup>b</sup>	+	+	+	+	+
Other common STHs	+	+	+	+	+
Leprosy	+	+	+	+	+
Leishmaniasis	+	+		+	+
Lymphatic filariasis		+	+		
Taeniasis/Cysticercosis	+			+	+
Malaria <sup>a</sup>	+	+	+	+	+
Tuberculosis <sup>a</sup>	+	+	+	+	+

a: adds to overall disease burden in neglected populations; b: *Necator americanus* and *Ancylostoma duodenale*; STH: soil-transmitted helminths: *Ascaris*, *Trichuris*, *Strongyloides*. Other neglected tropical diseases occur in the Region. Some other important infectious diseases in the Region which are, arguably, not neglected include: HIV/AIDS, other STDs, diarrheal diseases and URIs.

Spaces (Healthy Schools), Healthy Municipalities, and Healthy and Productive Municipalities can make excellent entry points for building and enhancing attention to the NDs. Outside of PAHO, various agencies, NGOs and institutes from the environmental, natural resources and development sectors and community-based organizations have programs in health or programs linkable to health which can make both good entry points and partnerships, as the World Wildlife Fund has successfully done (WWF 2005, Biodiversity support program. An ounce of prevention: making the link between health and conservation).

### Priority health sector interventions

What are the priority health sector interventions (intra- and inter-programmatic) in the five Key Countries and other priority countries of the Region? The implementation of the framework may focus on the following types of proven interventions or other interventions with rationally-expected benefits, but always based on national needs and priorities and epidemiological knowledge.

1. School-based deworming combined with micronutrient distribution (e.g., vitamin A, iron, zinc, iodine) and with school-feeding programs such as those coordinated by the World Food Program and NGOs. Articulation with School Health (World Bank), Health-Promoting Schools (PAHO), and Healthy Schools (WHO, UNICEF) initiatives.

2. Deworming with child immunization programs and with pre-natal care services for pregnant women.

3. Deworming as a routine part of maternal-child-neonate health (MCNH) outreach and IMCI in high risk areas – at no cost.

4. Deworming as a routine part of adolescent health care (especially girls) in high risk areas.

5. Schistosomiasis drug treatment in transmission areas.

6. Mass drug administration (MDA) for lymphatic filariasis and onchocerciasis foci.

7. Early case detection and treatment for leprosy (MDT), trachoma (SAFE), and American cutaneous leishmaniasis (protocols in need of development).

8. Early case detection and morbidity management for lymphatic filariasis, schistosomiasis, leprosy, ectoparasites, and superficial fungal infections.

9. Co-collection of blood samples (evaluate anemia, malaria, and Chagas) together with fecal samples (for intestinal protozoa and helminths including schistosomiasis) and diagnosed by cross-trained microscopists and laboratory technicians.

10. Provision of ITNs and IT-curtains; personal protection (clothing, repellents, bandages on wounds in case of leishmaniasis); and source reduction for vector control for Chagas disease, filariasis, and leishmaniasis (syn-

ergies with malaria and dengue vector control possible). Linkage with the Integrated Vector Management strategy of PAHO/WHO.

11. Antihelminthic and antiparasitic chemotherapy with appropriate skin care of HIV/AIDS patients to avoid disseminated strongyloidiasis and scabies, and reduce complications of concurrent leishmaniasis and other parasitic infections (see Harms G, Feldmeier H 2005. The impact of HIV infection on tropical diseases. *Infect Dis Clin North Am* 19: 121-35).

12. Health education (schoolchildren, community, family) and hygiene education (family and personal hygiene) – e.g., “check your skin” messages.

### Interventions from other sectors (inter-sectoral opportunities)

Several types of activities which involve joint actions by other sectors working together with the health sector can advance the prevention, elimination, and control of the NDs. Some of these activities include:

1. Animal management for zoonotic reservoirs in domestic animals large and small (synergy with veterinary public health).

2. Improved water and sanitation (safe water, safe excreta disposal).

3. Housing improvement for control of the vectors of Chagas disease, filariasis and leishmaniasis (synergies with malaria and dengue vector control).

4. Improved household energy systems: substitution of dirty for clean biofuels, other energy sources (synergy with respiratory diseases, indoor air quality).

5. Improved neighborhood drainage and solid waste management.

6. Promotion of home-based vegetable gardens and backyard orchards, market gardens and plant nurseries, combined with bee-keeping where possible.

7. Reforestation for fuel woods, soil conservation and flood and landslide mitigation, agroforestry (e.g., community agroforestry nurseries; agroforestry with wildlife protection).

8. Combining and coordinating IVM with Integrated Pest Management (IPM) in agroecosystems.

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