Pan American Health Organization

World Health Organization
REGIONAL OFFICE FOR THE Americas

LEISHMANIASES

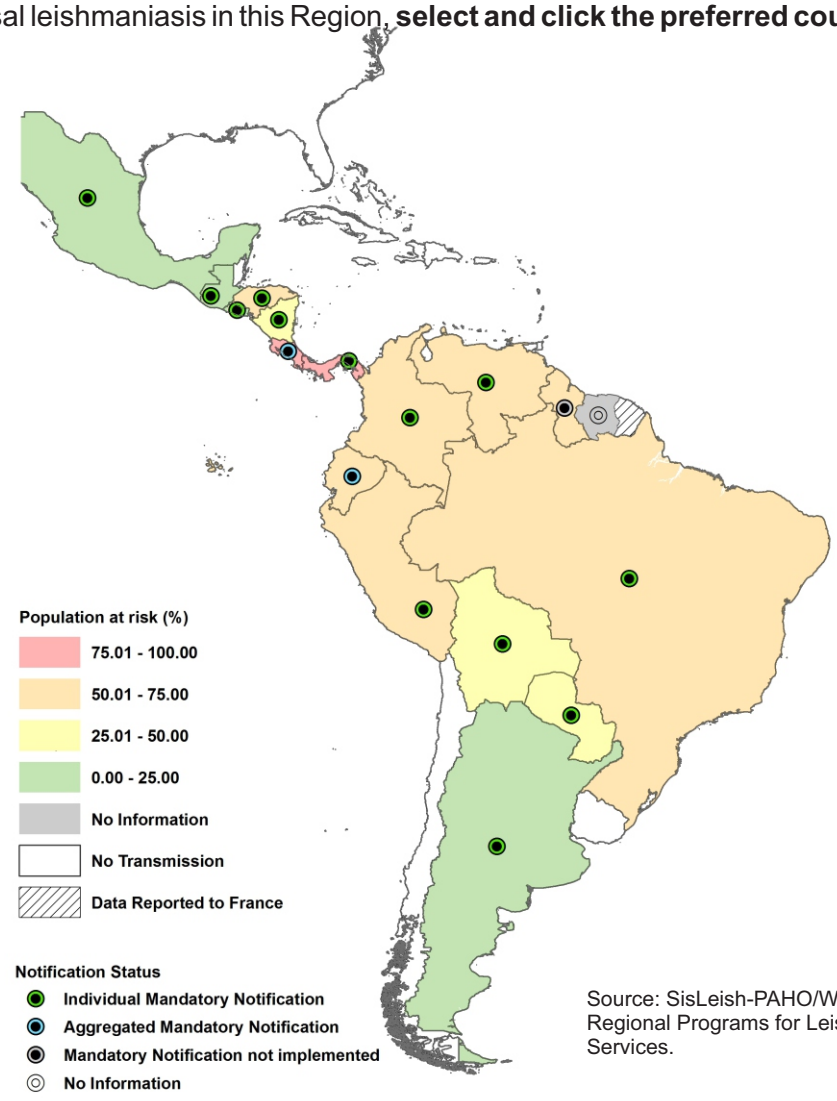
Epidemiological Report in the Americas

INTRODUCTION

The leishmaniases are vector-borne diseases with a zoonotic cycle in the Americas and remain a problem to public health. This disease presents a high burden capable of yielding severe clinical forms that may cause deformities, disabilities and death. Bolivia and Peru are among the countries with the highest global DALYs (Disability Adjusted Life of Years) of cutaneous/mucosal leishmaniasis and Brazil is among the countries with the highest fatality rates for visceral leishmaniasis (1.2).

In the last five years, the Pan American Health Organization/World Health Organization (PAHO/WHO) has been promoting access to diagnosis and treatment to endemic countries. Furthermore, surveillance actions have been improved and strengthened in order to guide, prioritize activities and establish technical cooperation. Since the implementation of the Leishmaniasis Information System (SisLeish/PAHO/OMS), regional data have been aggregated and consolidated, thus allowing analysis and monitoring of the disease. From the 18 endemic countries, 17 have individual or aggregated mandatory notification for leishmaniasis, and 43.75% (240,635,853) of the population are exposed to the risk.

This epidemiological inform shows the advancements obtained in the Region and updates the information on leishmaniases from 2014. Additionally, it displays an infographic for each country containing the epidemiological data of surveillance, control and assistance, as well as demographic, economic and environmental information of epidemiological significance. In order to visualize the data and current status on cutaneous and mucosal leishmaniasis in this Region, **select and click the preferred country below.**



Source: SisLeish-PAHO/WHO: Data reported from the Regional Programs for Leishmaniases/Surveillance Services.

EPIDEMIOLOGICAL STATUS

Cutaneous and Mucosal Leishmaniasis

From 2001 to 2014 a total of 797,849 new cases of cutaneous and mucosal leishmaniasis were reported to PAHO/WHO with an annual mean of 56,989 cases, distributed among 17 of the 18 endemic countries in the Americas. It is possible to observe a stable regional tendency; however, when the periods are analyzed individually there is a rise of cases up to 2005, due to the increase of reports from two countries from the Andean subregion, Colombia and Peru (Figure 1).

In 2014, a total of 16 endemic countries reported 51,098 cases of cutaneous and mucosal leishmaniases with an incidence rate of 19.76 cases per 100,000 inhabitants; the data from Suriname and French Guyana were not included in the system. A total of 75% of the detected cases were reported by Brazil (20,418), Colombia (11,586) and Peru (6,231); nevertheless, the highest incidence rates were recorded by countries from Central America: Nicaragua (62.97/100,000 inhabitants) and Costa Rica (52.55/100,000 inhabitants). These cases occurred in 216 of the 315 (68%) units of the first administrative level (departments, states, regions or provinces, according to each country division) and in 3,174 (26%) of the 12,054 units of the second administrative level (counties, *cantones*, provinces, and districts, among others).

For surveillance and control it is necessary to establish standardized indicators and an epidemiological stratification in order to understand the magnitude, tendency and risk of occurrence of the disease, as well as, to support the organization of services, prioritization and management of actions to obtain better efficiency.

In general, distinct indicators are used by the endemic countries to elect and direct the actions against cutaneous/mucosal leishmaniasis, and among them are number of cases, incidence rates and case densities. When analyzed separately, these indicators present advantages and disadvantages when portraying the different epidemiological scenarios. Through analysis made by the Regional Program for Leishmaniasis, along with epidemiology experts and discussions between countries, a composite indicator was established from the number of cases, incidence rates and case densities. The latter was stratified at the second subnational administrative level and validated at the regional and country level (Figure 2).

The natural break method was used to classify these areas, as it reduces the fluctuation within and between ranks. Based on these ranks, five transmission strata were created: low, moderate, high, intense and very intense. Subsequently, algorithms and actions were established, since surveillance and control of this disease demands a combination of activities, due to the interaction between host, parasite, vectors and reservoirs, which are influenced by external factors, such as: environmental, economic, social, physical, and biological, among others.

The disassociated data at the second subnational administrative level are shown in Figures 2 and 3; the data display risk stratification with the composite indicator and case density for cutaneous leishmaniasis. Guyana was not included in the analysis because its data is only available at the first administrative level (Regions). The information in Figure 2 shows the wide geographical distribution of cutaneous leishmaniasis in the Americas and characterizes and differentiates counties by color intensity, according to their transmission risk at the regional level. The map shown in Figure 3 displays the

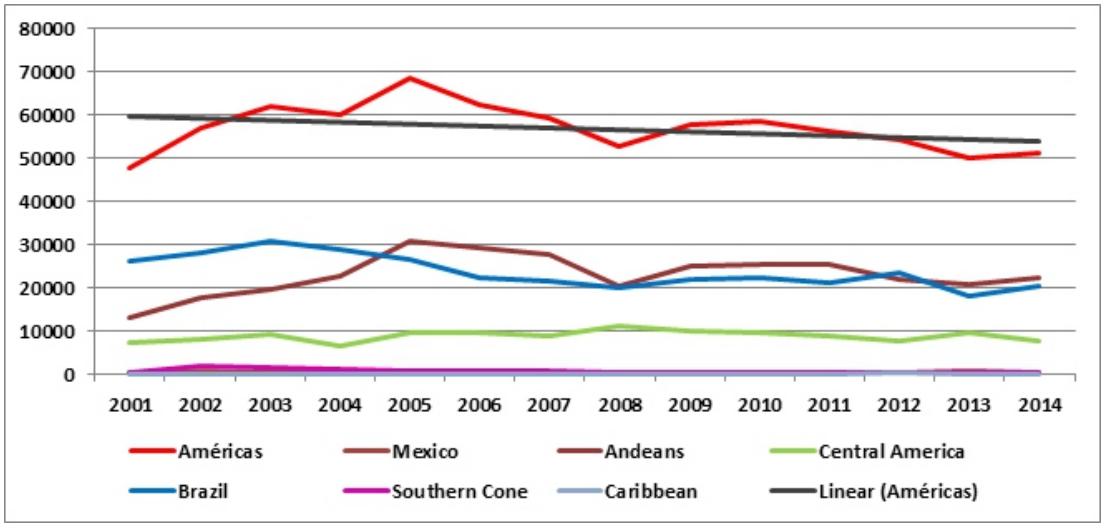


Figure 1. Cutaneous and mucosal leishmaniasis in endemic countries of the Americas, 2001-2014.
Source: SisLeish-PAHO/WHO: Data reported from the Regional Programs for Leishmaniases/Surveillance Services.
Data available on May 22, 2016.

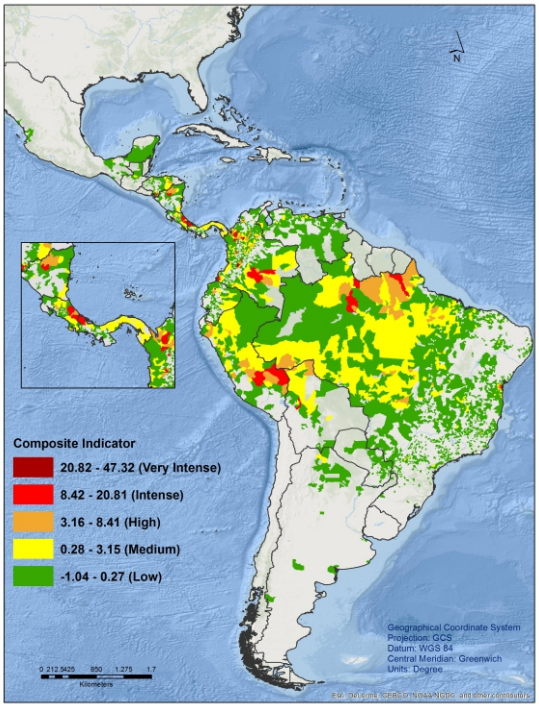


Figure 2. Risk stratification of cutaneous and mucocutaneous leishmaniasis at the second subnational administrative level in the Americas, 2014. Source: SisLeish-PAHO/WHO: Data reported from the Regional Programs for Leishmaniases/Surveillance Services. Data available on May 22, 2016.
*ICL: Composite Indicator for cutaneous leishmaniasis – represented by number of cases, incidence rate and case density.

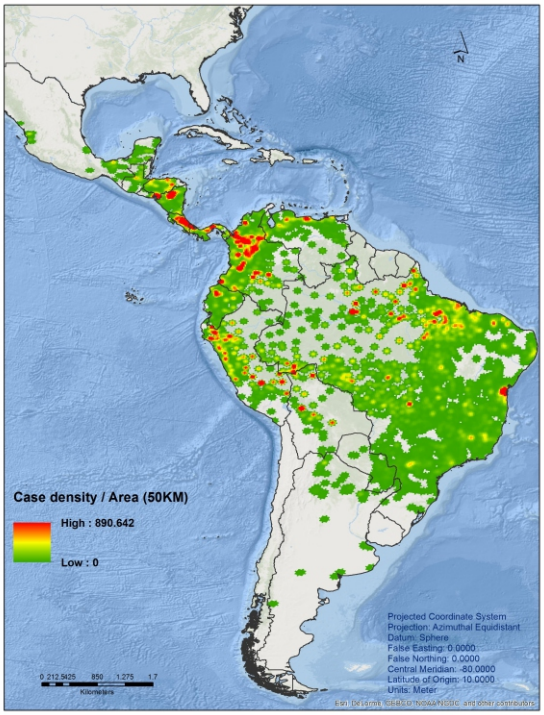


Figure 3. Case density of cutaneous and mucocutaneous leishmaniasis in endemic countries of the Americas, 2014. Source: SisLeish-PAHO/WHO: Data reported from the Regional Programs for Leishmaniases/Surveillance Services. Data available on May 22, 2016.

areas with the highest concentration of cases of cutaneous leishmaniasis based on case density, referenced by the central point of the county and a 50km radius.

From the available information on clinical forms, 95.84% (47,046) correspond to the cutaneous form and 4.16% (1,953) to the mucosal/mucocutaneous form, the latter being a severe form because it produces disabilities and mutilations if not treated an accordingly or timely manner. The highest case numbers of this clinical form were reported by Brazil (1,016), Bolivia (228) and Peru (343), which added together represent a total of 81.25% of the cases reported in the Region. The disseminated and diffuse cutaneous forms are still a challenge due to difficulties with management and therapeutic responses. Furthermore, it is worth mentioning that among the cutaneous forms, a total of 1,027 cases were clinically characterized and reported as atypical cutaneous leishmaniasis, which is a clinical form that generally produces non-ulcerated small lesions; however, the parasite and vectors involved in this transmission cycle are the same found in the visceral leishmaniasis. The low level of evidence on treatment efficacy for this particular clinical form makes it harder to manage and to assign a proper conduct. In 2014, 1,027 cases of atypical cutaneous leishmaniasis were report by four countries: Honduras (93.2%), Nicaragua (5.55%), Venezuela (0.97%) and El Salvador (0.3%).

The regional data show that the gender and age variables (Figures 4 and 5) are available in 99.9% (51,069) of reported cases. 70.5% (36,051) correspond to males and 51.32% correspond to the group of people over 20 years old and less than 50 years old. Both are considered risk groups, since the main transmission pattern of the disease is sylvatic and the formal and informal workers, military, tourists and others, enter the natural habitat of the vector and become infected. 99.9% of the age information is available due to an enhancement of data reporting in 2014, where only 0.88% (454) of cases did not contain age information compared to 2013 where 15.53% (7,762) of cases did not report age information.

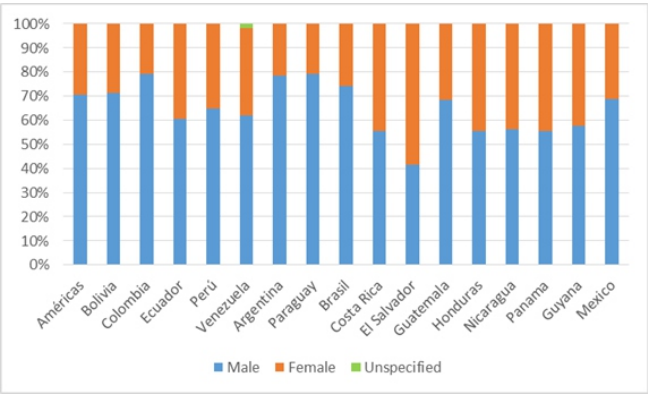


Figure 4. Gender and country proportion of cutaneous and mucosal leishmaniasis, Americas, 2014.
Source: SisLeish-PAHO/WHO: Data reported from the Regional Programs for Leishmaniases/Surveillance Services.
Data available on May 22, 2016.

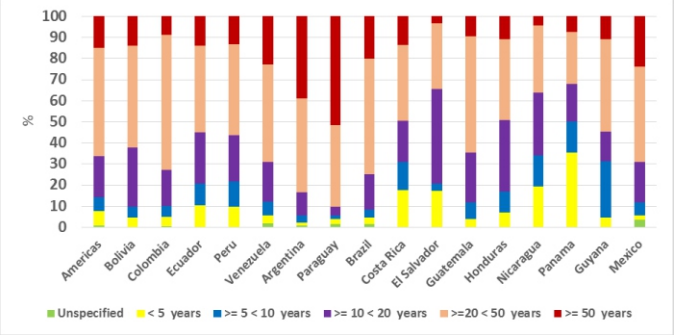


Figure 5. Age and country proportion of cutaneous and mucosal leishmaniasis, Americas, 2014.
Source: SisLeish-PAHO/WHO: Data reported from the Regional Programs for Leishmaniases/Surveillance Services.
Data available on May 22, 2016.

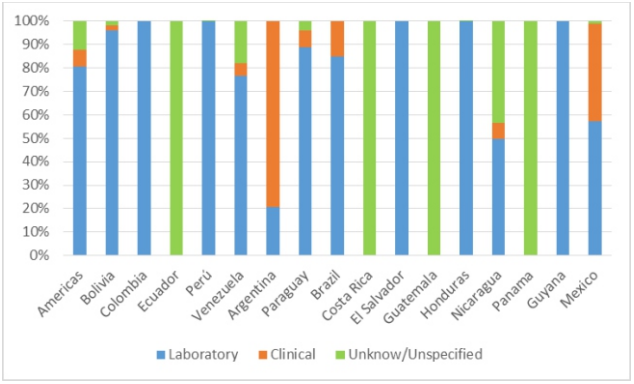


Figure 6. Case proportions based on confirmation criterion for cutaneous and mucosal leishmaniasis, Americas, 2014.
Source: SisLeish-PAHO/WHO: Data reported from the Regional Programs for Leishmaniases/Surveillance Services.
Data available on May 22, 2016.

The group with children under 10 years of age represents 13.46% (6,880) of records; nonetheless, in countries from Central America such as Costa Rica (31.1%), Nicaragua (34%) and Panama (50.3%) this percentage exceeds 30% of cases. On the other hand, countries in the Southern Cone, such as Argentina and Paraguay, most cases are concentrated in the group with people over 50 years of age.

In 2014, 80.71% (41,244) of cutaneous and mucosal leishmaniasis cases were confirmed by laboratory diagnosis, which represents an increase in the percentage when compared to 2013 (69.6%) (Figure 6). Nevertheless, this information is unknown or unavailable in Costa Rica, Ecuador, Guatemala and Panama. A total of 161 cases (0.32%) of different cutaneous and mucosal forms presented co-infection of *Leishmania*/HIV, where only one case was reported in Colombia and the remaindering in Brazil. It is possible to perceive a growth of the number and proportion of cases of co-infections of *Leishmania*/HIV in Brazil when comparing 2013 with 98 (0.54%) cases to 2014 with 161 (0.78%) cases.

Less than half of cases recorded information on the clinical evolution of the disease, seeing that 23,370 (46.52%) cases evolved to recovery and 92 (0.18%) to death (Figure 7). From total deaths, 17 were associated with possible complications due to inadequate use of specific medications with cardio, renal and hepatic toxicity. This information is not available from National Programs or surveillance systems from Colombia, Ecuador, Argentina, Costa Rica, Guatemala, Panama and Guyana.

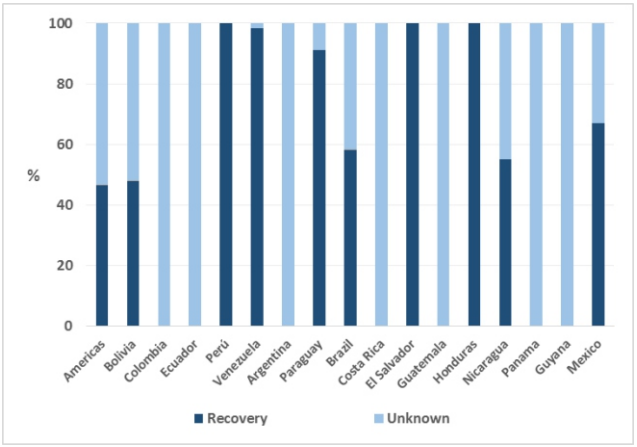


Figure 7. Case proportions based on evolution of the disease for cutaneous and mucosal leishmaniasis, Americas, 2014.
Source: SisLeish-PAHO/WHO: Data reported from the Regional Programs for Leishmaniases/Surveillance Services.
Data available on May 22, 2016.

VISCERAL LEISHMANIASIS

Visceral leishmaniasis is endemic in 12 countries in the Americas; it is classified according to three epidemiological scenarios: countries with sporadic transmission (Costa Rica, Guatemala, Honduras, Nicaragua, Bolivia, Guyana and Mexico), countries with stable or controlled transmission (Colombia and Venezuela) and countries with expanding transmission (Argentina, Brazil and Paraguay).

From 2001 to 2014 a total of 48,720 visceral leishmaniasis cases were reported with an annual mean of 3,480 cases, reflecting 96.42% (46,976) concentrated in Brazil. It is possible to observe a stable case tendency between 2004 and 2012; however, from 2009 a rise in number of cases occurred in the countries from the Southern Cone and a decline in two Andean countries (Colombia and Venezuela) Figure 8. The data in SisLeish are available from 2012; since then, 654 deaths caused by visceral leishmaniasis were recorded with a fatality mean of 6.6% (Figure 9).

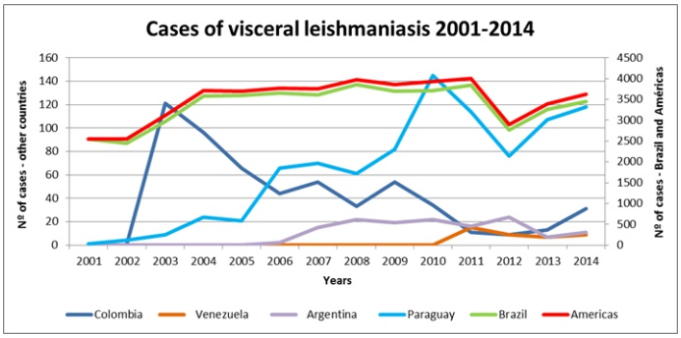


Figure 8. Cases of visceral leishmaniasis according to the countries with the highest number of occurrence, Americas, 2001-2014.
Source: SisLeish-PAHO/WHO: Data reported from the Regional Programs for Leishmaniases/Surveillance Services.
Data available on May 22, 2016.

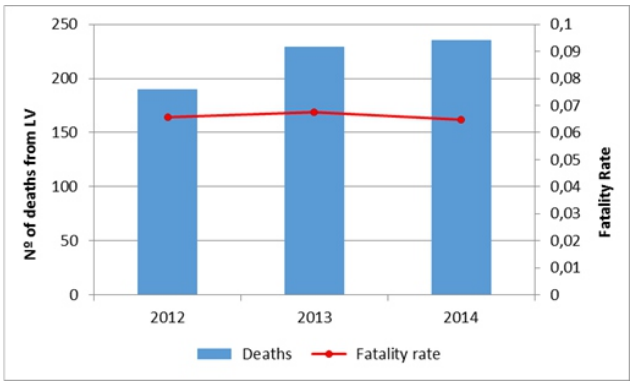


Figure 9. Number of deaths and fatality rate by visceral leishmaniasis, Americas, 2012-2014.
Source: SisLeish-PAHO/WHO: Data reported from the Regional Programs for Leishmaniases/Surveillance Services.
Data available on May 22, 2016.

In 2014, a total of 3,624 visceral leishmaniasis cases and an incidence rate of 2.42 cases per 100,000 inhabitants were reported in the Americas. From the reported cases, 95% were concentrated in Brazil; nonetheless, it is possible to observe a constant rise in the incidence rate from Paraguay in the last three years, both in regards to their at-risk population and in the general country population. Moreover, Colombia had a threefold increase in cases in 2014 compared to 2012 (Table 1).

Countries	2012				2013				2014			
	N°	%	Risk pop incidence [1]	Total Incid. [2]	N°	%	Risk pop incidence [1]	Total Incid. [2]	N°	%	Risk pop incidence [1]	Total Incid. [2]
Brazil	2.770	95,8	4,54	2,31	3.253	95,8	4,35	2,71	3.453	95,2	5,21	2,62
Paraguay	76	2,6	2,47	2,03	107	3,2	3,85	3,27	118	3,3	4,06	2,68
Venezuela	9	0,3	1,28	0,22	7	0,2	0,58	0,10	9	0,2	1,55	0,24
Colombia	9	0,3	2,34	0,36	13	0,4	2,65	0,29	31	0,9	3,3	0,41
Argentina	24	0,8	1,13	1,06	7	0,2	0,61	0,19	11	0,3	1,75	0,96
Honduras	0	0,0	0,0	0,0	3	0,1	1,21	0,67	2	0,1	3,12	0,31
El Salvador	0	0,0	0,0	0,0	1	0,05	2,74	0,90	0	0,0	0,0	0,0
Guatemala	0	0,0	0,0	0,0	1	0,05	2,58	1,98	0	0,0	0,0	0,0
Mexico	4	0,1	0,57	0,21	4	0,1	0,59	0,22	0	0,0	0,0	0,0
Total	2892	100,0	4,25	2,15	3.396	100,0	4,17	2,40	3.624	100,0	5,07	2,42

Table 1. Number and proportion of cases and incidence rate[1,2] of visceral leishmaniasis, Americas, 2012 -2014.
Source: SisLeish-PAHO/WHO: Data reported from the Regional Programs for Leishmaniases/Surveillance Services.
1- Incidence rate per 100.000 inhabitants considering the population and transmission áreas for VL in the countries and regions.
2- Incidence per 100.000 inhabitants considering the total population of the countries with VL transmission. LV
Data available on May 22, 2016.

From the total cases, 64.7% (2,357) are male, which is similar to the regional pattern from the years before; nevertheless, in Argentina, females were more affected with an estimated 64% (Figure 10). With respect to age, 33.4% of the cases were from children under five years old, followed by the groups ≥ 20 < 50 years of age (31.7%) and over 50 years old (15.7%) (Figure 11).

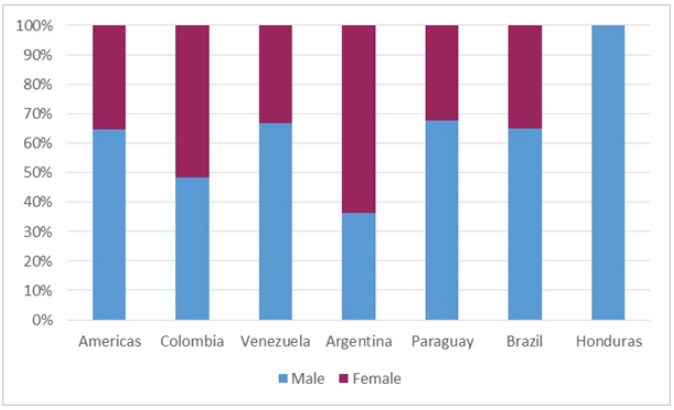


Figure 10. Case proportion of visceral leishmaniasis by gender and country, Americas, 2014.
Source: SisLeish-PAHO/WHO: Data reported from the Regional Programs for Leishmaniases/Surveillance Services.
Data available on May 22, 2016.

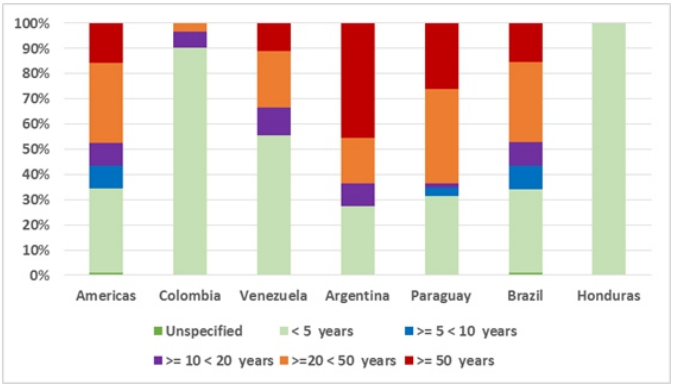


Figure 11. Case proportion of visceral leishmaniasis by age and country, Americas, 2014.
Source: SisLeish-PAHO/WHO: Data reported from the Regional Programs for Leishmaniases/Surveillance Services.
Data available on May 22, 2016.

Also in 2014, 242 (6.68%) cases of co-infection of visceral leishmaniasis/HIV were reported from Brazil (234) and Paraguay (8). 85.7% (3,106) cases were confirmed by laboratory diagnosis and the percentage of cases of unknown or unavailable information, with this same variable, has been reducing along the years. The proportion of cases that evolved into clinical recovery were 66.9% (2,425), and 235 (6,48%) cases from Brazil (230) and Paraguay (5) resulted in deaths, with a fatality rate of 6.66% and 4.9%, respectively.

Visceral leishmaniasis occurred in six countries, distributed in 54 departments/states and 879 counties with an annual mean of 4 cases (rank 1-128). Through the analysis of case density, disassociated at the second subnational administrative level and within a

50km radius, it is possible to observe a concentration of cases in the region of Asunción, Paraguay and in counties from the Northeast, Southeast and Midwest of Brazil (Figure 12). The spatial distribution of visceral leishmaniasis in the region reveals a high number of counties with low and moderate incidence rates; conversely, when compared to the case density, these counties generally correspond to the state/department capitals with a high population density (Figure 13).

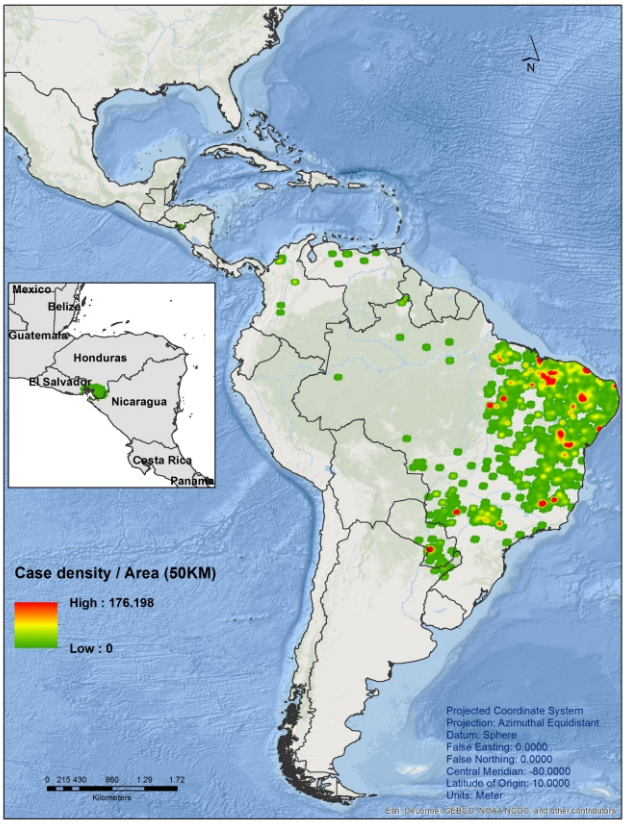


Figure 12. Case density of visceral leishmaniasis at the second administrative level, Americas, 2001-2014.
Source: SisLeish-PAHO/WHO: Data reported from the Regional Programs for Leishmaniases/Surveillance Services.
Data available on May 22, 2016.

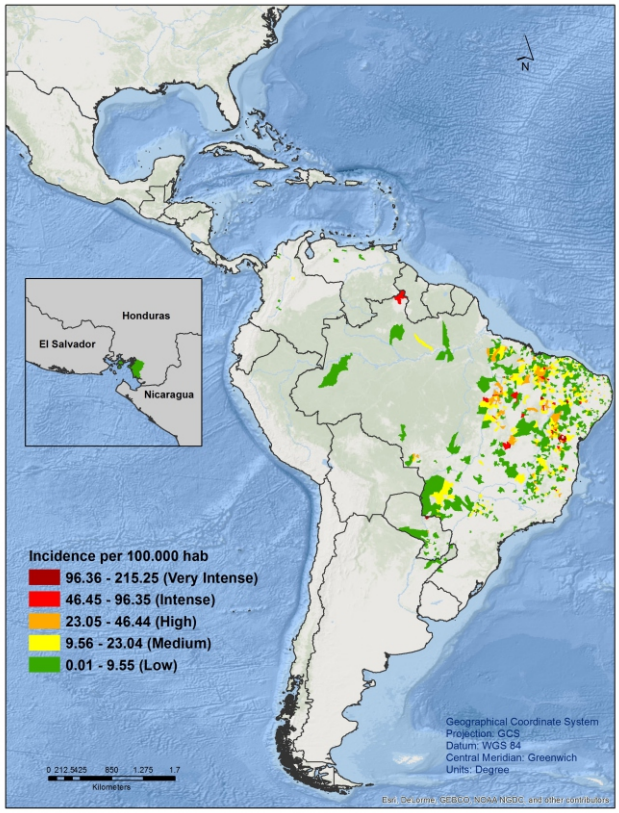


Figure 13. Incidence rate of visceral leishmaniasis at the second administrative level, Americas, 2001-2014.
Source: SisLeish-PAHO/WHO: Data reported from the Regional Programs for Leishmaniases/Surveillance Services.
Data available on May 22, 2016.

FINAL CONSIDERATIONS

In the last three years, data and epidemiological information from the Americas have been improved, which together with the countries has led to the definition and standardization of indicators, and also to the guidance of surveillance actions and control of the disease. Presently, the data at the regional level are disassociated at the second subnational administrative level; however, the indicators present limitations when analyzed individually.

The use of indicators, like case density per area, and the composite indicator for cutaneous/mucosal leishmaniasis, visceral leishmaniasis (number of cases and incidence rate) is an alternative to minimize limitations and support countries in their decision making. The national and subnational analysis must be more disassociated, for this purpose the countries need to identify their transmission areas at the third or fourth administrative level, thus characterizing and monitoring the foci at its smallest geographical unit. The uses of the composite indicator to establish the risk stratification is of extreme importance to the surveillance system, in order to prioritize and direct actions, and enhance the surveillance and control of this disease.

The regional information from 2014 shows an enhancement in the database of SisLeish, displaying a decrease in the percentage of cases with unknown information for gender, age, confirmed diagnosis, and an increase in indicators for clinical recoveries and laboratory diagnoses. Yet, it also shows a rise in the percentage of cases of *Leishmania*/HIV co-infection for cutaneous and mucosal forms, which might be attributed to joint actions between Programs for Leishmaniases, for HIV, and consequent improvement of timely case reporting services in a more premature way.

The record of deaths from cutaneous, mucosal and visceral leishmaniasis, and the reduction of incidence rates in groups (< 10 and > 50 years of age) and more severe forms of the disease remain a challenge, which is why PAHO/WHO and endemic countries are actively working together to intensify actions, investigate cases, stimulate joint management between leishmaniases Programs, surveillance services, healthcare services and pharmacovigilance, with the purpose of strengthening diagnostics, treatment, rehabilitation, prevention, surveillance and control of the leishmaniases in the Americas.

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