PLAN OF ACTION TO STRENGTHEN THE SURVEILLANCE AND CONTROL OF LEISHMANIASIS IN THE AMERICAS

2017-2022

2017

Pan American Health Organization

World Health Organization
REGIONAL OFFICE FOR THE Americas

Communicable Diseases and Health Analysis Department

CONTENT

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INTRODUCTION

The Leishmaniasis Plan of Action for the Americas is an instrument that consolidates the main lines of action to strengthen surveillance and control of the disease in the Region. Furthermore, it presents the process indicators to assess its progress, as well as the epidemiological and operational indicators to monitor the disease and progress in the quality of performed services and available information.

It was elaborated from the guidelines and directives of the Global Leishmaniasis Program of the World Health Organization - WHO, adapted to the epidemiological characteristics and specific aspects of the Region, in order to reach the commitment assumed by the member countries, within the framework of the mandates approved by the World Health Assembly and the Directing Council of the Pan American Health Organization - PAHO/WHO, expressed by Resolutions WHA 60.13 of May 2007, WHA 66.12 of 2013, CD49. R19 of October 2009 and CD55.R09 of September 2016.

This plan of action is the result of an analysis of epidemiological data, technical discussions, agreements and recommendations made by experts, researchers and professionals responsible for the actions to fight this disease in endemic countries, based on scientific evidence available in the Region.

The actions proposed in this Plan were formulated from the diagnosis of the disease status in the Region, initially dividing them into two groups according to the type of disease: cutaneous and visceral leishmaniasis, which differ in clinical presentation, species of *Leishmania*, vectors and reservoirs, as well as, characteristics of the transmission cycle, which makes the actions of surveillance and control different.

The actions are focused on early diagnosis, adequate treatment and follow-up of affected people, surveillance, prevention and control of human cases, vectors and reservoirs, when required.

1. CONCEPTUAL FRAMEWORK

1.1. Neglected Infectious Diseases

Neglected Infectious Diseases are a set of diseases of infectious origin that currently persist exclusively among the poorest and most neglected communities in the world, where they are frequently grouped and overlapped. The WHO estimates that more than one billion people suffer from one or more of these diseases, and that there are several million living in areas where there is a risk of contracting them.

This group of diseases is called neglected or forgotten because they share two essential characteristics: first, they have been neglected, from the local, national, or international level, which is manifested by the lack of resources (financial, technical and human) granted for their approach and control, and second, they are strongly associated with poverty and marginality.

WHO formulated the "Global Plan to Combat Neglected Tropical Diseases 2008-2015", which included actions for 17 pathologies, most of which are chronic, disabling, sometimes deadly, and often deforming infections, prevalent in Populations of Asia, Africa and in the tropics of America.

The importance of neglected and other diseases associated with poverty is evident when improving health and living conditions in the Americas is sought through reducing the burden of infectious diseases. If we want to better control or eliminate these diseases, it is necessary not only the collective effort of PAHO/WHO but also the commitment of the Member States, as well as of the actors and allies of the different sectors and organizations and the participation of affected communities.

WHO recommends five strategies to combat NIDs: (i) preventive chemotherapy (for NIDs where this applies), (ii) intensive case management, (iii) vector control, (iv) provision of drinking water, sanitation and hygiene improvement, and (v) veterinary public health. Although many of the NIDs have a predominant strategic line for their combat, virtually all NIDs will require a combination of strategies in question to achieve their ultimate control.

In the Americas, the Directing Council of the PAHO adopted Resolution CD55.R09 of 2016, which defined the new Regional Plan of Action against neglected infectious diseases and post-elimination measures and expanded control of NIDs. This resolution defines the following general objectives of the plan of action:

a) Interrupt transmission of and eliminate eight NIDs for which there are costeffective tools: blinding trachoma, Chagas disease, dog-mediated human rabies, leprosy (Hansen's disease; eliminated as a public health problem), human taeniasis/cysticercosis, lymphatic filariasis, onchocerciasis (river blindness), and schistosomiasis.
b) Prevent, control, and reduce the burden of disease from five NIDs for which there are integrated and innovative management tools: cystic echinococcosis/hydatidosis, fascioliasis, human plague, leishmaniasis (cutaneous and visceral), and soil-transmitted helminthiasis.
c) Assess the Regional epidemiological situation with respect to other NIDs affecting groups living in vulnerable conditions, such as brucellosis, Buruli ulcer, ectoparasitic infections (e.g., lice, scabies, tungiasis), selected fungal infections, myiasis, strongyloidiasis, venomous snake bite and arthropod bite poisonings, and yaws, including gap assessment of the current systems for the detection and monitoring of these NIDs.
d) Reduce the risk of recrudescence or reintroduction of any NID in the post-elimination phase.

1.2. Leishmaniasis

Leishmaniasis remains as one of the most neglected diseases in the world and predominantly affects the poorest, especially in developing countries; it is estimated that there are 350 million people at risk of contracting it and two million new cases occur each year. Over the last 20 years, scientific advances in treatment and

diagnosis have been achieved, such as rapid tests for visceral leishmaniasis, demonstration of efficacy of miltefosine and Amphotericin B Liposomal for treatment, and the prices of several key drugs have been reduced. This has facilitated the implementation of sustainable Regional and national monitoring and control programs.

In 2007, the resolution WHA60.13 on the control of leishmaniasis was endorsed at the World Health Assembly (WHA), which called for conditions that would allow WHO to assume a leadership role in technical cooperation to initiate, maintain and expand disease control programs. In this same resolution, Member States made the commitment to strengthen surveillance and control of leishmaniasis worldwide. This commitment was reinforced by the countries of the Region of the Americas in Resolution CD49.R19 of 2009 in the context of the fight against DIDs.

In 2010, the 63rd World Health Assembly reinforced the importance of instituting Regional leishmaniasis programs. In 2011, PAHO/WHO instituted the Regional leishmaniasis program in the Region in order to strengthen technical cooperation through: 1) understanding the burden of disease, 2) establishing an information system to support the decisions, 3) implementing diagnostic and treatment actions, 4) establishing and developing integrated surveillance and control actions for leishmaniasis according to the epidemiological characteristics of each country, and 5) strengthening Regional and national capacities, as well as operative investigation.

In 2013, the resolution 66.12 of the World Health Assembly on Neglected Tropical Diseases was adopted to achieve the goals of control, elimination and eradication of this group of diseases, which includes leishmaniasis.

One of the major challenges in leishmaniasis is that there are currently no tools to reduce the burden of disease. In the Region of the Americas, leishmaniasis has a zoonotic cycle, and therefore Regional goals and efforts are focused on reducing severe forms of disease, avoiding deaths and reducing contact between man and the vector.

2. STATUS ANALSIS

2.1. Leishmaniasis worldwide

Leishmaniasis is a group of diseases caused by the protozoan parasite *Leishmania*. More than 20 species of *Leishmania* are pathogenic to humans and are transmitted by the bite of infected female phlebotomines. There are three main types of leishmaniasis: i) visceral, often known as kala-azar and the most severe form of disease (LV); ii) cutaneous, the most common (LC); and iii) mucocutaneous (CML).

The disease mainly affects the poor in Africa, Asia and Latin America, and is associated with malnutrition, migration, poor housing conditions, weak immune system and lack of resources.

Leishmaniasis is endemic in more than 98 countries and territories and there is transmission across five continents; however, the burden of human morbidity is concentrated primarily on some major outbreaks. It is estimated that approximately 0.2 to 0.4 million new cases of VL occur each year and between 0.7 and 1.2 million new cases of CL occur worldwide.

More than 90% of global VL cases occur in six countries: Bangladesh, Brazil, Ethiopia, India, South Sudan and Sudan (Figure 1). Cutaneous leishmaniasis is widely distributed, with about one-third of cases occurring in each of the three epidemiological Regions, the Americas, the eastern Mediterranean and West Asia from the Middle East to Central Asia. The ten countries with the highest estimated case counts are: Afghanistan, Algeria, Brazil, Colombia, Ethiopia, Iran, Nicaragua, Peru, Sudan and Syria, and together account for between 70 and 75% of the estimated global incidence CL (Figure 2).

Figure 1 - Distribution of cases of visceral leishmaniasis in the world, 2013

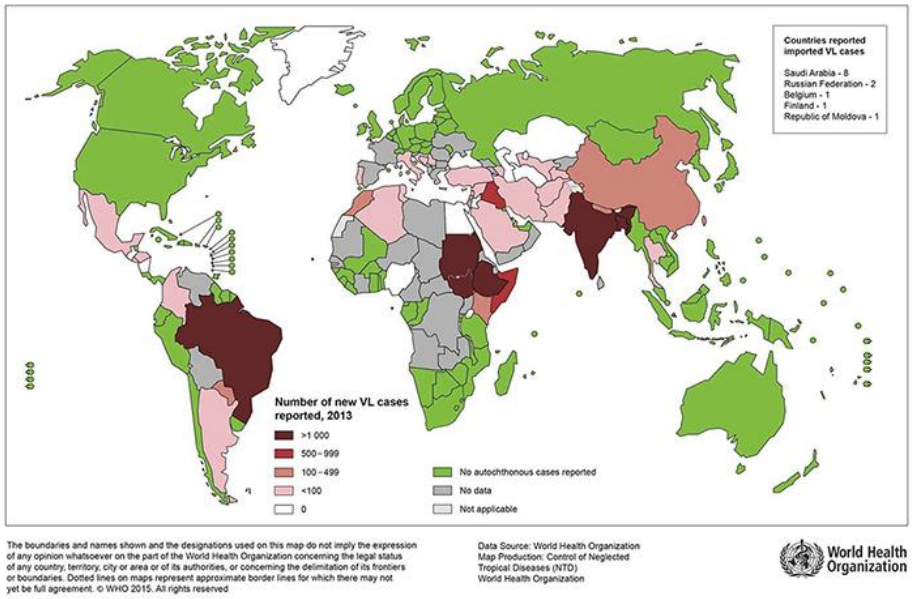
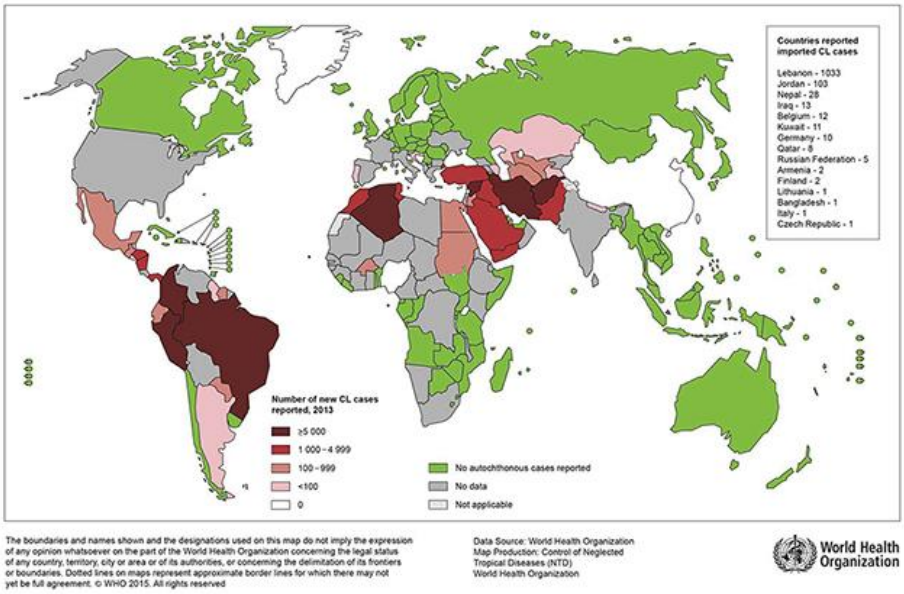


Figure 2 - Distribution of cases of cutaneous leishmaniasis in the world, 2013



2.2. Leishmaniasis in the Region of the Americas

In the Americas, leishmaniasis is a public health problem due to its morbidity and mortality and broad geographical distribution. Its complex cycle of transmission includes different species of parasites, reservoirs and vectors. They affect mainly the poorest and people with most difficulty to access health services.

In this Region, leishmaniasis is caused by different protozoan species of the genus *Leishmania* and transmitted to animals and humans by insects of the family Psychodidae, maintained by the zoonotic cycle. In the humans they cause a set of clinical syndromes that can compromise the skin, mucosal membranes and viscera. The parasite is a protozoan belonging to the family Trypanosomatidae. The genus *Leishmania* is divided into two subgenus *Leishmania* and *Viannia* and 15 of the 22 species pathogenic to man have been identified in the Americas.

Phlebotomines, vectors of parasites of the genus *Leishmania*, are hematophagous Diptera of the family Psychodidae and subfamily Phlebotominae. In the Americas, the genus *Lutzomyia* is the most important genus, with more than 400 identified species; however, little more than 50 are considered as potential vector species or involved in the transmission of the different species of *Leishmania* in the Region.

In the Americas, the transmission cycle of leishmaniasis is zoonotic, requiring the presence of an animal reservoir for the maintenance of the parasite in nature. Identified sylvatic reservoirs for different species of *Leishmania* include: marsupials (*Didelphis* spp.), sloths (*Choloepus* spp. and Bradypus spp.), anteater (*Tamandua tetradactyla*), crab-eating *fox (Cerdocyon thous*), rodents (*Rattus* spp., *Proechimys* spp., *Nectomys* spp., *Oryzomys* spp., etc.), among others. In the urban environment, the dog is the main reservoir in the transmission of *L. infantum* (syn.) *L. chagasi*.

Leishmaniasis is characterized by large clinical polymorphism and depending on the species of the *Leishmania* involved and the immune response triggered by the host, it can manifest in benign and self-limited clinical forms of cutaneous leishmaniasis, to the most serious forms such as mucosal leishmaniasis, mucocutaneous, diffuse cutaneous and visceral leishmaniasis.

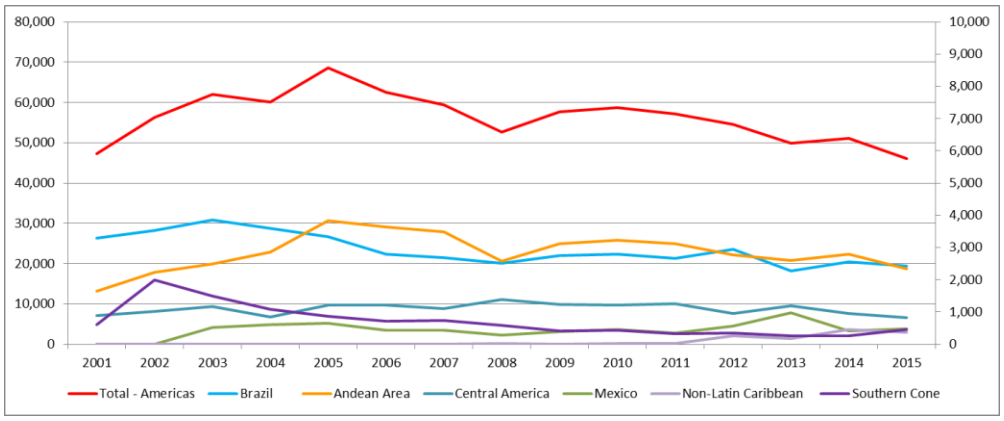
2.2.1. Cutaneous/mucosal leishmaniasis

Cutaneous leishmaniasis is endemic in 18 countries of the Region, of which 17 (94.4%) reported data from 2001 to 2015 to PAHO/WHO. In that period, 845,775 cases were reported, with an annual average of 54,742 in 2005, the highest number of cases was recorded, representing an increase of 19.0% compared to the average number of cases in the period. 40.25% of the cases (340,342) were registered in the Andean subRegion, 15.45% (130,672) in Central America and 41.65% (352,247) in Brazil, which added to Colombia (19.7%) and Peru (13.12%), represent 74.45% of the total cases reported in the Region from 2001 to 2015 (Figure 3).

In 2015, 46,082 cases were registered in the Region in 17 of the 18 endemic countries, representing an incidence rate of 17 cases per 100,000 inhabitants. Colombia (7,541), Peru (5,459) and Brazil (19,395) reported the highest number of cases detected, but the highest incidence rates were observed in Suriname (218.48 / 100,000 inhabitants) and Nicaragua (76.64 / 100,000). The cases occurred in 234 units of the first political administrative level (departments, states or provinces, according to the division in each country) and in 3,238 municipalities in the Region (Figures 4, 5 and 6).

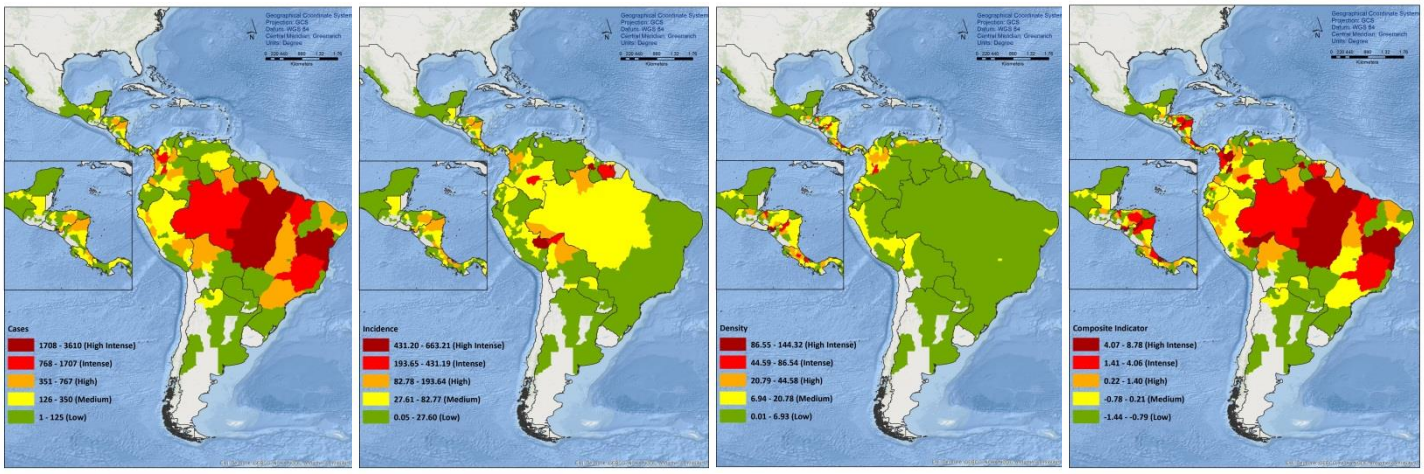
Of the total cases with available information on clinical forms, 93.96% (43,297) corresponded to the cutaneous form and 4.21% (1,942) to the mucosal/mucocutaneous form, seeing that Brazil (1,071), Bolivia (236) And Peru (362) reported the highest number of cases detected in this way, which together represent 86% of the cases registered in the Region. However, the highest percentages of the mucosal form were observed in Paraguay (27.78%), followed by Bolivia (10.5%), Peru (6.63%) and Brazil (5.52%). Additionally, 1,018 cases of the atypical cutaneous clinical form were reported in two countries: Honduras (96.5%) with the highest percentage and Nicaragua (3.5%).

Figure 3 - Cases of cutaneous leishmaniasis, according to subRegion, Americas, 2001 -2015



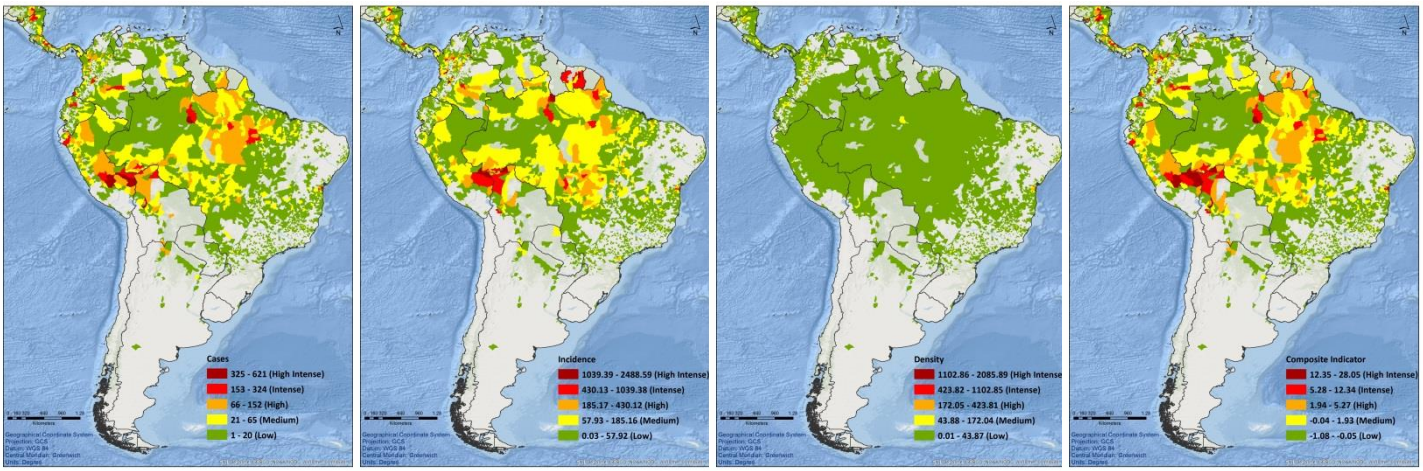
Source: SisLeish-PAHO/WHO - Data reported by Leishmaniasis National Programs and/or Surveillance Services of Endemic Countries - * Southern Cone, Mexico and the Non-Latin Caribbean - left axis; other countries - right axis. 05/10/2016.
Andean Area: Bolivia, Colombia, Ecuador, Peru and Venezuela; Central America: Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama; Southern Cone: Argentina and Paraguay; Non-Latin Caribbean: Guyana. This grouping of countries is the same as PAHO/WHO used for the publication of the "Health Status in the Americas. Basic Indicators"

Figure 4 - Case distribution, incidence rate/100,000 population, case density/Km^2 and cutaneous leishmaniasis composite indicator at the first subnational administrative level, Americas, 2015



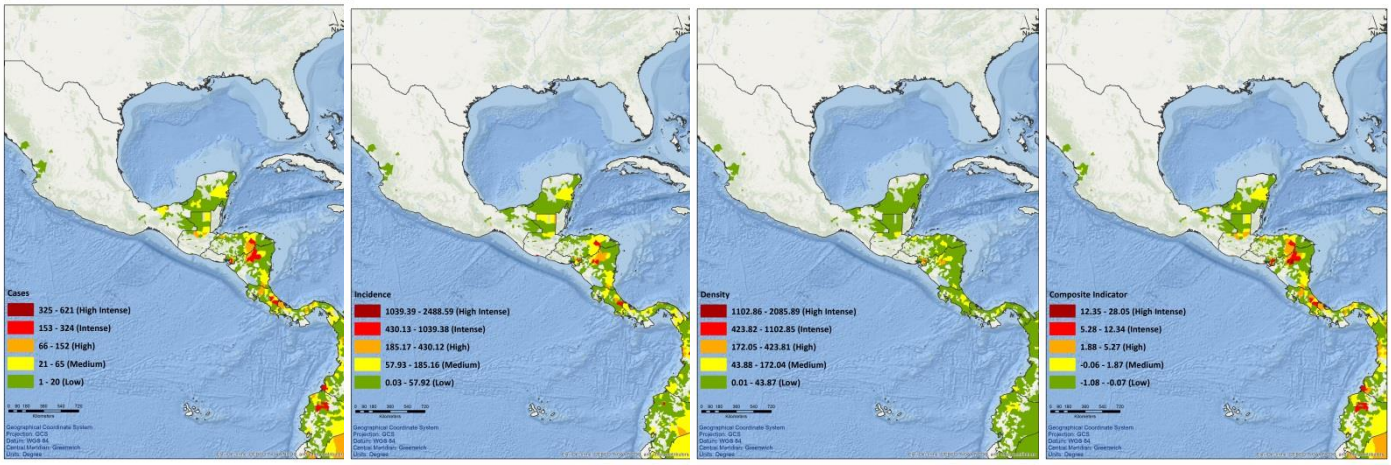
Source - SisLeish-PAHO / WHO - Data reported by the Leishmaniasis National Programs and/or surveillance services of endemic countries.

Figure 5 - Case distribution, incidence rate/100,000 population, case density/Km^2 and cutaneous leishmaniasis composite indicator at the second subnational administrative level, Americas, 2015



Source - SisLeish-PAHO / WHO - Data reported by the Leishmaniasis National Programs and/or surveillance services of endemic countries.

Figure 6 - Case distribution, incidence rate/100,000 population, case density/Km^2 and cutaneous leishmaniasis composite indicator at the second subnational administrative level, Central America, 2015

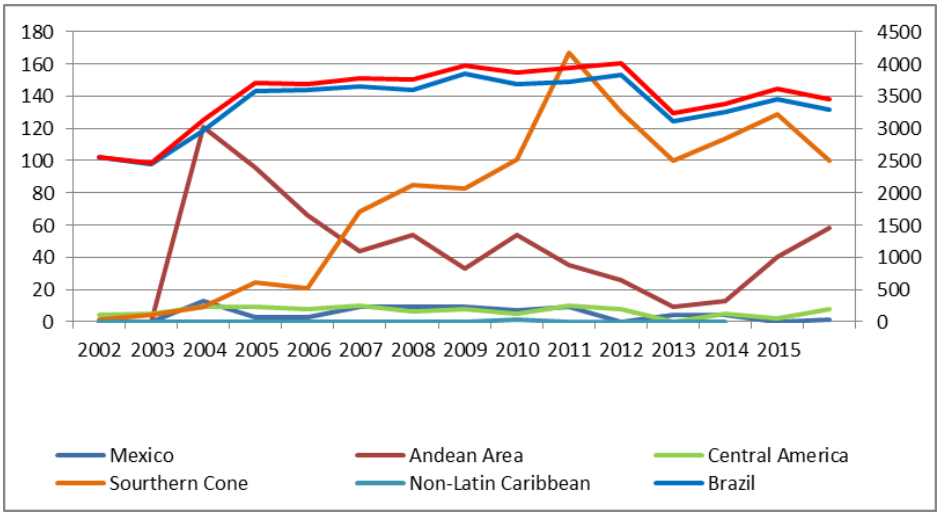


Source - SisLeish-PAHO / WHO - Data reported by the Leishmaniasis National Programs and/or surveillance services of endemic countries.

2.2.2. Visceral leishmaniasis

From 2001 to 2015, 52,176 cases of visceral leishmaniasis were registered in the Americas, distributed in 12 countries of the Region. Although 96.35% of these cases (50,268) were reported by Brazil, there has been an increase of cases in countries of the Southern Cone, Paraguay (990) and Argentina (146) (Figure 7).

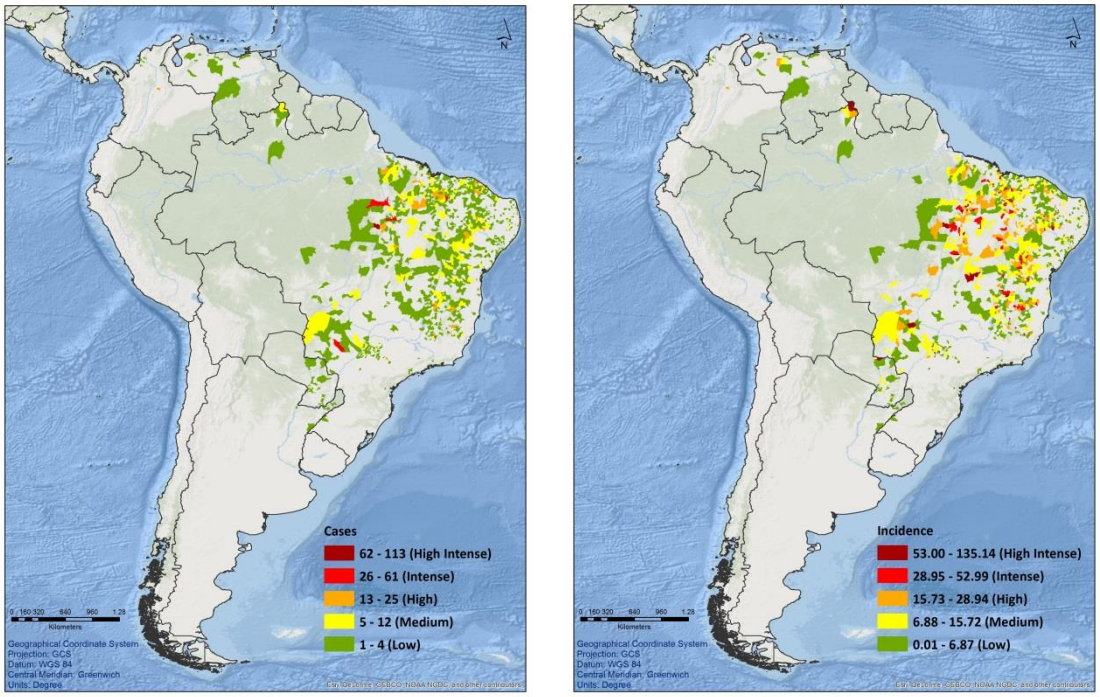
Figure 7 - Cases of visceral leishmaniasis, according to subRegion, Americas, 2001 -2015



Source: SisLeish-PAHO/WHO - Data reported by Leishmaniasis National Programs and/or Surveillance Services of Endemic Countries - * Total Americas and Brazil - right axis; Other countries - left axis. 05/10/2016

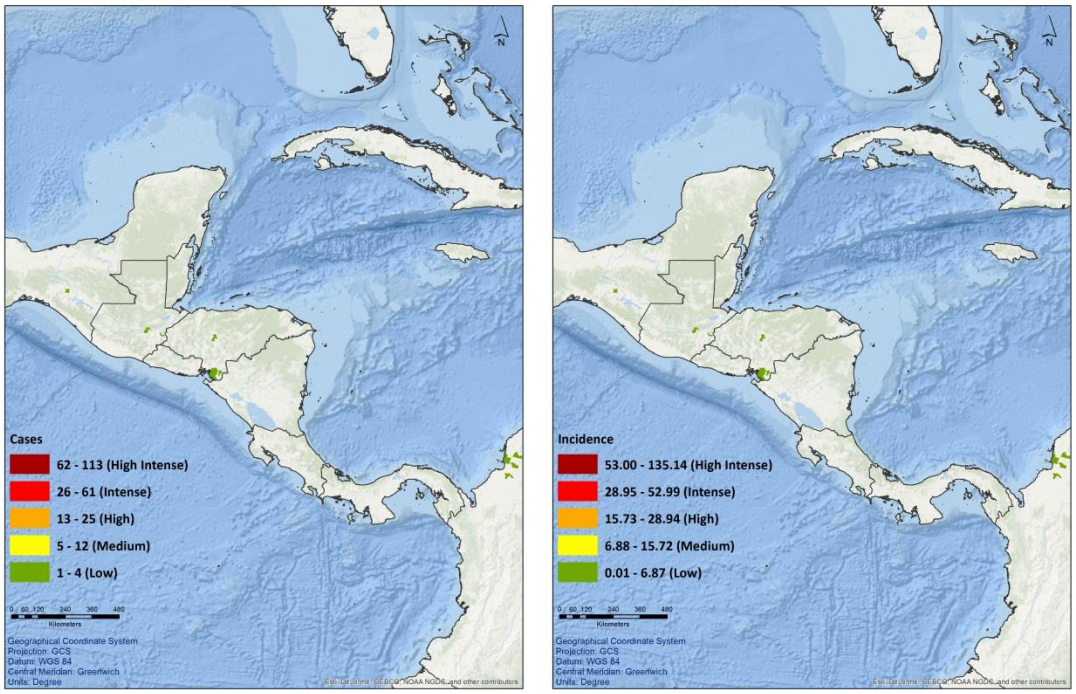
In 2015, a total of 3,456 cases were reported in eight countries distributed in 928 municipalities (ranging from 1 to 113 cases) (Figures 8 and 9). The countries that reported the highest number of cases were Brazil with 95.15% (3.289), followed by Paraguay 2.7% (92), Venezuela 1% (37) and Colombia 0.6% (21).

Figure 8 - Visceral leishmaniasis cases and incidence by country at the second subnational administrative level, South America, 2015.



Source - SisLeish-PAHO/WHO - Data reported by the Leishmaniasis National Programs and/or surveillance services of endemic countries.

Figure 9 - Visceral Leishmaniasis cases and incidence per 100,000 population by country at the second subnational administrative level, Central America, 2015.



Source - SisLeish-PAHO/WHO - Data reported by the Leishmaniasis National Programs and/or surveillance services of endemic countries.

The visceral leishmaniasis incidence in the Region was 2.27 cases per 100,000 pop., considering only the population in transmission areas. Brazil, Paraguay and Guatemala presented the highest rates with 2.54, 2.36 and 1.89 cases per 100,000 pop., respectively.

In 2015, 3,456 visceral leishmaniasis cases were registered in the Americas, of which 257 (7.44%) cases were of VL/HIV co-infection. The proportion of co-infected patients was maintained during 2012 to 2015, with an annual average of 7% (ranging from 6.15% to 7.75%). Brazil and Paraguay reported the highest proportion of co-infection cases, with an annual average of 7.11% and 9.23%, respectively. Moreover, in 2015, 268 deaths were reported, resulting in a fatality rate of 7.75%, similar to the annual average of the last four years (6.9%).

2.2.3. Leishmaniasis epidemiological classification and scenarios in the Americas

The classification and identification of epidemiological scenarios for leishmaniasis allow knowledge of the magnitude and disease risk of occurrence, in order to prioritize and guide surveillance, prevention and control actions. Therefore, the different transmission cycles and the role of each element present in the chain of transmission must be taken into account, also consider concepts, definitions and indicators for each of the Leishmaniasis. The proposal is detailed in the Procedures Guidelines for Surveillance and Control of Leishmaniasis in the Americas.

It is worth mentioning, that leishmaniasis epidemiological analysis and classification can be done at any administrative level; However, ideally it should be at the most disaggregated operational level, so that

monitoring and control actions are most effective in defined time-space scenarios. Each country in the Region has its own administrative policy structure, with a hierarchical relationship of definitions and names that differ between countries. For comparative purposes we present in table 1 the designation of each national and subnational administrative level and their respective names in each country.

Table 1 - List of leishmaniasis endemic countries and administrative levels, Americas, 2015

Endemic Countries CL and/or VL	ADMINISTRATIVE LEVELS		
	1st Subnational Administrative level	2nd Subnational administrative level	3rd Subnational administrative level
Argentina	Provinces	Departments	Municipalities
Belize	District	Territory	-
Bolivia	Departments	Provinces	Municipalities
Brazil	State	Municipality	District / Town
Colombia	Departments	Municipalities / District	Location
Costa Rica	Provinces	Cantons	District
Ecuador	Provinces	Cantons	Parishes
El Salvador	Departments	Municipalities	Towns
Guatemala	Department	Municipality	Location
Guyana	Regions	Neighborhood councils	-
Honduras	Department	Municipality	Villages
Mexico	Department	Municipality	Location
Nicaragua	Departments / Regions	Municipalities	Location
Panama	Provinces / Counties	Districts	Corregimientos / Counties
Paraguay	Departments	Districts / Municipalities	Location
Peru	Departments	Provinces	Districts
Suriname	Districts	Resorts	Towns
Venezuela	State	Municipality	Location

2.2.3.1. Cutaneous/mucosal leishmaniasis

For the CL risk classification and stratification, the following indicators were identified and used: number of cases, incidence and density of cases. These indicators were analyzed individually and after seeing the advantages and disadvantages of each to adequately represent the epidemiological scenarios, it was decided to establish a composite indicator, which has been validated for the risk stratification of CL. For the analysis and use of the indicators a study of their distribution was done using the natural breaks method to reduce the variance

within classes and to minimize the variance between them. Based on the classes, 5 transmission strata were generated: low, moderate, high, intense and very intense. The different indicators are detailed in Table 2.

Table 2 - Cutaneous/mucosal leishmaniasis indicators, calculus and their utility

INDICATORS	CALCULUS	UTILITY
Cases of cutaneous/mucosal leishmaniasis	Total number of new confirmed CL cases reported in the year in the Region, subRegion, and country at the 1st and 2nd subnational administrative levels. Note: Cases confirmed according to the PAHO/WHO Standardized Case Definition	Knowledge of the CL occurrence, profile, case progression, distribution and trend.
Incidence rate of cutaneous/mucosal leishmaniasis	Total number of new CL cases during the year/total population at risk in the Region, subRegion, and country at the 1st and 2nd sub-national administrative levels x 100,000 population	Knowledge of the CL occurrence risk and monitor the trend of the disease
Density rate of cutaneous/mucosal leishmaniasis	Total number new CL cases during the year/transmission area in Km^2 in the Region, subRegion, and country at the 1st and 2nd sub-national administrative levels, or defined area of transmission	Quantify the occurrence of CL cases in a limited geographical area.
Composite Indicator-CL (CICL)	After calculating the annual indicators for number of cases, incidence and density for each country at the 1st and 2nd sub-national administrative levels, the average and standard deviation was calculated and they were normalized and standardized according to the following calculus: **Normalized case indicator =** Number of cases - cases average / standard deviation **Normalized incidence indicator =** Incidence - average incidence / standard deviation. **Normalized density indicator** = Density - average density / standard deviation **CICL = Σ** Normalized case indicator + Normalized incidence indicator + Normalized density indicator The CICL for each analyzed territorial unit was categorized by natural breaks, which allowed the generation of five strata of risk of transmission: low, moderate, high, intense and very intense.	Knowledge of CL occurrence integrating the indicators (cases, incidence and density). The categories of the indicator are used to direct and prioritize surveillance, prevention and control actions in defined territories.

Based on the CL composite indicator, the algorithm was defined for the epidemiological classification of CL geographical areas (Figure 10). The proposed algorithm is presented below, as well as the definition of its terms, Table 3.

Figure 10 - Américas Epidemiological classification for surveillance and control of cutaneous leishmaniasis in the Americas

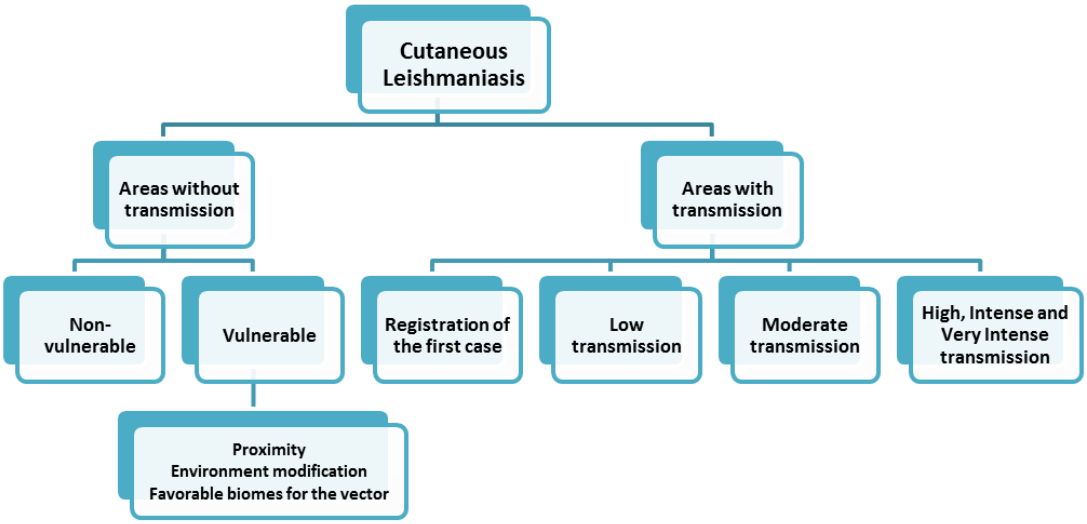


Table 3 - Term definition for epidemiological classification for surveillance and control of Leishmaniasis in the Americas: Regional level, countries, and national sub-levels.

TERMS	DEFINITIONS
Transmission scenarios	Ecological characterization of the environment where transmission occurs.
Area concept	Geographical space which data can be stratified.
Areas without transmission or silent	Areas with no historical record of autochthonous VL cases neither in humans nor in canines. These areas are classified as vulnerable or non-vulnerable.
Vulnerable areas	Areas that meet at least one of the following criteria: a) have favorable conditions for presence of the vector; B) be contiguous to areas with transmission within the country or, in the case of border areas, within a neighboring country; c) present intense migratory traffic with other areas of the country or with border areas of bordering countries; D) shares road networks with areas with transmission.
Receptive Areas	They are vulnerable or non-vulnerable areas with registered vector presence.
Non-receptive areas	Vulnerable or non-vulnerable areas with no vector presence present. In order to characterize an area as non-receptive, one must have the corresponding entomological study
Areas with transmission	Areas where at least one autochthonous, human or canine case has occurred. These areas are classified according to presence or no presence of outbreak.
Outbreak occurrence:	Areas without transmission: occurrence of human or canine cases Areas with transmission: increase of the number of human cases compared to the expected number of cases according to the endemic channel.

2.2.3.2. Visceral leishmaniasis

For the epidemiological classification of VL areas in the Americas, we initially considered the different transmission scenarios in the countries and their internal status. The proposed algorithm for the epidemiological classification of the areas, as well as the definition of its terms (Table 2b, Figures 11 and 12) is presented below.

Figure 11 - Epidemiological Classification of Visceral Leishmaniasis in the Americas: Regional Level.

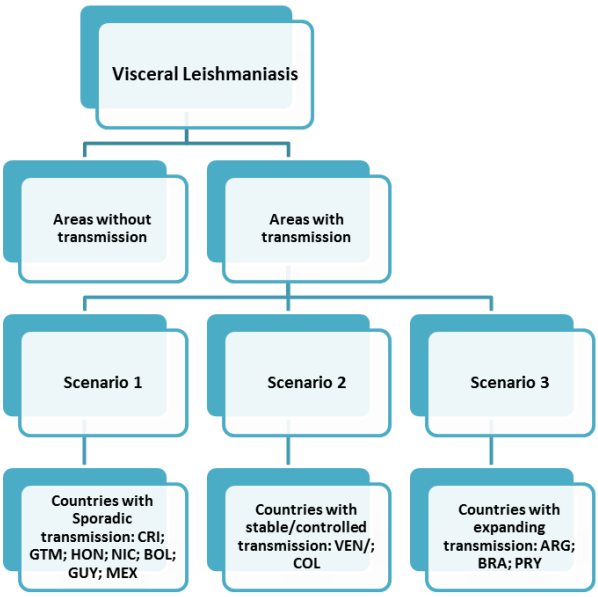
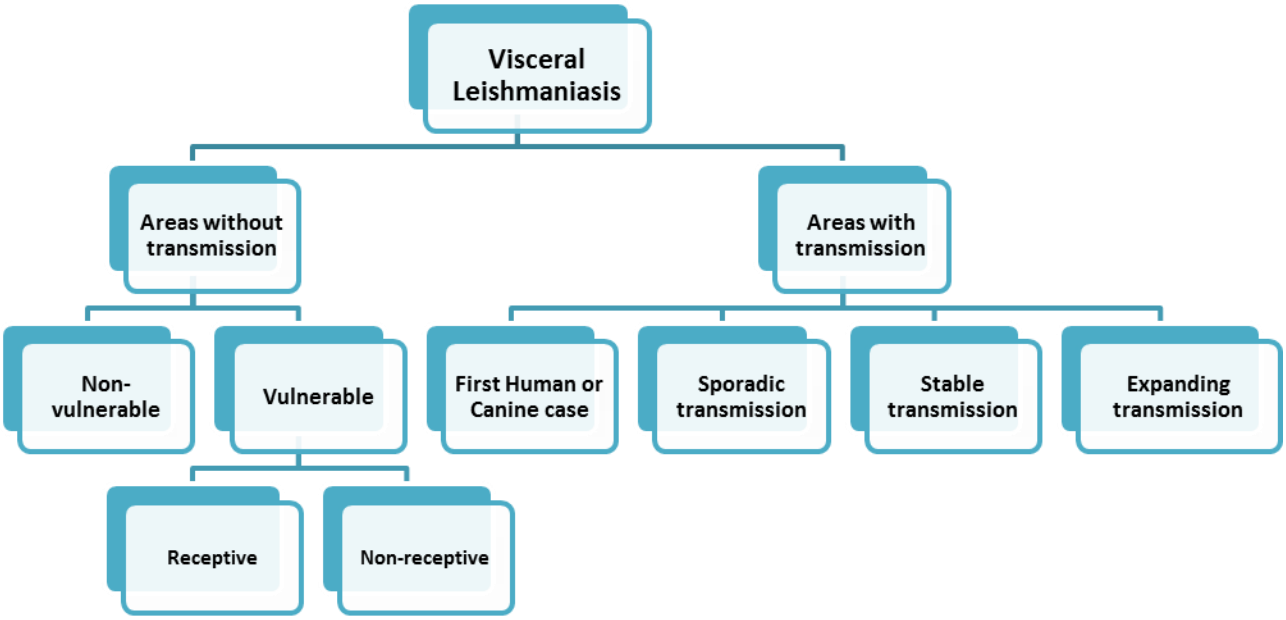


Figure 12 - Epidemiological classification for the surveillance and control of VL in the Americas: National countries and sublevels.

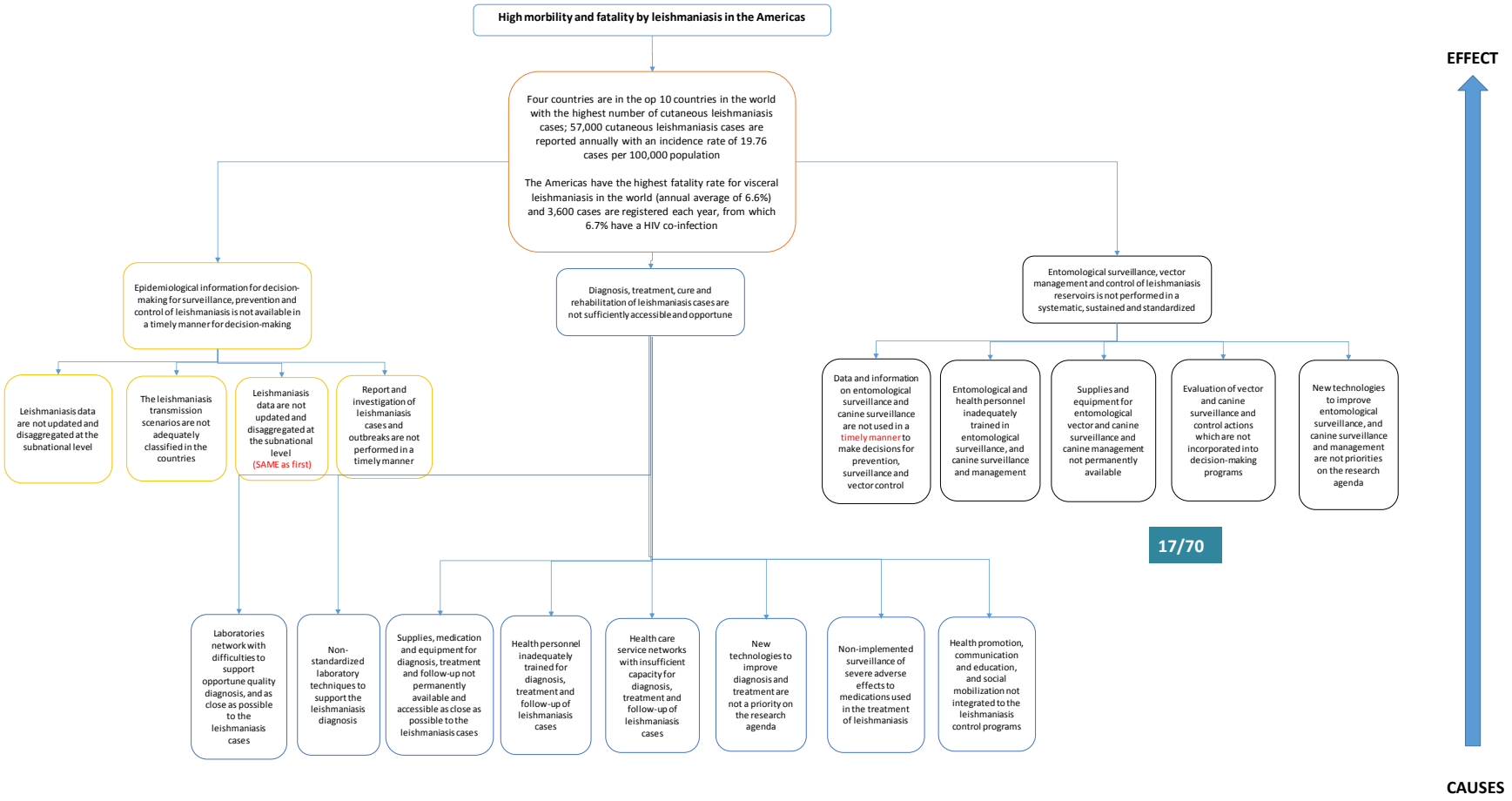


2.3. Tree of problems and Objectives tree for surveillance and control of leishmaniasis in the Americas

After analyzing the leishmaniasis epidemiological status in the Americas, supported by the delegates of the leishmaniasis national programs or their equivalents from the endemic countries that participated in the Regional meetings of the program organized by PAHO/WHO between 2012 and 2015, and with the joint work between the PAHO/WHO Regional leishmaniasis program and the countries, the problems and possible causes related to high morbidity and fatality due to leishmaniasis in the Region was analyzed. The constructed problem tree is presented in figure 13.

Subsequently, at the leishmaniasis Regional meeting held in Bogotá, Colombia in November 2015, the objectives were defined to guide the Regional plan of action for 2017-2022. These objectives were placed in the goal tree shown in Figure 14.

Figure 13 - Tree problems of surveillance, prevention and control of leishmaniasis in the Americas



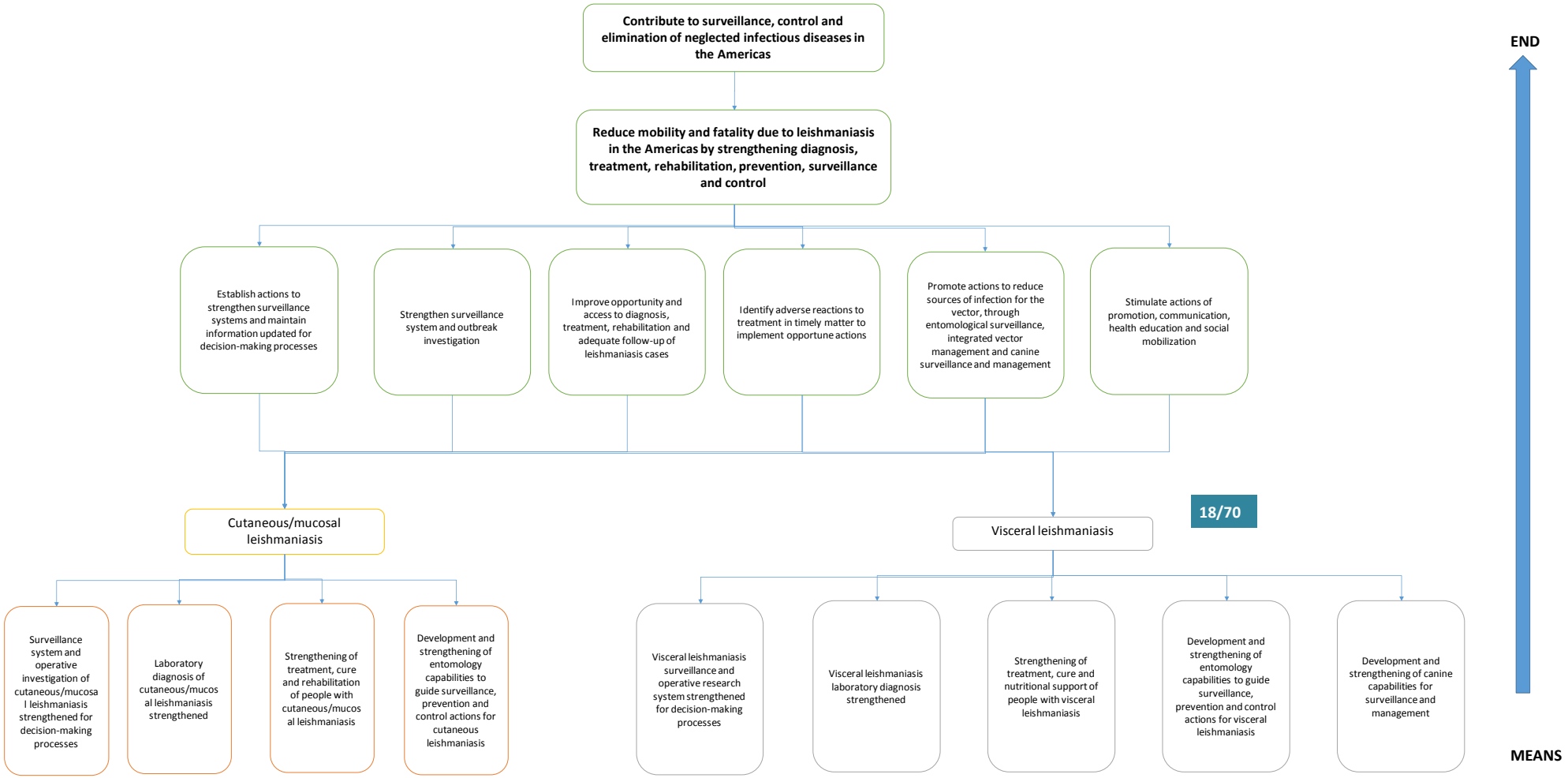
SECONDARY CAUSES

Inadequate housing conditions in the intra and peri-domicile

Health services with poor coverage and access in the dispersed rural areas affected by leishmaniasis

Plans and programs for the control and elimination of weak or non-existing neglected infectious diseases

Figure 14 - Objective tree of surveillance, prevention and control of leishmaniasis in the Americas



3. LEISHMANIASIS IN THE AMERICAS

In the Americas, the Leishmaniasis Regional Program is recent and was instituted in 2011 to support Member States in implementing the mandates approved by the World Health Assembly and the PAHO/WHO Directing Council. Thus far, monitoring and control actions were carried out in specific cases and countries worked individually to control the disease. The first Regional actions and discussions began in 2008 when PAHO/WHO held the first Regional Meeting with the endemic countries and several recommendations were agreed upon by the participants.

Based on these recommendations and guidelines of the WHO Global Leishmaniasis Program, revised in 2010 through the technical document "Control of Leishmaniasis" - WHO-TRS 949, 2010, the proposals for strengthening and development of the surveillance and control actions of the disease were adapted to the epidemiological characteristics and the specific characteristics of the Region.

Among the proposed and necessary actions to reduce the severe forms of leishmaniasis, to avoid deaths related to the use of drugs, to reduce the deaths caused by visceral leishmaniasis and to reduce the contact of the man with the vector, the lines of action to strengthen the diagnosis, treatment, prevention, surveillance and control of transmission of leishmaniasis in the Americas were created.

There are several advances and actions that have been developed in the endemic countries, with the support of experts and collaborators, representing a joint effort to strengthen surveillance and control of leishmaniasis in the Region. Countries have gradually incorporated the proposed actions into their respective programs, highlighting the strengthening of surveillance systems components, case management, health workers technical capacity for development and organization of actions integrated to Primary Health Care and other health services. Likewise, actions to strengthen surveillance, and vector and reservoirs control, when indicated, are being carried out from the standardization of established methodologies through the epidemiological classification.

The Sustainable Development goals are an opportunity to integrated leishmaniasis to neglected infectious diseases, since the established objective is to end AIDS epidemics, tuberculosis, malaria and neglected tropical diseases by 2030.

The approved resolutions of the World Health Assembly and PAHO/WHO in the last five years, for a comprehensive approach to control and elimination of neglected infectious diseases, are also a framework that facilitates the adoption of prevention, surveillance and control of leishmaniasis. Resolution WHA 66.12 of 2014 and resolution CD55.R09 of 2016 are the Regional framework driving collaboration between PAHO/WHO and Member States to strengthen response capacities to address neglected infectious diseases in the Americas.

Based on the progress and challenges, identified in the Americas, for surveillance, prevention and control of leishmaniasis this plan of action was developed, with the participation of the delegates of leishmaniasis national programs or their equivalents, national health laboratories, WHO collaborating centers and Regional leishmaniasis programs, zoonosis, entomology for public health, research and neglected infectious diseases.

The plan of action was structured using the logical framework methodology which established the purpose, goals, objectives, expected results and products and services for 2017-2022. Subsequently, the performance measurement matrix was developed and presented the indicators for the goals and expected results. Both matrices were developed

and completed by delegates of the leishmaniasis programs or their equivalents from Brazil, Colombia, Honduras and Peru, who were nominated by the endemic countries at the Regional meeting held in Bogota, Colombia in 2015, and met in Lima, Peru in May 2016. The meeting also had the participation of CIDEIM and PAHO/WHO Regional programs for leishmaniasis, neglected infectious diseases and zoonosis.

For the adequate development and implementation of this plan of action in the countries of the Americas, the leishmaniasis national programs or their equivalents, with the support of PAHO/WHO, partners, stakeholders and allies, should encourage and promote the following transversal actions:

1. Sustain the political, financial and technical commitment at national and subnational levels, as well as the support of partners and strategic allies to strengthen or implement actions.
2. Maintain the Leishmaniasis Information System (SisLeish) annually updated with data at the second subnational administrative level.
3. Adequately analyze and monitor epidemiological and operational indicators.
4. Develop standardized methodologies to evaluate interventions and leishmaniasis programs, as well as to generate information for decision-making processes and guidance of actions.
5. Maintain the treatment recommendations updated, and ensure first line medication and therapeutic alternatives for the diagnosed patients for free and required quality.
6. Plan surveillance and control actions, based on the procedures agreed upon and described in the guidelines for surveillance and control of leishmaniasis in the Americas. Take into consideration the standardization of techniques, methodologies and proposals for the Region.
7. Define strategies to improve the technical capacity of health professionals, as well as to organize the services of health care for human cases, vector and reservoirs, according to the epidemiological status.
8. Ensure participation of national laboratories in the Regional Program for Direct External Evaluation of Performance, as well as its internal implementation in each country.
9. Define and implement standardized proposals and methodologies, planning integrated and cross-sectoral actions to make them more effective.
10. Ensure that new leishmaniasis outbreaks are investigated and that border alerts are issued and addressed in an integrated manner between countries.
11. Support the development of new technologies.
12. Strengthen monitoring, evaluation and operational research/implementation as a means to improve decision-making processes throughout the life cycle of programmatic actions for prevention, surveillance and control of leishmaniasis.

4. SCOPE, PURPOSE, OBJETCTIVES, GOALS AND EXPECTED RESULTS OF THE PLAN OF ACTION

Based on the analysis of the leishmaniasis epidemiological status in the Americas and by country, as well as the progress and still persistent challenges to reduce the leishmaniasis mortality and mobility in the Region, the scope, purpose, objectives, goals and expected results of the Plan of Action have been established for the period of 2017-2022. Afterwards, through the logical framework matrix, the chain of products and services were identified for each expected result and the performance indicators were defined. The logical framework and the performance measurement matrix are available in annex 1 and 2, respectively.

Figure 15 portraits the scope, purpose, goals, objectives and expected results of the plan for cutaneous/mucosal and visceral leishmaniasi

Figure 15 - Scope, purpose, goals, objectives and expected results of the Leishmaniasis Plan of Action for the Americas, 2017-2022.

Scope	Contribute to surveillance, control and elimination of neglected infectious diseases in the Americas
Purpose	To reduce the leishmaniasis morbi-mortality in the Americas through strengthening of the diagnosis, treatment, rehabilitation, prevention, surveillance and control
Goals	To reduce fatality by visceral leishmaniasis by 50% in the Region by 2022.
	To reduce deaths by cutaneous/mucosal leishmaniasis by 90% in the Region by 2022.
	To reduce the cutaneous leishmaniasis proportion in children under 10 years of age by 50% in the Region by 2022.
	To reduce the visceral leishmaniasis incidence rate in the Region by 2022, according to the epidemiological scenario: • By 50% in countries with an expanding transmission in areas with intense transmission; • By 50% in countries with stable/manageable transmission, and; • Not to increase the incidence in countries with sporadic transmission.
Objectives	To establish actions for the strengthening of the surveillance system and maintenance of updated information for decision making processes.
	To reinforce the surveillance system and outbreak investigation.
	To improve the opportunity and access to diagnosis, treatment, rehabilitation and adequate follow-up of leishmaniasis cases.
	To identify in a timely manner treatment adverse effects to implement opportune actions.
	To promote actions to decrease infection sources for the vector, through entomological surveillance, integrated management of vectors, surveillance and reservoir management.
	To encourage actions of promotion, communication, health education and social mobilization.
Expected results	Surveillance system and operative investigation for cutaneous/mucosal and visceral leishmaniasis strengthened for decision-making processes.
	Laboratory diagnosis for cutaneous/mucosal and visceral leishmaniasis strengthened.
	Treatment, cure, rehabilitation and nutritional support of people with cutaneous/mucosal and visceral leishmaniasis strengthened.
	Entomological capabilities strengthened and developed to guide surveillance, prevention and control actions towards cutaneous/mucosal and visceral leishmaniasis.
	Reservoir surveillance and management capabilities strengthened and developed for visceral leishmaniasis.

For each of the goals the indicators were identified and the performance measurement matrix was built, Figure 16. For each of the expected results the performance matrix was also built as well as identification of the indicators, countries already established as baselines in 2015, target countries by 2022, data source, data collection method, frequency, expected actions and responsible party. The performance measurement matrix of the expected results is available in annex 2.

Figure 16 - Performance measurement matrix of the leishmaniasis plan of actions goals for the Americas, 2017-2022.

PURPOSE	GOALS AND INDICATORS	INITIAL DATA	GOALS	DATA SOURCE	DATA COLLECTION METHOD	FREQUENCY	EXPECTED ACTIONS	RESPONSIBLE PARTY
To reduce the leishmaniasis morbi-mortality in the Americas through strengthening of the diagnosis, treatment, rehabilitation, prevention, surveillance and control		**2016**	**2022**					
	Goal: To reduce fatality by visceral leishmaniasis by 50% in the Region by 2022. 1. Number of endemic countries that reduce fatality by visceral leishmaniasis by 50% Baseline: fatality average reported to SisLeish from 2012 to 2015.	**Americas = 6.89%** **ARG – 1.04%** **BRA- 6.92%** **COL - 0.0%** **PRY- 6.61%** **VEN - 11.64%**	**Americas = 3.44%** **ARG – 0.52%** **BRA- 3.46%** **COL - 0.0%** **PRY – 3.30%** **VEN - 5.82%**	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual	Countries are expected to adequately revise, update and register cases and deaths by VL and CL/ML in their information system and to report in an opportune and complete manner the data to SisLeish	Endemic countries and PAHO-CHA/VT/ Leishmaniasis
	Goal: To reduce deaths by cutaneous/mucosal leishmaniasis by 90% in the Region by 2022 2. Number of countries that reduce deaths by cutaneous/mucosal leishmaniasis by 90% (scheduled processes: 50% in 3 years, 70% in 4 years and 90% in 6 years). Baseline: average deaths by cutaneous/mucosal leishmaniasis reported to SisLeish from 2012 to 2015.	**Americas = 16** **BRA - 16** **COL -0** **HON - 0** **NIC - 0** **PER - 1** **VEN - 0**	**Americas = 2** **BRA - 2** **COL - 0** **HON - 0** **NIC - 0** **PER - 0** **VEN - 0**	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual	Countries are expected to investigate and adequately register deaths by CL/ML in their information system and to report in an opportune and complete manner the data to SisLeish To standardize protocol and investigation forms for death by leishmaniasis to implement in all of	Endemic countries and PAHO-CHA/VT/ Leishmaniasis

PURPOSE	GOALS AND INDICATORS	INITIAL DATA	GOALS	DATA SOURCE	DATA COLLECTION METHOD	FREQUENCY	EXPECTED ACTIONS	RESPONSIBLE PARTY
	Goal: To reduce the cutaneous leishmaniasis proportion in children under 10 years of age by 50% in the Region by 2022. 3. Number of countries that reduce the cutaneous leishmaniasis proportion in children under 10 years of age by 50% Baseline: Proportion of cutaneous leishmaniasis cases in children under 10 years old report to SisLeish from 2012 to 2015.	**Americas = 12.10%** **BOL - 11.24%** **COL - 9.06%** **CRI - 31.95%** **ECU - 22.49%** **SLV - 39.52%** **GTM - 10.78%** **GUY - 13.66%** **HON -13.49%** **NIC - 36.79%** **PAN - 49.25%** **PER - 13.88%** **VEN - 9.89%**	**Americas = 6.05%** **BOL - 5.62%** **COL - 4.53%** **CRI - 15.97%** **ECU - 11.25%** **SLV- 19.76%** **GTM- 5.39%** **GUY - 6.83%** **HON - 6.74%** **NIC - 18.39%** **PAN-24.62%** **PER -6.94%** **VEN - 4.94%**	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual	the countries Include in SisLeish information towards death investigation by leishmaniasis Countries are to investigate all cases in children under 10 years old, to adopt preventative and control mesures and to adequately register the CL/ML cases in children into their information system and report in a timely and complete manner to SisLeish. PAHO/WHO is to keep SisLeish updated and functioning. Countries are to reinforce their capabilities to develop prevention, surveillance and	Endemic countries and PAHO-CHA/VT/ Leishmaniasis
	Goal: To reduce the visceral leishmaniasis incidence rate in the Region by 50% in countries with an expanding transmission in areas with intense transmission; 50% in countries with stable/manageable transmission, and; Not to increase the incidence in countries with sporadic	Americas – 4.35/100,000 population Expanding ARG - 1.1 BRA - 4.55 PRY - 3.35 Stable COL - 3.83 VEN – 1.16	Americas – 2.17/100,000 population Expanding ARG – 0.55 BRA – 2.27 PRY – 1.67 Stable COL – 1.92 VEN – 0.58	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual		Endemic countries and PAHO-CHA/VT/ Leishmaniasis

PURPOSE	GOALS AND INDICATORS	INITIAL DATA	GOALS	DATA SOURCE	DATA COLLECTION METHOD	FREQUENCY	EXPECTED ACTIONS	RESPONSIBLE PARTY
	transmission. 4.1. Number of countries with expanding transmission of visceral leishmaniasis in areas of intense transmission that reduce the incidence by 50%. 4.2. Number of countries with stable/manageable visceral leishmaniasis transmission that reduce the incidence by 50% 4.3. Number of countries with sporadic transmission of visceral leishmaniasis that do not increase the incidence. Baseline: average incidence of visceral leishmaniasis reported by areas with intense, stable/manageable and sporadic transmission to SisLeish from 2012 to 2015.	Sporadic GTM - 1.89 HON – 2.4 MEX – 4.28 BOL, CRI, SVL, GUY, NIC	Sporadic GTM, HON, MEX, BOL, CRI, SVL, GUY, NIC				control actions against visceral leishmaniasis	

5. OPERATIVE ACTIONS FOR SURVEILLANCE AND CONTROL OF LEISHMANIASIS IN THE AMERICAS

Leishmaniasis surveillance and control require a combination of actions, seeing that men, parasite, vector and reservoirs are involved in the transmission cycle in the Americas. All of the surveillance actions for human cases, vectors and reservoirs, presented in this plan, were discussed and agreed upon by experts, collaborators and countries. The objectives, recommendations and methodologies are detailed and available at the Guide of Surveillance and Control Procedures for Leishmaniasis in the Americas.

The operative actions for surveillance and control of cutaneous leishmaniasis are available in annex 3 for each of the, previously described, five epidemiological transmission strata: 1) low transmission. 2) moderate transmission, 3) high transmission, 4) intense transmission and 5) very intense transmission.

Regarding visceral leishmaniasis, the actions are available in annex 3 for each of the three epidemiological scenarios according to transmission: 1) countries with sporadic transmission, 2) countries with stable/manageable transmission and 3) countries with expanding transmission.

The actions for the five risk strata for cutaneous leishmaniasis are the same. However, it is expected of the countries to utilize the stratification criteria to prioritize the surveillance and control actions within the subnational jurisdiction considering the operational, technical capability and supply availability. Despite having prioritized areas with leishmaniasis transmission, there are also recommendations for surveillance of areas without transmission or with imported cases.

6. MONITORING THE PLAN PROGRESS

Monitoring is the routine follow up of a program, from data collection and reporting to analyses, production of published reports and development of actions. The objective of monitoring is to evaluate progress or implementation status, ensure accountability, detect problems and limitations, promote decision-making based on evidence and provide opportune information to make adjustments whenever necessary. In general, the used indicators measure follow-up, processes or impact.

The monitoring of this plan is based on the list of indicators present in the performance measurement matrix available in annex 2. These indicators will provide reliable annual information on progress of surveillance and control of leishmaniasis at a national and Regional level. Besides these indicators, it is also necessary the development of national plans of action from each country, with detailed activities for each product and service proposed in the logical framework matrix, annex 1. Likewise, it is expected of the countries to monitor and evaluate progress of their own epidemiological and operational indicators of the leishmaniasis control programs.

6.1 Plan indicators

The definition, calculation, utility, analyses and actions to be unfolded by each proposed indicator to monitor the Plan of Action, presented in the performance measurement matrix of annex 2, are described below. We urge the countries to consult the description to assist in defining the national plans of action.

6.1.1. Goal indicators of the plan

Number of countries that reduce fatality by visceral leishmaniasis Indicator 1 of the performance matrix	
Name/definition	**Calculation**
Number of endemic countries that reduce fatality by visceral leishmaniasis by 50%	Number of VL endemic countries that reduce the VL fatality by 50% by 2022 taking into account the fatality baseline which is the average fatality from 2012 to 2015.
Fatality is the proportion of visceral leishmaniasis cases that died by visceral leishmaniasis.	The fatality calculation for each country is: Number of new VL cases and relapses that died by VL divided by the total number of VL cases.
Utility	**Analyses/actions**
Deaths by VL are caused by several factors and among them are: late diagnosis, co-mobility, co-infection, patient response and extreme age groups (children and adults over 50 years old).	Al deaths by VL must be investigated to identify the causes and to take the corrective actions, either being personnel capabilities, organization of health services that support the healthcare system, the evaluation and follow-up before and during treatment, among others.
This indicator must be monitored every 3 months in each country and monthly measured in each administrative subnational level. It will be monitored annually at the Regional level.	The VL fatality must analyze separately the VL-HIV co-infection cases and without co-infection in order to analyze the fatality causes, which might be late diagnosis, inadequately patient management or complications.

Number of countries that reduce deaths by cutaneous/mucosal leishmaniasis Indicator 2 of the performance matrix	
Name/definition	**Calculation**
Number of countries that reduce deaths by cutaneous/mucosal leishmaniasis by 90%	Number of countries that reduce deaths by cutaneous/mucosal leishmaniasis by 90% by 2022 taking into account the baseline which is the average deaths from 2012 to 2015.
The goal is through a scheduled process: 50% in 3 years, 70% in 4 years and 90% in 6 years.	The calculation for each country is: number of CL/ML cases that died by leishmaniasis in a specific period. Deaths by CL/ML are those attributed by leishmaniasis or the toxicity caused by the medication used in the treatment.
Utility	**Analyses/actions**
This indicator evaluates if the medication is a factor associated to mortality of CL. **Deaths by CL/ML are, in general, caused by the inadequate use of medication, which may include: inadequate prescription, lack of complete clinical evaluation before prescription of the medication and lack of follow-up during treatment.** **This indicator must be monitored every 3 months in each country and monthly measured in each administrative subnational level. It will be monitored**	Al deaths by CL/ML must be investigated to identify the causes and to take the corrective actions, either being personnel capabilities, organization of health services that support the healthcare system, the evaluation and follow-up before and during treatment, among others.

annually at the Regional level.

Proportion of new cases of cutaneous leishmaniasis in children under 10 years old Indicator 3 of the performance matrix	
Name/definition	**Calculation**
Number of countries that reduce the cutaneous leishmaniasis proportion in children under 10 years of age by 50%	Number of endemic countries that reduce proportion of CL cases in children under 10 years old by 50% by 2022 taking into account the baseline which is the average proportion of CL cases in children under 10 years old from 2012 to 2015. The calculation for each country is: number of new CL cases registered in children under 10 years divided by total number of new cases of the disease.
Utility	**Analyses/actions**
This indicator is useful for investigation, entomological investigation and to direct vector prevention and control actions in areas with intra and peri-domicile transmission. **In the Region the average cases in children under 10 years old is 11.9% (ranking from 10.8 to 13.4).** **The status of each country and national jurisdiction must be analyzed to establish the case occurrence in children rank through entomological surveillance in the domestic scenario.**	The occurrence of leishmaniasis cases in children suggests that the transmission is occurring in the intra or peri-domicile, being necessary to take prevention, surveillance and control actions.

Reduce visceral leishmaniasis incidence in countries with expanding transmission in areas with intense transmission Indicator 4.1 of the performance matrix	
Name/definition	**Calculation**
Number of countries with expanding transmission of visceral leishmaniasis in areas of intense transmission that reduce the incidence by 50%.	Number of countries with expanding VL in areas with intense transmission that reduce VL incidence by 50% by 2022 taking into account the baseline which is the average VL incidence from 2012 to 2015 in areas with intense transmission. Intense transmission area is the second administrative level according to structure/political division from each country and the leishmaniasis risk stratification.
Utility	**Analyses/actions**
Monitor and evaluate the surveillance, prevention and control actions against VL developed in areas with intense transmission from each country to verify the intervention impact in the reduction of human transmission.	The leishmaniasis national programs or their equivalents must plan, develop, monitor and evaluate performed surveillance, prevention and control actions If any problem is detected in the action development, the national programs or their equivalents must revise the strategies and take immediate measures to solve the problem.

Reduce visceral leishmaniasis incidence in countries with stable/manageable transmission	
Indicator 4.2 of the performance matrix	
Name/definition	**Calculation**
Number of countries with stable/manageable visceral leishmaniasis transmission that reduce the incidence by 50%	Number of countries with VL stable/manageable transmission that reduce VL incidence by 50% by 2022 taking into account the baseline which is the average VL incidence from 2012 to 2015. Each country must identify the transmission areas according to the disease distribution.
Utility	**Analyses/actions**
Monitor and evaluate the surveillance, prevention and control actions against VL developed in each country to verify the intervention impact in the reduction of human transmission.	The leishmaniasis national programs or their equivalents must plan, develop, monitor and evaluate performed surveillance, prevention and control actions If any problem is detected in the action development, the national programs or their equivalents must revise the strategies and take immediate measures to solve the problem.

Reduce visceral leishmaniasis incidence in countries with sporadic transmission	
Indicator 4.3 of the performance matrix	
Name/definition	**Calculation**
Number of countries with sporadic transmission of visceral leishmaniasis that do not increase the incidence.	Number of countries with VL sporadic transmission that do not increase the incidence by 2022 taking into account the baseline which is the average VL incidence from 2012 to 2015.
Utility	**Analyses/actions**
Monitor and evaluate the surveillance, prevention and control actions against VL developed in vulnerable areas or areas with transmission.	The leishmaniasis national programs or their equivalents must plan, develop, monitor and evaluate surveillance, prevention and control actions performed in areas with transmission or vulnerable areas to avoid increase of the VL incidence. If any alteration is detected in the epidemiological status the national programs or their equivalents must revise the strategies and take necessary measures to solve the problem.

6.1.2. Surveillance indicators

Opportune reporting of data and annual population to SisLeish	
Indicators 1.1.1 and 2.1.1 of the performance matrix	
Name/definition	**Calculation**
Number of endemic countries with opportune reporting to SisLeish of CL/ML and VL data and annual population of the previous year at the second administrative level.	Number of countries that include in SisLeish the CL/ML data and population at the second administrative level until April 30th of the subsequent year.
Utility	**Analyses/actions**
This indicator is for monitoring by the Leishmaniasis Regional Program PAHO/WHO. The countries are expected to report to SisLeish their CL/ML and VL data and population in a timely manner and the Regional program to analyze the national and Regional information to produce the annual reports. **Reporting must be separately by CL/ML and VL.**	In case of delay in the reporting by each country, the Regional program will follow up until all annual data is completed. If the data are not available in the SisLeish until May 31st of each year, the Regional analysis will be conducted without the data and will appear as "information unavailable" in the Regional reports.

Leishmaniasis risk stratification to guide surveillance and control actions	
Indicators 1.1.2 and 2.1.2 of the performance matrix	
Name/definition	**Calculation**
Number of countries that apply the CL/ML and VL risk stratification to guide surveillance and control actions. **The CL/ML risk stratification should be by second political subnational administrative level.** **For VL, each country should conduct their risk stratification when required. This includes countries with canine or human transmission or that are vulnerable. A country is considered vulnerable to VL when there is no autochthonous transmission, however, shares borders or ground/water pathways with countries with transmission.**	Number of endemic countries that annually apply the CL/ML risk stratification available in SisLeish. Number of endemic countries, with expanding transmission of VL, annually applying the risk stratification.
Utility	**Analyses/actions**
This indicator is for monitoring by the Leishmaniasis Regional Program PAHO/WHO. An increase in the number of countries that apply the risk stratification available in SisLeish to develop surveillance and control actions for each risk strata is expected.	If the number of countries that apply the risk stratification available in SisLeish does no increase, the Regional program should analyze along with the countries the causes and alternatives for its use.

Report and investigation of cutaneous leishmaniasis outbreaks	
Indicator 1.1.3 of the performance matrix	
Name/definition	**Calculation**
Number of countries that report and investigate CL outbreaks according to the operational procedures standardized by the PAHO/WHO Regional Program.	Number of countries that report to SisLeish the investigated outbreaks that occurred throughout the year.
Utility	**Analyses/actions**

Knowledge of the magnitude, epidemiological characteristics and transmission pattern of outbreaks and adoption of surveillance, treatment and control actions to reduce the transmission.	The occurrence of CL outbreaks might be related to the transmission in the intra, peri, extra-domicile or sylvatic area occasioned by different factors. Knowledge of outbreaks characteristics and characterization of the population at risk allow the use of adequate prevention and control measures.

Report and investigation of visceral leishmaniasis outbreaks	
Indicator 2.1.5 of the performance matrix	
Name/definition	**Calculation**
Number of countries that report and investigate VL outbreaks or VL cases	Number of countries that report to SisLeish the investigated outbreaks and cases that occurred throughout the year.
Utility	**Analyses/actions**
Knowledge of the magnitude, epidemiological characteristics and transmission pattern of outbreaks and adoption of surveillance, treatment and control actions to reduce the transmission.	Knowledge of the VL cases and outbreaks characteristics allows the use of adequate prevention and control measures.

Alert report of visceral leishmaniasis in the borders to SisLeish in timely manner	
Indicator 2.1.3 of the performance matrix	
Name/definition	**Calculation**
Number of countries that report in timely manner the VL border alerts to SisLeish. **A VL alert is generated by the identification of the vector, canine or human cases for the first time or VL outbreaks in border municipalities. It should be reported in the first 30 days after the occurrence of the described situations.**	Number of countries that report VL border alerts within 30 days after its occurrence.
Utility	**Analyses/actions**
This indicator is for monitoring by the Leishmaniasis Regional Program PAHO/WHO. The countries are expected to report presence of involved/suspected vectors, confirmed VL canine/human cases or outbreaks in border municipalities. **The countries that will receive the border alert must monitor and plan surveillance and control actions in the border municipalities when necessary.**	The delay in the border alerts will imply the lack or absence of joint actions between countries and their border.

Report of VL-HIV co-infection cases	
Indicator 2.1.4 of the performance matrix	
Name/definition	**Calculation**
Number of countries that report VL-HIV co-infection cases.	Number of countries that annually report to SisLeish VL-HIV co-infection cases.
Utility	**Analyses/actions**
Knowledge of the magnitude of VL-HIV co-infection, to monitor its pattern to develop health inter-programmatic	All VL-HIV co-infection cases must have a systematic follow up and secondary prophylaxes, to avoid relapses and deaths, according to

actions and to take measures to reduce fatality. **This indicator is useful to take specific measures towards early diagnosis and opportune and adequate treatment to reduce deaths by VL.** **This indicator must be monitored every 3 months in each country and monthly measured in each administrative subnational level.**	the PAHO/WHO's and countries' recommendations Countries must monitor co-infection cases to plan the medication acquirement, taking into account that the treatment duration is longer in these cases.

6.1.3. Indicators for diagnosis and treatment of human cases

Laboratory diagnosis of leishmaniasis cases	
Indicators 1.2.1 and 2.2.1 of the performance matrix	
Name/definition	**Calculation**
Number of endemic countries that diagnose at least 80% and 95% of the CL/ML and VL cases, respectively, by laboratory exams. **The expected percentage of cases diagnosed by laboratory tests was established according to the sensibility of the available tests.** **Laboratory tests for VL include parasitological and immunological tests (rK39 rapid test).**	Number of endemic countries that diagnose at least 80% of the CL/ML by laboratory exams. Number of endemic countries that diagnose at least 95% of the VL cases by laboratory exams.
Utility	**Analyses/actions**
This indicator allows the evaluation of the diagnostic criteria established by the PAHO/WHO and countries guidelines, to avoid treatment of people not infected due to the severe toxicity of the medication. **Evaluates the access to diagnostic services in the countries.** **It is expected that at least 80% and 95% of the CL/ML and VL cases, respectively, are diagnosed by laboratory exams.**	If the proportion of laboratory diagnosed leishmaniasis cases is under the expected percentage there should be a revision of the function and operation of the laboratory network from the countries to take the needed corrective measures.

Use of rK39 rapid test for early diagnosis of visceral leishmaniasis	
Indicator 2.2.2 of the performance matrix	
Name/definition	**Calculation**
Number of countries that use the rK39 rapid test for early diagnosis of VL. **The rK39 rapid test assists early VL diagnosis facilitating access to the diagnosis.**	Number of endemic countries that use the rK39 rapid test for early diagnosis of VL.
Utility	**Analyses/actions**
This indicator allows monitoring implementation of rapid tests in the national leishmaniasis programs or its equivalents to strengthen early diagnosis where they occur. **VL early diagnosis facilitates beginning of treatment in timely manner to reduce fatality.**	The decentralization of the rapid test will allow the national programs or equivalents to have tests available at locations closer to the occurrence of cases. The national laboratories of public health must capacitate health personnel for the adequate use of rapid tests. The national programs of equivalents may acquire rK39 rapid tests through PAHO/WHO.

Program for Direct External Evaluation of Performance (PEED) for the microscopic diagnosis of leishmaniasis	
Indicator 1.2.2 of the performance matrix	
Name/definition	**Calculation**
Number of countries that participate in the direct external evaluation of performance for the microscopic diagnosis of leishmaniasis **The Regional reference laboratory is the National Institute of Health from Colombia. This laboratory ships panels with positive and negative smear to the participating laboratory for processing according to the PEED's guidelines.**	Number of countries that annually participate in the PEED.
Utility	**Analyses/actions**
This indicator is useful for monitoring the CL microscopic diagnosis quality and for evaluating the capabilities in the diagnosis and proposing corrective measures.	All countries must participate in the PEED as part of actions of the program, and to assure the diagnosis quality. This evaluation will be performed once a year and coordinated by the Regional reference laboratory and the PAHO/WHO Regional program.

Internal quality evaluation of the leishmaniasis diagnosis quality	
Indicators 1.2.3 and 2.2.3 of the performance matrix	
Name/definition	**Calculation**
Number of countries with at least 90% of the network laboratories performing microscopic diagnosis of CL/ML and VL and preforming internal quality evaluation of the diagnosis (it should reach 100% throughout the years). **Each country should develop and implement an internal quality control program for leishmaniasis diagnosis and have all network laboratories enrolled.**	Number of endemic countries with at least 90% of the network laboratories performing microscopic diagnosis for leishmaniasis and participating in the internal quality evaluation (it should reach 100% throughout the years).
Utility	**Analyses/actions**
Monitoring of this indicator allows verifying the progress of the countries in the implementation of internal quality control programs for leishmaniasis diagnosis.	The quality evaluation of the laboratory network allows the country to monitor the diagnosis quality, identify limitations and necessities. The national programs or their equivalents and the national laboratories for public health will be able to revise and evaluate the functioning and the problem-solving capacity in adopting corrective measures to strengthen and improve the quality of diagnosis in the country. Improvement of the diagnosis quality contributes to the improvement of quality of report data at a national level to SisLeish and to decision-making processes by the program.

Treatment of leishmaniasis cases	
Indicators 1.3.1 and 2.3.1 of the performance matrix	
Name/definition	**Calculation**
Number of endemic countries that treat at least 95% of the CL/ML diagnosed cases **Number of endemic countries that treat at least 100% of the VL diagnosed cases.**	Number of endemic countries with complete treatment for at least 95% of the CL/ML diagnosed cases. The annual progress will be analyzed taking into account the baseline, which is the average of treated cases from 2012 to 2025. Number of endemic countries that treat at least 100% of the VL diagnosed cases. There is no baseline for this indicator, because the monitoring of indicator will begin with data reported in 2016.
Utility	**Analyses/actions**
This indicator allows monitoring of the progress of access to treatment for diagnosed cases to reduce risk of occurrence of severe forms and avoid morbidity and deaths. **This indicator must be monitored every 3 months in each country and monthly measured in each administrative subnational level.**	If the percentage of treated leishmaniasis cases out of the total of diagnosed cases is not the expected, it is necessary to evaluate the data registration, medication availability, diagnosis Access and opportunity and availability of services and health personnel to perform diagnosis, treatment and follow up. It is necessary to ensure active search of diagnosed cases that have not begun their treatment and follow up of cases that abandoned treatment to take specific actions. This analysis should be performed at each administrative subnational level and the country status should be monitored at the national level.

Cure rate of leishmaniasis cases	
Indicators 1.3.2 and 2.3.2 of the performance matrix	
Name/definition	**Calculation**
Number of endemic countries that report at least 80% of cured cases of CL/ML from the total treated cases. **Number of endemic countries that report at least 95% of cured cases of VL from the total treated cases.**	Number of endemic countries that cure at least 80% of CL/ML cases. The annual progress will be analyzed taking into account the baseline, which is the average of cured cases from 2012 to 2025. Number of endemic countries that cure at least 95% of VL cases. The annual progress will be analyzed taking into account the baseline, which is the average of cured cases from 2012 to 2025.
Utility	**Analyses/actions**
This indicator allows monitoring of the progress of countries regarding cure of treated cases to reduce the risk of occurrence of severe forms and to avoid morbidity and deaths.	If the percentage of cured leishmaniasis cases out of the total of treated cases is not the expected, it is necessary to evaluate the data registration (reporting, quality, completeness, etc.), medication availability, diagnosis access and opportunity, availability of services and health personnel to perform the follow up, and patient availability to complete the treatment. It is necessary to ensure active search for cases of abandonment of treatment to take specific actions. This indicator should be monitored monthly in each country and subnational administrative level.

Availability of leishmaniasis medication throughout the year	
Indicators 1.3.3 and 2.3.3 of the performance matrix	
Name/definition	**Calculation**
Number of endemic countries that keep medication available for the treatment of leishmaniasis throughout the year. **The available medication must include first line therapy and at least one alternative drug for cases of contraindication or therapeutic failure.**	Number of CL/ML endemic countries that keep medication available throughout the year for all diagnosed CL/ML cases. Number of VL endemic countries that keep medication available throughout the year for all diagnosed VL cases.
Utility	**Analyses/actions**
The medication availability follow up must be performed continuously/monthly at the subnational level in each country. Delay in the beginning of treatment due to unavailability of medication is an indicative of management problems, putting infected patients at risk, especially VL cases, severe forms of CL/ML and children.	The leishmaniasis national programs must plan and perform opportune follow up of the acquisition, purchase and distribution of the medication within the country to comply with this indicator. If there is shortage, the national program must take immediate actions. Countries can turn to national/international emergency purchases, and immediately inform PAHO/WHO in each country and the leishmaniasis Regional program for support with donations/loans from other countries or purchases through the strategic fund. Besides having the medication available throughout the year, it is important that the drugs are the ones recommended, of quality and proven safety, and ensure immediate access to all cases.

Access to rehabilitation services by CL/ML cases	
Indicator 1.3.4 of the performance matrix	
Name/definition	**Calculation**
Number of countries that officially include CL/ML cases with disabilities in national rehabilitation programs.	Number of countries that officially include access to cases of CL/ML with disabilities in national rehabilitation programs. The progress of this indicator will be analyzed taking into account the 2016 baseline in SisLeish.
Utility	**Analyses/actions**
This indicator allows monitoring of the progress of countries regarding inclusion of patients with disabilities due to CL/ML into rehabilitations programs to attend, stop and avoid disabilities, give psychological support and improve the life quality.	Disability caused by CL/ML has a direct influence on the disease burden of the country measured by disability-adjusted life year (DALY). The inclusion and access provided to patients will allow improvement of their health. National programs or their equivalents need to advocate for the inclusion of patients with CL/ML into rehabilitation programs.

Report and investigation of severe adverse effects caused by leishmaniasis medication	
Indicators 1.3.5 and 2.3.4 of the performance matrix	
Name/definition	**Calculation**
Number of countries that report and investigate severe adverse effects caused by leishmaniasis medication.	Number of countries that report and investigate severe adverse effects caused by medication for CL/ML. Number of countries that report and investigate severe adverse effects caused by medication for VL. The progress of this indicator will be analyzed taking into account the 2016 baseline in SisLeish.
Utility	**Analyses/actions**
This indicator allows monitoring of the countries progress regarding surveillance of drug adverse effects through Pharmacovigilance systems to alert to inadequate use or drug quality.	Reporting of occurrence of severe adverse effects caused by leishmaniasis medication should be performed in a timely manner to adopt needed measures and actions to determine possible causes and avoid new events.

6.1.4. Indicators for entomology and reservoirs

Established capacities to develop actions for entomological surveillance	
Indicators 1.4.1 and 2.4.1 of the performance matrix	
Name/definition	**Calculation**
Number of endemic countries with established capacities to develop actions for entomological surveillance against leishmaniasis. **The meaning of established capacities is the availability of professionals and technicians with a degree and experience to develop actions for surveillance, identification and phlebotomine taxonomy. Additionally, availability of supplies and resources (financial, logistics, etc.) to develop the actions.**	Number of endemic countries with established capacities to develop entomological surveillance actions, including identification and phlebotomine taxonomy. The progress of this indicator will be analyzed taking into account the 2016 baseline in SisLeish.
Utility	**Analyses/actions**
Knowledge and monitoring of capacities to develop actions for surveillance, identification and phlebotomine taxonomy in the Region and in the countries while supporting the leishmaniasis national programs. **This indicator is for monitoring by the PAHO/WHO Leishmaniasis and Entomology Regional Programs.**	Provide technical cooperation to the countries by the entomology and leishmaniasis Regional programs for strengthening of the Regional and national capacities. Promote planning, implementing and evaluating of entomological surveillance actions in the countries in an integrated way with the leishmaniasis national programs or their equivalents. The entomological surveillance allows early identification of transmission receptivity, and to direct and evaluate prevention and control actions.

Established capacities to develop vector prevention and control actions	
Indicators 1.4.2 and 2.4.2 of the performance matrix	
Name/definition	**Calculation**
Number of endemic countries with established capacities to develop vector prevention and control actions against leishmaniasis. **The meaning of established capacities is the availability of professionals and technicians with a degree and experience to develop actions for surveillance, identification and phlebotomine taxonomy. Additionally, availability of supplies and resources (financial, logistics, etc.) to develop the actions.**	Number of endemic countries with established capacities to develop vector prevention and control actions against CL/ML. Number of endemic countries with established capacities to develop vector prevention and control actions against VL. The progress of this indicator will be analyzed taking into account the 2016 baseline in SisLeish.
Utility	**Analyses/actions**
Knowledge and monitoring of capacities to develop actions for vector prevention and control in the Region and in the countries while supporting the leishmaniasis national programs. **This indicator is for monitoring by the PAHO/WHO Leishmaniasis and Entomology Regional Programs.**	Provide technical cooperation to the countries by the entomology and leishmaniasis Regional programs for strengthening of the Regional and national capacities for vector prevention and control. Promote planning, implementing and evaluating of entomological surveillance actions in the countries in an integrated way with the leishmaniasis national programs or their equivalents.

Established capacities to develop actions for canine surveillance	
Indicator 2.5.1 of the performance matrix	
Name/definition	**Calculation**
Number of receptive and endemic countries with established capacities to develop canine surveillance actions against VL. **The meaning of established capacities is the availability of professionals and technicians with a degree and experience to develop canine surveillance actions. Additionally, availability of supplies and resources (financial, logistics, etc.) to develop the actions.**	Number of receptive and endemic countries with established capacities to develop canine surveillance actions against VL. The progress of this indicator will be analyzed taking into account the 2016 baseline in SisLeish.
Utility	**Analyses/actions**
Knowledge and monitoring of capacities to develop canine surveillance actions in the Region and in the countries while supporting the leishmaniasis national programs. **This indicator is for monitoring by the PAHO/WHO Leishmaniasis and Zoonosis Regional Programs.**	Provide technical cooperation to the countries by the zoonosis and leishmaniasis Regional programs for strengthening of the Regional and national capacities for vector prevention and control. Promote planning, implementing and evaluating of canine surveillance actions in the countries in an integrated way with the leishmaniasis and zoonosis national programs or their equivalents.

Established capacities to develop actions for canine management	
Indicator 2.5.2 of the performance matrix	
Name/definition	**Calculation**
Number of receptive and endemic countries with established capacities to develop canine management actions against VL. **The meaning of established capacities is the availability of professionals and technicians with a degree and experience to develop canine management actions. Additionally, availability of supplies and resources (financial, logistics, etc.) to develop the actions.**	Number of receptive and endemic countries with established capacities to develop canine management actions against VL. The progress of this indicator will be analyzed taking into account the 2016 baseline in SisLeish.
Utility	**Analyses/actions**
Knowledge and monitoring of capacities to develop canine management actions in the Region and in the countries while supporting the leishmaniasis national programs. **This indicator is for monitoring by the PAHO/WHO Leishmaniasis and Zoonosis Regional Programs.**	Provide technical cooperation to the countries by the zoonosis and leishmaniasis Regional programs for strengthening of the Regional and national capacities for vector prevention and control. Promote planning, implementing and evaluating of canine surveillance actions in the countries in an integrated way with the leishmaniasis and zoonosis national programs or their equivalents.

7. INTERSECTORIAL COLABORATIONS AND JOINT ACTIONS

Leishmaniasis is a disease of great biological, clinical and epidemiological complexity due to distinct cycles and transmission patterns, involving a diversity of parasite species, vectors and reservoirs influenced by physical, environmental, social, economic aspects, among others, which directly affect the occurrence of this disease. Additionally, the currently available interventions for development of prevention, surveillance and control actions are limited and have little effect.

Control of leishmaniasis is not a single and direct responsibility of the Program, but a commitment which must be formally approached by the Ministry of Health from each country, to define strategies and actions that can be worked with other vector borne diseases that are of interest to the public health.

As mentioned in the context framework of this document, leishmaniasis was included as part of the neglected infectious diseases – NTDs. Several countries of the Region have identified and included leishmaniasis in their NTDs plan of action, seeing that NTDs affect the same vulnerable population groups living in common geographic areas, facilitating integration of actions within these areas, which would optimize and potentiate resources (technical, human and financial) to positively impact the health status of these communities.

This approach is also based in the coincidence of health determinants related to the persistence of NTDs in certain population groups and geographic areas, which can be addressed through intersectoral joint actions to improve access to clean water, sanitation, education, housing improvement and poverty reduction.

The inclusion of leishmaniasis in the Plan of action for the elimination of neglected infectious diseases facilitates the admittance of leishmaniasis in the political agenda and among addressed priorities, which is why the knowledge of the leishmaniasis epidemiological profile and the risk groups from each country is a necessity for the current status diagnosis and joint planning of actions.

Each country must analyze their internal status and identify the needs and actions that can be developed intersectorally and/or inter-programmatically by evaluating the advantages of proposing a collaborative effort, such as working on surveillance, prevention and vector control actions with dengue programs in areas where the leishmaniasis transmission pattern is urban or with malaria programs for rural or sylvatic transmission patterns. Furthermore, for case management, quality control and patient follow-up, one should use experiences and strategies already available by the tuberculosis and leprosy programs, as well as ways to organize the diagnosis and treatment service, based on the structure of the health services network, encouraging and organizing actions from the Primary Health Care to referral services.

On the other hand, during outbreaks or occurrence of cutaneous leishmaniasis, one should identify the risk groups and exposed population, allowing the service to work along with the companies to support prevention actions with the goal of reducing contact of the worker with the vector.

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ANNEX 1

Logical framework matrix – Plan of Action to strengthen the leishmaniasis surveillance and control in the Americas, 2017-2022

SCOPE	**Contribute to surveillance, control and elimination of neglected infectious diseases in the Americas**					
	↑					
PURPOSE	To reduce the leishmaniasis morbi-mortality in the Americas through strengthening of the diagnosis, treatment, rehabilitation, prevention, surveillance and control					
	↑	↑	↑	↑	↑	↑
GOALS	To establish actions for the strengthening of the surveillance system and maintenance of updated information for decision making processes.	To reinforce the surveillance system and outbreak investigation.	To improve the opportunity and access to diagnosis, treatment, rehabilitation and adequate follow-up of leishmaniasis cases.	To identify in a timely manner treatment adverse effects to implement opportune actions.	To promote actions to decrease infection sources for the vector, through entomological surveillance, integrated management of vectors, surveillance and reservoir management.	To encourage actions of promotion, communication, health education and social mobilization.

EXPECTED RESULTS	**1. Cutaneous/mucosal leishmaniasis**				**2. Visceral leishmaniasis**				
	1.1. Surveillance system and operative investigation for cutaneous/mucosal leishmaniasis strengthened for decision-making processes.	1.2. Laboratory diagnosis for cutaneous/mucosal and visceral leishmaniasis strengthened.	1.3. Treatment, cure, and rehabilitation of people with cutaneous/mucosal leishmaniasis strengthened.	1.4 Entomological capabilities strengthened and developed to guide surveillance, prevention and control actions towards cutaneous/mucosal leishmaniasis.	2.1. Surveillance system and operative investigation for visceral leishmaniasis strengthened for decision-making processes.	2.2. Laboratory diagnosis for visceral leishmaniasis strengthened.	2.3. Treatment, cure, rehabilitation and nutritional support of people with visceral leishmaniasis strengthened.	2.4. Entomological capabilities strengthened and developed to guide surveillance, prevention and control actions towards visceral leishmaniasis.	2.5 Reservoir surveillance and management capabilities strengthened and developed for visceral leishmaniasis.
	↑	↑	↑	↑	↑	↑	↑	↑	↑

	↑	↑	↑	↑	↑	↑	↑	↑	↑
	Cutaneous/mucosal leishmaniasis				**Visceral leishmaniasis**				
Products and services	1.1.1. Information system and registry of leishmaniasis data updated and disaggregated at least to the second subnational administrative level	1.2.1. Decentralized, organized and functioning laboratory network to ensure access to diagnosis as close as possible to the area of occurrence	1.3.1. Organized and functioning healthcare network to ensure access to opportune and adequate treatment of cutaneous/ mucosal leishmaniasis cases	1.4.1. Entomology actions for leishmaniasis, integrated into the entomology services of each country to support surveillance and control	2.1.1. Classified areas with or without visceral leishmaniasis transmission	2.2.1. Decentralized, organized and functioning laboratory network to ensure access to diagnosis as close as possible to the area of occurrence	2.3.1. Organized and functioning healthcare network to ensure access to opportune and adequate treatment of visceral leishmaniasis cases	2.4.1. Entomology actions for leishmaniasis, integrated into the entomology services of each country to support surveillance and control	2.5.1. Monitoring and management of canines actions for visceral leishmaniasis, integrated into the zoonosis services at different administrative levels of each country, and intersectoral coordination with the Official Veterinary Services (OVS)
	1.1.2. Classified areas with or without cutaneous/ mucosal leishmaniasis transmission	1.2.2. Supplies for the diagnosis of cutaneous / mucosal leishmaniasis available / permanently accessible as close as possible to the area of occurrence	1.3.2. Supervision and adherence to the strengthened treatment, as well as the treatment follow-up and response monitoring of the cutaneous/ mucosal leishmaniasis cases	1.4.2. Supplies and equipment for the leishmaniasis entomological surveillance and vector control available and accessible	2.1.2. Risk stratification of the visceral leishmaniasis according to the needs and epidemiological status	2.2.2. Supplies for the diagnosis of visceral leishmaniasis available / permanently accessible as close as possible to the area of occurrence	2.3.2. Supervision and adherence to the strengthened treatment, as well as the treatment follow-up and response monitoring of the visceral leishmaniasis cases	2.4.2 Supplies and equipment for the leishmaniasis entomological surveillance and vector control available and accessible	2.5.2. Supplies for the leishmaniasis canine surveillance and management available and accessible
	1.1.2. Developed monitoring and operational	1.2.3. Trained health personnel for sampling and	1.3.3. Supplies for the treatment of cutaneous/	1.4.3. Trained entomology personnel to	2.1.3. Surveillance and operative research	2.2.3. Trained health personnel for sampling and	2.3.3 Supplies for the treatment of visceral	2.4.3. Trained entomology personnel to	2.5.3 Trained health personnel to develop canine

	research actions according to the transmission pattern and risk stratification	parasitological diagnosis as close as possible to the area of occurrence	mucosal leishmaniasis permanently available and accessible	develop entomology surveillance, management and vector control actions	actions developed according to the risk stratification	diagnosis of visceral leishmaniasis	leishmaniasis permanently available and accessible	develop entomology surveillance, management and vector control actions	surveillance and management actions
	1.1.4. Identified and investigated new foci or outbreaks of cutaneous/ mucosal leishmaniasis	1.2.4. Standardized techniques for the diagnosis of cutaneous / mucosal leishmaniasis implemented at different levels of healthcare	1.3.4. Surveillance of medication adverse effects strengthened to avoid consequences of these events and support decision-making of leishmaniasis programs	1.4.4. Entomological surveillance actions implemented according to risk stratification and transmission pattern to supports evidence-based decision making	2.1.4. Identified and investigated new foci or outbreaks of visceral leishmaniasis	2.2.4. Standardized techniques for the diagnosis of visceral leishmaniasis implemented at different levels of healthcare	2.3.4. Surveillance of medication adverse effects strengthened to avoid consequences of these events and support decision-making of visceral leishmaniasis programs	2.4.3. Entomological surveillance actions implemented according to risk stratification and transmission pattern to supports evidence-based decision making	2.5.4 Canine surveillance and management actions implemented according to risk stratification and transmission pattern
	1.1.5. Trained health personnel to develop surveillance and operative research actions for cutaneous / mucosal leishmaniasis	1.2.5. Laboratories network developing internal quality control practices for the diagnosis of cutaneous / mucosal leishmaniasis	1.3.5. Deaths during treatment or post-treatment follow-up of reported and investigated cutaneous / mucosal leishmaniasis cases	1.4.5. Vector management and control actions implemented to reduce the transmission risk to the exposed population	2.1.5. Trained health personnel to develop surveillance and operative research actions for visceral leishmaniasis	2.2.5. Laboratories network developing internal quality control practices for the diagnosis of visceral leishmaniasis	2.3.5. Investigated and reported deaths by visceral leishmaniasis	2.4.5. Vector management and control actions implemented to reduce the transmission risk to the exposed population	2.5.5. Affected communities and raise awareness of local authorities to support development of canine surveillance and management actions through responsible ownership programs, update canine population census, etc.
	1.1.6. *Leishmania*	1.2.6. National	1.3.6. Development	1.4.6. Monitored,	2.1.6. *Leishmania*	2.2.6. New	2.3.6. Case	2.4.6. Affected	2.5.6. Stimulate, in at-

	species identified in endemic areas of cutaneous / mucosal leishmaniasis	laboratories with strengthened quality control practices and participating in the Program for Direct External Evaluation of Performance (PEED) for the microscopic diagnosis of cutaneous / mucosal leishmaniasis	of new therapeutic alternatives to improve access, adherence and results to the treatment promoted in cutaneous / mucosal leishmaniasis programs	evaluated and informed vector control and prevention actions	species identified in endemic areas of visceral leishmaniasis	technologies to improve access to diagnosis promoted in visceral leishmaniasis programs	management of VL/HIV co-infection integrated in health care referral centers	communities and raise awareness of local authorities to support development of entomology surveillance and vector control	risk population, use of individual prevention measures for canine visceral leishmaniasis (e.g. collars, repellents, etc.).
		1.2.7. New technologies to improve access to diagnosis promoted in cutaneous/ mucosal leishmaniasis programs	1.3.7. Care for people affected by cutaneous / mucosal leishmaniasis included in countries' rehabilitation programs	1.4.7. New technologies to improve entomological surveillance, prevention and control promoted in cutaneous/ mucosal leishmaniasis programs		2.2.7. Access to validated rapid tests in the Region by promoting inclusion in the PAHO / WHO strategic fund and the health registration in the countries	2.3.7. Trained health personnel in management of visceral leishmaniasis cases	2.4.7. New technologies to improve entomological surveillance, prevention and control promoted in visceral leishmaniasis programs	2.5.7. New technologies to improve canine surveillance, prevention and management promoted for use in visceral leishmaniasis programs, including alliances with centers / research groups, WHO collaborating centers, among others.
			1.3.8. Trained health personnel in management of cutaneous/	1.4.8. Affected communities and raise awareness of			2.3.8. Care for people affected by visceral leishmaniasis	2.4.8. Monitored, evaluated and informed vector control and	2.5.8. Monitored, evaluated and informed canine prevention,

			mucosal leishmaniasis cases	local authorities to support development of entomology surveillance and vector control			included in integrated programs to against malnutrition	prevention actions	management and control actions
			1.3.9. Access to anti-leishmaniasis medication of proven efficacy and safety in the Region to promote inclusion in the list of essential drugs, the PAHO / WHO strategic fund and health registration in the countries				2.3.9. Development of new therapeutic alternatives to improve access, adherence and treatment results promoting its use in visceral leishmaniasis programs		2.5.9. Advocacy, agreements and public and veterinary health actions to regulate the transit, management and control of canines developed between PAHO / WHO and the OIE
			1.3.10. Implemented sentinel surveillance of the therapeutic response to treatment of the various species of leishmaniasis in the Region				2.3.10. Access to anti-leishmaniasis medication of proven efficacy and safety in the Region to promote inclusion in the list of essential drugs, the PAHO / WHO strategic fund and health registration in the countries		

ANNEX 2

Expected results performance measurement matrix of the Plan of Action to strengthen surveillance and control of leishmaniasis in the Americas, 2017-2022

PURPOSE	GOALS AND INDICATORS	INITIAL DATA	GOALS	DATA SOURCE	DATA COLLECTION METHOD	FREQUENCY	EXPECTED ACTIONS	RESPONSIBLE PARTY
		2015	**2022**					
To reduce the leishmaniasis morbi-mortality in the Americas through strengthening of the diagnosis, treatment, rehabilitation, prevention, surveillance and control	**Goal: To reduce fatality by visceral leishmaniasis by 50% in the Region by 2022.** 1. Number of endemic countries that reduce fatality by visceral leishmaniasis by 50% Baseline: fatality average reported to SisLeish from 2012 to 2015.	**Americas = 6.89%** **ARG – 1.04%** **BRA- 6.92%** **COL - 0.0%** **PRY- 6.61%** **VEN - 11.64%**	**Americas = 3.44%** **ARG – 0.52%** **BRA- 3.46%** **COL - 0.0%** **PRY – 3.30%** **VEN - 5.82%**	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual	Countries are expected to adequately revise, update and register cases and deaths by VL and CL/ML in their information system and to report in an opportune and complete manner the data to SisLeish	Endemic countries and PAHO-CHA/VT/ Leishmaniasis
	Goal: To reduce deaths by cutaneous/mucosal leishmaniasis by 90% in the Region by 2022 2. Number of countries that reduce deaths by cutaneous/mucosal leishmaniasis by 90% (scheduled processes: 50% in 3 years, 70% in 4 years and 90% in 6 years). Baseline: average deaths by cutaneous/mucosal leishmaniasis reported to SisLeish from 2012 to 2015.	**Americas = 16** **BRA - 16** **COL -0** **HON - 0** **NIC - 0** **PER - 1** **VEN - 0**	**Americas = 2** **BRA - 2** **COL - 0** **HON - 0** **NIC - 0** **PER - 0** **VEN - 0**	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual	Countries are expected to investigate and adequately register deaths by CL/ML in their information system and to report in an opportune and complete manner the data to SisLeish To standardize protocol and investigation forms for death by leishmaniasis to	Endemic countries and PAHO-CHA/VT/ Leishmaniasis

PURPOSE	GOALS AND INDICATORS	INITIAL DATA	GOALS	DATA SOURCE	DATA COLLECTION METHOD	FREQUENCY	EXPECTED ACTIONS	RESPONSIBLE PARTY
	Goal: To reduce the cutaneous leishmaniasis proportion in children under 10 years of age by 50% in the Region by 2022. 3. Number of countries that reduce the cutaneous leishmaniasis proportion in children under 10 years of age by 50% Baseline: Proportion of cutaneous leishmaniasis cases in children under 10 years old report to SisLeish from 2012 to 2015.	**Americas = 12.10%** **BOL - 11.24%** **COL - 9.06%** **CRI - 31.95%** **ECU - 22.49%** **SLV - 39.52%** **GTM - 10.78%** **GUY - 13.66%** **HON -13.49%** **NIC - 36.79%** **PAN - 49.25%** **PER - 13.88%** **VEN - 9.89%**	**Americas = 6.05%** **BOL - 5.62%** **COL - 4.53%** **CRI - 15.97%** **ECU - 11.25%** **SLV- 19.76%** **GTM- 5.39%** **GUY - 6.83%** **HON - 6.74%** **NIC - 18.39%** **PAN-24.62%** **PER -6.94%** **VEN - 4.94%**	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual	implement in all of the countries Include in SisLeish information towards death investigation by leishmaniasis Countries are to investigate all cases in children under 10 years old, to adopt preventative and control measures and to adequately register the CL/ML cases in children into their information system and report in a timely and complete manner to SisLeish. PAHO/WHO is to keep SisLeish updated and functioning. Countries are to reinforce their capabilities to develop prevention, surveillance and control actions against visceral	Endemic countries and PAHO-CHA/VT/ Leishmaniasis
	Goal: To reduce the visceral leishmaniasis incidence rate in the Region by 50% in countries with an expanding transmission in areas with intense transmission; 50% in countries with stable/manageable transmission, and; Not to increase the incidence in countries with sporadic transmission. 4.1. Number of countries with expanding transmission of visceral leishmaniasis in areas of intense	**Americas – 4.35/100,000 population** **Expanding** **ARG - 1.1** **BRA - 4.55** **PRY - 3.35** **Stable** **COL - 3.83** **VEN – 1.16** **Sporadic**	**Americas – 2.17/100,000 population** **Expanding** **ARG – 0.55** **BRA – 2.27** **PRY – 1.67** **Stable** **COL – 1.92** **VEN – 0.58** **Sporadic**	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual		Endemic countries and PAHO-CHA/VT/ Leishmaniasis

PURPOSE	GOALS AND INDICATORS	INITIAL DATA	GOALS	DATA SOURCE	DATA COLLECTION METHOD	FREQUENCY	EXPECTED ACTIONS	RESPONSIBLE PARTY
	transmission that reduce the incidence by 50%. 4.2. Number of countries with stable/manageable visceral leishmaniasis transmission that reduce the incidence by 50% 4.3. Number of countries with sporadic transmission of visceral leishmaniasis that do not increase the incidence. Baseline: average incidence of visceral leishmaniasis reported by areas with intense, stable/manageable and sporadic transmission to SisLeish from 2012 to 2015.	**GTM - 1.89** **HON – 2.4** **MEX – 4.28** **BOL, CRI, SVL, GUY, NIC**	**GTM, HON, MEX, BOL, CRI, SVL, GUY, NIC**				leishmaniasis	

CUTANEOUS / MUCOSAL LEISHMANIASIS								
EXPECTED RESULTS	**INDICATORS**	**INITIAL DATA**	**GOALS**	**DATA SOURCE**	**DATA COLLECTION METHOD**	**FREQUENCY**	**EXPECTED ACTIONS**	**RESPONSIBLE PARTY**
1.1. Strengthening of surveillance system and operative investigation of cutaneous/ mucosal leishmaniasis for decision making processes		**2015**	**2022**					
	1.1.1. Number of endemic countries with opportune reporting to SisLeish of CL/ML data and annual population of the previous year at the second administrative level.	ARG BRA GTM HON MEX NIC PRY SLV VEN	ARG BOL, BRA COL, CRI ECU GTM, GUY HON MEX NIC PAN, PRY, PER SUR, SLV URY VEN	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual	Countries adequately registering CL/ML cases into their information system and in an opportune and complete manner reporting the data to SisLeish Countries using the CL/ML risk stratification to plan surveillance, assistance and control actions. Countries with a surveillance system that detects CL/ML outbreaks and the response ability to analyze and investigate the outbreaks Countries with trained personnel to	Endemic countries and PAHO-CHA/VT/ Leishmaniasis
	1.1.2. Number of countries that apply the CL/ML risk stratification to guide surveillance and control actions.	0	ARG BOL, BRA COL GTM HON NIC PER, PAN, PRY VEN	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual		Endemic countries and PAHO-CHA/VT/ Leishmaniasis
	1.1.3. Number of countries that report and investigate CL outbreaks	0	ARG BOL, BRA, COL GTM HON NIC PAN, PER, PRY VEN	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual		Endemic countries and PAHO-CHA/VT/ Leishmaniasis

CUTANEOUS / MUCOSAL LEISHMANIASIS								
EXPECTED RESULTS	**INDICATORS**	**INITIAL DATA**	**GOALS**	**DATA SOURCE**	**DATA COLLECTION METHOD**	**FREQUENCY**	**EXPECTED ACTIONS**	**RESPONSIBLE PARTY**
							perform surveillance and operational investigation. PAHO/WHO will maintain SisLeish updated and functioning.	
1.2. Strengthening of the laboratory diagnosis of cutaneous/ mucosal leishmaniasis	1.2.1. Number of endemic countries that diagnose at least 80% of the CL/ML cases by laboratory exams	9 BOL, BRA, COL, GUY, HON, NIC, PRY, PER SLV	ARG BOL, BRA COL GTM, GUY HON MEX NIC PAN, PRY, PER SUR, SLV VEN	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual	Countries adequately registering CL/ML cases into their information system and in an opportune and complete manner reporting the data to SisLeish Countries (National Reference Laboratories of Public Health) participating in the PEED Countries (leishmaniasis programs and national laboratories of	Endemic countries and PAHO-CHA/VT/ Leishmaniasis
	1.2.2. Number of countries that participate in the direct external evaluation of performance for the microscopic diagnosis of leishmaniasis (PEED)	ARG,BOL BRA, COL* CRI, ECU GTM, HON MEX, NIC PAN, PRY, PER	ARG, BLZ, BOL, BRA COL, CRI DOM, ECU SLV, GTM HON, GUY MEX, NIC PAN, PRY SUR, PER, VEN.	Parasitology Laboratory of the Colombian National Institute of Health	Annual report of the Colombian National Institute of Health to the PAHO Leishmaniasis Regional Program	Annual		INS Colombia y OPS-CHA/ VT/Leishmaniasis
	1.2.3. Number of countries with at least 90% of the network laboratories performing microscopic diagnosis of	Countries must include	ARG,BOL, BRA, COL, CRI, ECU, SLV, GTM, HON, GUY, MEX,	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis	Annual		

CUTANEOUS / MUCOSAL LEISHMANIASIS								
EXPECTED RESULTS	**INDICATORS**	**INITIAL DATA**	**GOALS**	**DATA SOURCE**	**DATA COLLECTION METHOD**	**FREQUENCY**	**EXPECTED ACTIONS**	**RESPONSIBLE PARTY**
	CL/ML and preforming internal quality evaluation of the diagnosis.		NIC, PAN, PRY, SUR, PER, VEN;		national programs		public health) participating in the PEED that develop and maintain improvement actions toward quality of the microscopic diagnosis according to their performance results. Countries with an internal quality control program for the CL/ML microscopic diagnosis for each laboratory from its network and that maintain improvement actions toward quality of the microscopic diagnosis according to their performance results. Countries with	

CUTANEOUS / MUCOSAL LEISHMANIASIS								
EXPECTED RESULTS	**INDICATORS**	**INITIAL DATA**	**GOALS**	**DATA SOURCE**	**DATA COLLECTION METHOD**	**FREQUENCY**	**EXPECTED ACTIONS**	**RESPONSIBLE PARTY**
							trained personnel to perform CL/ML diagnosis Countries with trained personnel to perform surveillance and operational investigation PAHO/WHO will maintain SisLeish updated and functioning.	
1.3. Strengthening of the treatment, cure and rehabilitation of patients with cutaneous/ mucosal leishmaniasis	1.3.1. Number of endemic countries that treat at least 95% of the CL/ML diagnosed cases	BRA, COL, CRI, SLV, GTM, HON, NIC, PER,	ARG,BOL, BRA, COL, CRI, ECU, SLV, GTM, HON, GUY, MEX, NIC, PAN, PRY, SUR, PER, VEN;	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual	Countries adequately registering CL/ML cases and medication stock into their information system and in an opportune and complete manner reporting the data to SisLeish Countries with permanent availability of	Endemic countries and PAHO-CHA/VT/ Leishmaniasis
	1.3.2. Number of endemic countries that report at least 80% of cured cases of CL/ML from the total treated cases.	BOL, SLV, HON, NIC, VEN	ARG,BOL, BRA, COL, CRI, ECU, SLV, GTM, HON, GUY, MEX, NIC, PAN, PRY, SUR, PER, VEN;	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual		Endemic countries and PAHO-CHA/VT/ Leishmaniasis

CUTANEOUS / MUCOSAL LEISHMANIASIS								
EXPECTED RESULTS	**INDICATORS**	**INITIAL DATA**	**GOALS**	**DATA SOURCE**	**DATA COLLECTION METHOD**	**FREQUENCY**	**EXPECTED ACTIONS**	**RESPONSIBLE PARTY**
	1.3.3. Number of endemic countries that keep medication available for the treatment of leishmaniasis throughout the year.		ARG,BOL, BRA, COL, CRI, ECU, SLV, GTM, HON, GUY, MEX, NIC, PAN, PRY, SUR, PER, VEN;	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual	medication for treatment of CL/ML cases and perform supervision and follow up of treated cases until establishment of cure. Countries with trained personnel to perform CL/ML treatment and follow up Countries with national politics towards healthcare of disabled people Leishmaniasis national programs advocating and promoting healthcare and access to rehabilitation programs for disabled people due to CL/ML Countries with pharmacovigila	Endemic countries and PAHO-CHA/VT/ Leishmaniasis
	1.3.4. Number of countries that officially include CL/ML cases with disabilities in national rehabilitation programs	0	BOL, BRA, COL, HON, , MEX, NIC, PAN, PRY, PER, VEN	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual		Endemic countries and PAHO-CHA/VT/ Leishmaniasis
	1.3.5. Number of countries that report and investigate severe adverse effects caused by CL/ML medication.	0	ARG,BOL, BRA, COL, CRI, ECU, SLV, GTM, HON, GUY, MEX, NIC, PAN, PRY, SUR, PER, VEN;	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual		Endemic countries and PAHO-CHA/VT/ Leishmaniasis

CUTANEOUS / MUCOSAL LEISHMANIASIS								
EXPECTED RESULTS	**INDICATORS**	**INITIAL DATA**	**GOALS**	**DATA SOURCE**	**DATA COLLECTION METHOD**	**FREQUENCY**	**EXPECTED ACTIONS**	**RESPONSIBLE PARTY**
							nce practices for CL/ML treatment medication Pharmacovigilance system providing timely information on severe adverse reactions to national surveillance systems / leishmaniasis programs PAHO/WHO will maintain SisLeish updated and functioning.	
1.4. Developed and strengthened entomological capacities to guide surveillance, prevention and control actions for cutaneous / mucosal leishmaniasis	1.4.1. Number of endemic countries with established capacities to develop actions for entomological surveillance against CL/ML.	COL, BRA, ARG, PAR, HON, NIC, MEX	BOL, COL, CRI, ECU, SLV, GTM, GUY, HON, NIC, PAN, PER, VEN	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual	Countries adequately registering CL/ML cases and medication stock into their information system and in an opportune and complete manner	Endemic countries and PAHO-CHA/VT/ Leishmaniasis

CUTANEOUS / MUCOSAL LEISHMANIASIS								
EXPECTED RESULTS	**INDICATORS**	**INITIAL DATA**	**GOALS**	**DATA SOURCE**	**DATA COLLECTION METHOD**	**FREQUENCY**	**EXPECTED ACTIONS**	**RESPONSIBLE PARTY**
	1.4.2. Number of endemic countries with established capacities to develop vector prevention and control actions against CL/ML.	COL, BRA, ARG,	BOL, COL, CRI, ECU, SLV, GTM, GUY, HON, NIC, PAN, PER, VEN, PRY, ARG, BRA	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual	reporting the data to SisLeish Countries using guidelines and procedures agreed upon for the development of entomological surveillance and vector management and control actions Countries with supplies, equipment and trained personnel for the development of entomological surveillance, prevention and vector control actions. PAHO/WHO will maintain SisLeish updated and functioning.	Endemic countries and PAHO-CHA/VT/ Leishmaniasis

LEISHMANIASIS VISCERAL								
RESULTADOS ESPERADOS	**INDICADORES**	**DATOS INICIALES**	**METAS**	**FUENTE DE LOS DATOS**	**MÉTODO DE RECOPILACIÓN DE DATOS**	**FRECUENCIA**	**SUPUESTOS**	**RESPONSABLE**
2.1. Strengthening of surveillance system and operative investigation of visceral leishmaniasis for decision making processes		**2015**	**2022**					
	2.1.1. Number of endemic countries with opportune reporting to SisLeish of VL data and annual population	ARG, BRA, GTM, MEX, PRY, VEN	12 countries have reported cases. ARG,BOL, BRA,COL, CRI, SLV, GTM,GUY, HON, MEX, PRY, VEN	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual	Countries adequately registering VL cases and LV-HIV co-infection into their information system and in an opportune and complete manner reporting the cases and border alerts to SisLeish Countries using the VL risk stratification to plan surveillance, assistance and control actions. Countries with a surveillance system that detects VL cases and outbreaks and the has the response ability to analyze and investigate the required control actions Countries with trained personnel to perform VL surveillance and operative investigation PAHO/WHO will	Endemic countries and PAHO-CHA/VT/ Leishmaniasis
	2.1.2. Number of countries that apply the VL risk stratification to guide surveillance and control actions (including countries with human or canine transmission or that are vulnerable).	BRA	(BRA, COL, PRY, VEN)	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual		Endemic countries and PAHO-CHA/VT/ Leishmaniasis
	2.1.3. Number of countries that report in timely manner the VL border alerts to SisLeish.	2 (BRA, URU)	12 countries have reported cases. ARG,BOL, BRA,COL, CRI, SLV, GTM,GUY, HON, MEX, PRY, VEN	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual		Endemic countries and PAHO-CHA/VT/ Leishmaniasis
	2.1.4. Number of countries that report VL-HIV co-infection cases.	(BRA, PRY) VEN	(BRA, PRY, ARG, VEN, COL, HON, MEX)	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis	Annual		Endemic countries and PAHO-CHA/VT/ Leishmaniasis

LEISHMANIASIS VISCERAL								
RESULTADOS ESPERADOS	**INDICADORES**	**DATOS INICIALES**	**METAS**	**FUENTE DE LOS DATOS**	**MÉTODO DE RECOPILACIÓN DE DATOS**	**FRECUENCIA**	**SUPUESTOS**	**RESPONSABLE**
					national programs		maintain SisLeish updated and functioning.	
	2.1.5. Number of countries that report and investigate VL cases or VL outbreaks	0	12 countries have reported cases or outbreaks ARG,BOL, BRA,COL, CRI, SLV, GTM,GUY, HON, MEX, PRY, VEN	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual		Endemic countries and PAHO-CHA/VT/ Leishmaniasis
2.2. Strengthening of the laboratory diagnosis of visceral leishmaniasis	2.2.1. Number of endemic countries that diagnose at least 95% of the VL cases by laboratory exams.	COL, GTM, HON, MEX, PRY, VEN	12 countries have reported cases. ARG,BOL, BRA,COL, CRI, SLV, GTM,GUY, HON, MEX, PRY, VEN	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual	Countries adequately registering VL cases into their information system and in an opportune and complete manner reporting the data to SisLeish	Endemic countries and PAHO-CHA/VT/ Leishmaniasis
	2.2.2. Number of countries that use the rK39 rapid test for early diagnosis of VL.	(BRA, ARG, PRY, COL)	12 countries have reported cases. ARG,BOL, BRA,COL, CRI, SLV, GTM,GUY, HON, MEX, PRY, VEN	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual	Countries with permanent availability and access to rapid tests for diagnosis of VL cases, and human resource to perform the tests.	Endemic countries and PAHO-CHA/VT/ Leishmaniasis
	2.2.3. Number of countries with at least 90% of the network laboratories	El país debe referir	12 countries have reported cases. ARG,BOL,	SisLeish	Official report from epidemiological surveillance	Annual	Countries that have rapid tests validated by the Region. Countries with an	Endemic countries and PAHO-CHA/VT/ Leishmaniasis

LEISHMANIASIS VISCERAL								
RESULTADOS ESPERADOS	**INDICADORES**	**DATOS INICIALES**	**METAS**	**FUENTE DE LOS DATOS**	**MÉTODO DE RECOPILACIÓN DE DATOS**	**FRECUENCIA**	**SUPUESTOS**	**RESPONSABLE**
	performing microscopic diagnosis of VL and preforming internal quality evaluation of the diagnosis		BRA,COL, CRI, SLV, GTM,GUY, HON, MEX, PRY, VEN		systems / leishmaniasis national programs		internal quality control program for the VL microscopic diagnosis for each laboratory from its network and that maintain improvement actions toward quality of the microscopic diagnosis according to their performance results. PAHO/WHO will maintain SisLeish updated and functioning.	
2.3. Strengthening of the treatment, cure and nutritional support of patients with visceral leishmaniasis	2.3.1. Number of endemic countries that treat at least 100% of the VL diagnosed cases.	0	12	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual	Countries adequately registering VL cases and medication stock into their information system and in an opportune and complete manner reporting the data to SisLeish Countries with permanent availability of medication for treatment of VLcases and perform	Endemic countries and PAHO-CHA/VT/ Leishmaniasis
	2.3.2. Number of endemic countries that report at least 95% of cured cases of VL from the total treated cases.	COL, GTM, HON	12 countries have reported cases. ARG,BOL, BRA,COL, CRI, SLV, GTM,GUY, HON, MEX, PRY, VEN	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual		Endemic countries and PAHO-CHA/VT/ Leishmaniasis

LEISHMANIASIS VISCERAL								
RESULTADOS ESPERADOS	**INDICADORES**	**DATOS INICIALES**	**METAS**	**FUENTE DE LOS DATOS**	**MÉTODO DE RECOPILACIÓN DE DATOS**	**FRECUENCIA**	**SUPUESTOS**	**RESPONSABLE**
	2.3.3. Number of endemic countries that keep medication available for the treatment of VL throughout the year.	(BRA, ARG, COL, HON, NIC, CRI, SLV)	All countries with transmission ARG,BOL, BRA,COL, CRI, SLV, GTM,GUY, HON, MEX, PRY, VEN, URY	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual	supervision and follow up of treated cases until establishment of cure. Countries with pharmacovigilance practices for VL treatment medication Pharmacovigilance system providing timely information on severe adverse reactions to national surveillance systems / leishmaniasis programs PAHO/WHO will maintain SisLeish updated and functioning.	Endemic countries and PAHO-CHA/VT/ Leishmaniasis
	2.3.4. Number of countries that report and investigate severe adverse effects caused by VL medication.	0	12 countries have reported cases. ARG,BOL, BRA,COL, CRI, SLV, GTM,GUY, HON, MEX, PRY, VEN	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual		Endemic countries and PAHO-CHA/VT/ Leishmaniasis
2.4. Developed and strengthened entomological capacities to guide surveillance, prevention and control actions for visceral leishmaniasis	2.4.1. Number of endemic countries with established capacities to develop actions for entomological surveillance against VL.	(COL, PRY, BRA, ARG, HON)	ARG,BOL, BRA,COL, CRI, SLV, GTM,GUY, HON, MEX, PRY, VEN Vulnerable - PER, ECU, PAN	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual	Countries adequately registering entomological surveillance, prevention and control actions for VL in their information system and in an opportune and complete manner reporting the data to SisLeish	Endemic countries and PAHO-CHA/VT/ Leishmaniasis
	2.4.2. Number of endemic countries with established capacities to develop vector prevention and	COL, PRY, BRA, ARG, HON	12 countries ARG,BOL, BRA,COL, CRI, SLV, GTM,GUY,	SisLeish	Official report from epidemiological surveillance	Annual		Endemic countries and PAHO-CHA/VT/ Leishmaniasis

LEISHMANIASIS VISCERAL								
RESULTADOS ESPERADOS	**INDICADORES**	**DATOS INICIALES**	**METAS**	**FUENTE DE LOS DATOS**	**MÉTODO DE RECOPILACIÓN DE DATOS**	**FRECUENCIA**	**SUPUESTOS**	**RESPONSABLE**
	control actions against VL.		HON, MEX, PRY, VEN		systems / leishmaniasis national programs		Countries with established capacities to develop entomological surveillance for VL. Countries using guidelines and procedures agreed upon for the development of entomological surveillance and vector management and control actions Countries with supplies, equipment and trained personnel for the development of entomological surveillance, prevention and vector control actions. PAHO/WHO will maintain SisLeish updated and functioning.	

LEISHMANIASIS VISCERAL								
RESULTADOS ESPERADOS	**INDICADORES**	**DATOS INICIALES**	**METAS**	**FUENTE DE LOS DATOS**	**MÉTODO DE RECOPILACIÓN DE DATOS**	**FRECUENCIA**	**SUPUESTOS**	**RESPONSABLE**
2.5 Developed and strengthened canine surveillance and management capacities	2.5.1. Number of receptive and endemic countries with established capacities to develop canine surveillance actions against VL.	(ARG, BRA, PRY; URY)	ARG,BOL, BRA,COL, CRI, SLV, GTM,GUY, HON, MEX, PRY, VEN, URY	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual	Countries adequately registering canine surveillance and and management actions for VL in their information system and in an opportune and complete manner reporting the data to SisLeish Countries with established capacities to develop canine surveillance for VL. Countries using guidelines and procedures agreed upon for the development of canine surveillance and management actions Countries with supplies, equipment and trained personnel for the development of canine surveillance and management actions. PAHO/WHO will maintain SisLeish updated and functioning	Endemic countries and PAHO-CHA/VT/ Leishmaniasis/ zoonosis
	2.5.2. Number of receptive and endemic countries with established capacities to develop canine management actions against VL.	(ARG, BRA, PRY; URY)	ARG,BOL, BRA,COL, CRI, SLV, GTM,GUY, HON, MEX, PRY, VEN, URY	SisLeish	Official report from epidemiological surveillance systems / leishmaniasis national programs	Annual		Endemic countries and PAHO-CHA/VT/ Leishmaniasis/ zoonosis

ANNEX 3

Surveillance and control actions against leishmaniasis in the Americas

1. Cutaneous leishmaniasis epidemiological classification/risk stratification

1. 1. Analysis of the internal epidemiological status in each country

- ✓ Revise the cutaneous leishmaniasis risk stratification at the first and second subnational administrative level based on the data available at SisLeish. If there are errors, one must correct the required data (population, area, geographical extension and number of cases).
- ✓ Define the areas with or without cutaneous leishmaniasis transmission.
- ✓ Produce a work plan according to the risk stratification at the first and second subnational administrative level taking into account the strategical actions presented here.

1.1.a. Actions for areas with low transmission

- ✓ Implement and maintain surveillance actions
- ✓ Ensure access to early diagnosis through the organization and operative functioning of the laboratory network, including internal quality control practices and external evaluation.
- ✓ Ensure early treatment and individual follow up, including health services capabilities and supply availability. Taking into account notification and monitoring of medication adverse effects.
- ✓ Guide and implement individual or collective prevention actions according to the transmission characteristics.
- ✓ Investigate and characterize new transmission foci
- ✓ Monitor surveillance actions and epidemiological status.

1.1.b. Actions for areas with moderate, high, intense and very intense transmission

For areas with moderate or superior transmission, the surveillance and control actions are the same. However, the categories are guided according to the resource prioritization. The activities that must be implemented are:

- ✓ Identify the known transmission foci to the third or fourth subnational administrative level (taking into account the political-administrative division in each country).
- ✓ Identify the transmission pattern: primary sylvatic environment or rural/peri-urban environment intervened by men.

  - **Actions to implement in the primary sylvatic environment:**
    - Characterize the transmission foci and risk groups (e.g. age, gender, occupation).
    - Implement and maintain the surveillance actions.
    - Ensure early diagnosis through organization and operative functioning of the laboratory network, including internal and external quality control practices.
    - Ensure opportune treatment and individual follow up, including health services capacities and opportune availability of supplies.
    - Guide and implement individual or collective prevention actions according to the risk groups.
    - Investigate and characterize new transmission foci.

- It is not recommended to perform entomological surveillance nor vector control actions in this scenario.

- **Actions to implement in the rural/peri-urban environment intervened by men:**
  - Implement and maintain the surveillance actions.
  - Ensure early diagnosis through organization and operative functioning of the laboratory network, including internal and external quality control practices.
  - Ensure opportune treatment and individual follow up, including health services capacities and opportune availability of supplies.
  - Guide and implement individual or collective prevention actions according to the risk groups.
  - Characterize the foci and the transmission characteristics:
    - ✓ Outbreaks
    - ✓ Endemic areas

- **Outbreaks:**
  - Besides the recommended measures for diagnosis and treatment, set off the entomological surveillance actions to identify the most probable areas of transmission.
    - ✓ If the risk of domestic (intra or peri-domicile) transmission is detected, an outbreak investigation is required. Besides the already mentioned recommendations for rural/peri-urban environment, also perform the environmental management and evaluate the feasibility and relevance to execute the anti-vector chemical control. If indicated, the actions must be scheduled to be executed in a limited area and evaluated by short term effectiveness indicators later on.
    - ✓ If the risk of transmission is detected in sylvatic zones or areas intervened by men, it is required to implement the aforementioned actions to the primary sylvatic environment.

- **Endemic areas:**
  - Besides the recommended measures for diagnosis and treatment, set off the entomological surveillance actions to identify the most probable areas of transmission.
    - ✓ If the risk of domestic (intra or peri-domicile) transmission is detected, an outbreak investigation is required. Besides the already mentioned recommendations for rural/peri-urban environment and promote environmental management actions.
    - ✓ If the risk of transmission is detected in sylvatic zones or areas intervened by men, it is required to implement the aforementioned actions to the primary sylvatic environment.
    - ✓ Investigate and characterize new transmission foci.
    - ✓ Monitor the surveillance actions and the epidemiological status.

1.1.c. Actions for áreas with no transmission of cutaneous leishmaniasis

- ✓ Characterize the areas without transmission into vulnerable or non-vulnerable.
  - **Vulnerable areas:**
    - Proximity or contiguity of areas with transmission.
    - Environmental modification (deforestation, construction of highways, roads, hydroelectric plants, etc.).
    - Physiogeographic characteristics (biomes), altitude and precipitation favorable to the vector.

- ✓ Areas with no transmission and non-vulnerable with a confirmation of a human case:
  - **Investigate the case, ensure opportune treatment and individual case follow up**
    - If the case is autochthonous:
      - ✓ Set off actions to implement surveillance, diagnosis and treatment according to the given recommendations to an area with low transmission.
    - If the case is not autochthonous:
      - ✓ Inform the epidemiological surveillance system about the place of probable infection, according to the established information flow in each country.

- ✓ Vulnerable areas without transmission:
  - **Set off surveillance actions**
  - **If there is laboratory confirmation of a human case, investigation of the case is required, as well as insurance of opportune treatment and individual case follow up.**
  - **Investigate and evaluate autochthony by epidemiological and entomological background.**
    - If the case is autochthonous:
      - ✓ Set off actions to implement surveillance (case active search), diagnosis and treatment according to given recommendations to outbreak areas (first case).
    - If the case is not autochthonous:
      - ✓ Inform the epidemiological surveillance system about the place of probable infection, according to the established information flow in each country.

2. Actions by epidemiological scenario against visceral leishmaniasis

2.1. Analysis of the internal epidemiological status in each country

- ✓ Identify and define the areas with and without visceral leishmaniasis transmission
- ✓ Considering the epidemiological status and, if possible, the risk stratification. The stratification must be specific to each country, taking into account the number and the cases geographical distribution.
- ✓ Carry out a work plan according to the risk stratification at the first and second subnational administrative level according to the strategical actions below.

2.2. Actions in areas with transmission: first human or canine case

- ✓ Confirm the human or canine case by laboratory tests (immunochromatographic and/or parasitological). Furthermore, develop actions listed below.
- ✓ Ensure opportune treatment and individual follow up.
- ✓ Investigate the case and characterize the foci, considering the epidemiological and entomological background (foci study in an area of a ± 150 meter radius or new blocks).
  - If the case is autochthonous:
    - Set off actions to implement surveillance (case active search), diagnosis and treatment of human cases and further recommendations for outbreak situations (first case).
    - Identification and sequencing of *Leishmania* species by standardized techniques.
    - Awareness and organization of services for epidemiological surveillance, diagnosis and treatment.
    - Raise awareness of veterinaries to early diagnosis and notification of canine visceral leishmaniasis cases.

- Raise awareness of local decision-making agents, involved sectorial agents and the community to prevention measures, as well as measures to early detect human and canine visceral leishmaniasis cases.
- Set off entomological surveillance and vector control actions (environmental management and chemical control), in a minimal area defined by entomological studies.
- Set off reservoir surveillance actions in a radius around the case contemplating at least 100 dogs, carry out active case search of suspicious dogs, serological enquiries to identify infected dogs and according to the results, set off control actions (humanitarian reservoir euthanasia according to laws and guidelines of each country). In case of confirmation of the first infected dog, take samples for parasitological confirmation and identification of the *Leishmania* specie.

- If the case is not autochthonous:
  - Inform the epidemiological surveillance system about the place of probable infection, according to the established information flow in each country.

2.2.a. Actions in areas with sporadic transmission

- ✓ Maintain the surveillance actions in a permanently and systematically manner.
- ✓ Monitor and periodically evaluate the occurrence of human and canine cases, as well as entomological indicators and intervene when necessary.
- ✓ Ensure early diagnosis, opportune treatment and individual follow up of human cases.
- ✓ Systematically evaluate the epidemiological status to implement, if necessary, prevention, surveillance and control actions.

2.2.b. Actions in stable areas or with expanding transmission

- ✓ Maintain the services organized for the development of actions for surveillance, diagnosis and treatment of human cases.
- ✓ Sustain awareness among veterinaries to carry out early diagnosis and notification of canine visceral leishmaniasis cases.
- ✓ Raise awareness of local decision-making agents, involved sectorial agents and the community to prevention and control measures against visceral leishmaniasis.
- ✓ Carry out entomological and reservoir surveillance actions, as well as prevention and vector (environmental management and chemical control) and reservoir control.
- ✓ Mantener organizados los servicios para el desarrollo de las acciones de vigilancia, diagnóstico y tratamiento de los casos humanos.

2.2.c. Actions in areas with no transmission of visceral leishmaniasis

- ✓ Characterize the areas with no transmission into vulnerable or non-vulnerable
  - Vulnerable areas are those with:
    - Migratory flow
    - Proximity or contiguity of areas with transmission.
    - Environmental modification (deforestation, construction of highways, roads, hydroelectric plants, etc.).
    - Physiogeographic characteristics (biomes), altitude and precipitation favorable to the vector.
  - In the vulnerable areas is necessary to set off entomological surveillance actions, through a new entomological enquiry. Classify the vulnerable areas, based on the results, in:
    - Receptive: presence of the vectors

  - Non-receptive: absence of the vector
- In vulnerable receptive areas, it is necessary to implement the following actions:
  - Maintain entomological surveillance
  - Set off the human and reservoir surveillance through active search and reservoir enquiry around the area with vector presence, as described previously.
  - If there is no visceral leishmaniasis in humans nor in dogs, repeat reservoir monitoring once a year, and carry out a new entomological survey if environmental modifications occur.
  - If there is autochthonous human or canine visceral leishmaniasis, carry out actions according to recommendations given for the first case of visceral leishmaniasis.
- In vulnerable non-receptive areas:
- En las áreas vulnerables no receptivas:
  - Carry out a new entomological survey once a year until finding the vector
    - There are no surveillance and control actions recommended for non-vulnerable areas.

3. Cross-sectional actions in the different risk strata

The cross-sectional actions must be integrated to the leishmaniasis epidemiological context in the countries and the existing health systems and epidemiological surveillance framework.

The recommended cross-sectional actions are the following:

- ✓ Implement leishmaniasis surveillance system and ensure obligatory notification of individual cases in each country.
- ✓ Strengthen national and subnational capacities to collect and analyze leishmaniasis data for decision-making processes.
- ✓ Report data to SisLeish in a periodical and systematic manner.
- ✓ Ensure opportune availability and quality of medication, laboratory supply and supplies for surveillance, and vector and reservoir control.
- ✓ Monitor the adverse effects associated to medication through a pharmacovigilance system.
- ✓ Integrate diagnosis and treatment actions, and medical referral of the cases to the primary healthcare unit as part of the universal health coverage.
- ✓ Strengthen the leishmaniasis laboratory network in each country
- ✓ Promote intersectoral work to address the health social determinants of health related to leishmaniasis within the framework of the *Health in All Policies* initiative.
- ✓ Promote active participation of the community in the planning, implementation, monitoring and evaluation of leishmaniasis actions, with a complete and intercultural approach according to the social and economic characteristics of the affected communities.
- ✓ Promote the integration of leishmaniasis actions in the plans, programs, projects or strategies for a complete approach of the Neglected Infectious Diseases.
- ✓ Strengthen surveillance and vector control actions within the framework of the Integrated Vector Management Strategy.
- ✓ Strengthen the monitoring and control of reservoirs actions, integrating actions of the zoonosis surveillance system, according to the characteristics in each country.
- ✓ Promote operational research in all components of the leishmaniasis action in order to strengthen the national and subnational technical and operational capacity.