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**ANALYSIS OF THE STATUS OF RABIES IN
LATIN AMERICA 1990 - 1994**



ORGANIZACION PANAMERICANA DE LA SALUD
Oficina Sanitaria Panamericana, Oficina Regional de la
ORGANIZACION MUNDIAL DE LA SALUD

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IN LATIN AMERICA. 1990 - 1994**

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BACKGROUND:

Rabies has been a constant matter of concern in the countries of the American Continent, whose governments have expressed interest in eliminating this illness at different technical and political forums.

At the III Special Meeting of Health Ministers of the Americas, held in Santiago de Chile in October 1972, the Americas Ten Year Health Plan was approved, including the following recommendation:

- "4. To control and eventually root out canine rabies in the most important Latin American cities, aiming at total eradication of human rabies in the entire region".

At the III Interamerican Meeting on Animal Health (RIMSA III) held in Washington D.C. in April 1983, in view of the slow progress made in this field and the limitations of National Rabies Control Programs, the Panamerican Health Organization (PAHO) drew attention to the situation of rabies and, as a result, Resolution XVII was adopted, recommending the achievement of effective control of urban rabies in the main cities within the Region by the end of the decade. This Resolution was ratified by the XXX Board of Directors of the Panamerican Health Organization in September 1983, thus confirming the member countries' commitment to root out rabies from their main cities.

Based on the previous political decision, the PAHO summoned a Meeting of National Rabies Control Program Directors, which was held in Guayaquil, Ecuador, in December 1983. At this meeting, representatives from the different countries approved the Regional Program for Eliminating Urban Rabies in the leading cities of Latin America by the end of the decade of the eighties.

Two more Meetings of National Program Directors have been held since in Brasilia (1988) and Porto Alegre (1989), to assess the plan's progress and to make the necessary adjustments in order to achieve its goals.

At the end of the decade of the eighties, the PAHO, in cooperation with its member countries, carried out an evaluation of the regional programs and the ensuing Report was submitted to RIMSA VII, in Washington D.C., in 1991.

The XXXV Meeting of the Board of Directors of PAHO/WHO, held in September 1991, advised the Director to persist in the efforts implying the cooperation with the

countries and suggested an extension of the program to marginal areas and smaller populations in order to completely eliminate canine rabies.

Pursuant to these instructions, the IV Meeting of National Rabies Control Program Directors was summoned in Mexico D.F., Mexico, where the Regional Plan for the consolidation of the elimination of canine rabies by the year 2000 was approved.

The V Meeting of Directors of National Rabies Control Programs was summoned to take place in Santo Domingo, Dominican Republic, from February 13-15, 1995. This Meeting assessed the national programs and analyzed the situation of rabies in the region and in each of the member countries.

This document summarizes the information supplied by the countries attending the V Meeting and analyzes different epidemiological and administrative aspects of the national programs that have enabled the total or partial achievement of the goals envisaged or hindered their fulfillment.

PURPOSE

An analysis of the status of rabies and that of the rabies control programs in the continent and, specifically, in Latin American countries, in order to define short and medium term activities that will lead to the fulfillment of the goal to root out the illness by the year 2000.

METHODOLOGY

The methodology used for gathering information implied a written questionnaire, requested directly from the National Rabies Control Program Directors. This survey collected data from the different countries between 1990 and 1993 regarding the following issues: Global situation of human and animal rabies and distribution by cities; epidemiological features of dog mediated rabies transmission; medical care for people exposed to the virus; canine vaccination; epidemiological surveillance and control; infrastructure of rabies programs and sources of funds. In addition to the above, the countries were requested to include epidemiological maps showing the distribution of endemic rabies areas.

ANALYSIS OF RESULTS

1. Geographical extension and human and animal population.

For the purpose of the program for controlling and eliminating dog transmitted rabies, Latin America comprises 21 countries: Argentina, Belize, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Chile, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, the Dominican Republic, Uruguay and Venezuela.

Together, these countries cover an area just under (20) million Km², with a population of 471.2 million inhabitants - of which three out of four live in urban areas - and almost 50 million dogs.

Brazil is the subregion with the largest area (42.9%), whereas the Latin Caribbean and the Central American Isthmus are the regions with the smallest territories (1.0 and 2.6%, respectively).

As regards human and canine populations, Brazil covers approximately one third of both, Mexico accounts for one fifth of the human and one fourth of the canine population, while the Andean subregion houses a little more than 20% of both these populations (Tables 1 and 2).

In 1993, 53.9% of the Latin American territory was affected by dog-transmitted rabies. This area comprises some 303 million inhabitants and 35.5 million dogs, representing 64.2% and 71.5%, respectively, on both total regional populations (Tables 3 and 4 and Fig. 1).

2. Human Rabies

In the eighties, the average annual number of cases of human rabies reached 293, 16.9% higher than the annual average recorded in the previous decade amounting to 255. This is probably related, on one hand, to the positive changes in the mechanisms for gathering information and diagnosis and, on the other hand, to the population growth.

As regards the decade of the nineties to date, during the two year period from 1992 to 1993, 5.6% fewer cases were reported than in the period from 1990 to 1991.

Nevertheless, this trend, which reflects a reduction in the incidence of the illness in human beings at a regional level, is not the same in each of the subregions that constitute it. Therefore, while Mexico and Brazil registered a 45.3 and 23.1% drop in cases, respectively, during the two year period from 1992 to 1993 as compared with 1990 to 1991, other subregions underwent increases. This was particularly evident in the Central American Isthmus where, during the same period, human deaths caused by rabies increased to almost threefold. (Table No. 5).

In 1993, the countries with the highest risk of death from the illness, expressed in rates per 100.000 inhabitants, were El Salvador (0.3), Ecuador (0.26), Bolivia (0.20) and Guatemala (0.19). In seven countries, Argentina, Belize, Costa Rica, Chile, Honduras, Panama and Uruguay, no deaths from rabies were reported.

Final figures for 1994 show a significant decrease in the frequency of cases of rabies, although during that year the countries of Latin America reported 143 cases of death from this cause. To this figure five (5) deaths in the United

States must be added, thus leading to a total number of 148 human deaths from rabies in all of America during 1994 (Figure 2). That year, the countries with the highest specific death rate were again El Salvador, Peru and Guatemala.

Argentina and Panama, two countries that had not suffered any loss of human lives from rabies for many years, have reported one and two cases, respectively. (Table No. 6).

2.1 Sources of infection for human beings

The INPPAZ has on information regarding the identity of the possible source of infection (aggressor animal species) for 704 on the total 900 cases of human rabies reported in Latin America during the 1990-1993 period, which represents 78.2% of the human death rate from this cause. Table No. 7 shows the distribution by subregions of the total number of human cases reported in Latin America during this period, as well as the number of cases in which the source of infection was identified.

Among the latter, dogs turned out to be the main source of infection in human beings (84.1%) for the whole period, followed by chiropterans (7.2%), cats (4.0%) and others (4.7%). The heading "Others" includes wild animal species such as foxes, monkeys and raccoons, and, to a lesser extent, coyotes and wolves (Table No. 8 and figure No. 3).

The trend followed during the past years indicates a gradual although slow decrease in dogs as a source of infection for human beings, and there is evidence that proves that there may be a connection between "wild animals-human beings" and/or "wild animals-dogs-human beings".

3. Animal Rabies

During the period 1990-1993, Latin American countries reported a total of 51,459 cases of animal rabies, through the Continental Information System for Epidemiological Rabies Surveillance, coordinated by the Panamerican Institute for Food Protection and Zoonoses (INNPPAZ/SPV/PHO/WHO), which implies a yearly average of 12,865 cases¹.

Household pets (cats and dogs) as a whole accounted for 80.8% of the total cases reported, having dropped from 87.4% in 1990 and 71.5% in 1993.

The average diagnostic incidence of rabies in domestic animal of economic interest (DAEA), in categories including bovine, caprine, equine, ovine and

¹

Sources: VERA/INPPAZ/PHO Journals; Vols. XXII to XXV.

swine species, reached 15.6%, and amounted to 3.6% for wild animals. However, both these indexes showed an upward trend throughout the period; in the case of DAEA it increased from 11.4% to 24.8% and in the case of wild animals the increase was from 1.2% to 3.7% (Table 9).

There are obvious differences between the subregions, which become more evident in comparisons between countries. This is due to the diversity of the epidemiological situations on the one hand and, probably, to the lack of coordination between sectors, limiting the availability of information, on the other.

By way of example, in 1993 the highest ratio of rabies was found to be in household pets in all the subregions except for Brazil, and the ratio among wild animals was greatest in the Latin Caribbean. Lastly, the diagnostic incidence of rabies in DAEA was significantly higher in Brazil. Nevertheless, the reported frequency with which rabies occurred within this animal group according to the figures cited above reflects a lack of information and record filing, since it is widely known that rabies exists in several countries and subregions. (See Table No. 10).

The observation through time of the distribution of the relative significance of cases of rabies per animal species provides a very relevant viewpoint.

While in 1990 canine cases represented 83.4% of the total cases of animal rabies, a sustained decrease was evidenced throughout the period, reaching 67.1% in 1993 and 64.6% in 1994. The proportion among cats remains stable, whereas it increases among cattle, other tame animals of economic interest and wild animals. Table No. 11 and Figure No. 4 show a clear picture of this situation.

Given the significance of dogs as a source of rabies infection among human beings, which, as indicated previously, account for 84% of the cases of rabies in human beings, as from 1990 a more detailed analysis of the trend of rabies in this species has been carried out. Figure No. 5 shows the trend in the cases of canine rabies (clinical and confirmed cases) since before the beginning of the Regional Programme until 1994.

During the 1990-1993 period, 40,670 cases of canine rabies were reported, representing 76.9% of all the cases in animals calculated on an annual average of 10,168 cases (Table 12). This figure differs slightly from those published previously whenever there have been variations in the official information provided by the countries. Nevertheless, these changes do not alter the reading of the situation of rabies in this animal species.

The specific death rate in dogs caused by rabies for the region as a whole was 0.36% per 1,000 in 1990 and 0.13% per 1,000 in 1993, showing significant differences between the subregions and countries for any one given year.

The situation in the first and last year of the period was as follows: in 1990, Mexico and the Andean Subregion reported the highest death rate, with canine death rates caused by rabies of 1.3 and 0.33 per 1,000, respectively. In 1993, both these subregions again showed the highest specific death rates; however, the Andean Subregion remained almost unchanged (0.36 per 1,000), while the rate in Mexico dropped by 0.6 per 1,000.

The information included in this Report may be used to carry out a more in-depth analysis for each country and subregion.

Rabies in Cattle

The occurrence of rabies in cattle has implications for public health as well as for the economic aspects of cattle breeding. Therefore, its existence should be a cause for being alert, prompting close and permanent coordination and cooperation at least between these two sectors, i.e. health and agriculture.

Besides commenting on the number of cases reported annually (which exceeds 3,000) during this period, it is interesting to highlight that the presence of the illness is a clear indicator that the rabies virus is circulating among canine or wild animals, and that its reservoirs may eventually represent a risk for the human population, particularly for certain groups.

Moreover, in view of the fact that rabies is a highly lethal illness, the availability of vaccines of proven effectiveness and the value of livestock to the economy in most of the countries and for most cattle breeders, the failure to report cases of rabies in this species should not be commonplace.

Nevertheless, a glance at the figures presented in Table No. 13 reveals a surprisingly infrequent occurrence of rabies related deaths among cattle in countries where the conditions and epidemiological evidence would suggest the contrary. There are other influential factors that must be identified and solved.

4. Health Care for People Exposed to Rabies.

The care of people exposed to the risk of rabies was analyzed on the basis of the following variables: people assailed; people who began antirabies treatment following medical prescription; people who completed the treatment and people who discontinued the treatment, whether by medical prescription or dropouts. The analysis included full or partial information provided by 19 of the Region's 21 countries: Argentina, Belize, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Chile, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Paraguay, Peru, the Dominican Republic, Uruguay and Venezuela.

4.1 People Assailed

For the four year period under analysis (1990-1993), the countries reported that almost 3 million people had been assailed by different animal species, with an annual average of 719,441. The number of people assailed each year reported by any one country varied greatly, possibly owing to limitations in the systems used to gather information and also to an actual variability in the reporting of assaults.

The access to health care services, the population's confidence in the quality of medical assistance, and the importance and interest the community gives to reporting assaults and demanding health care are probably additional factors that contribute to explain the significant disparity observed among the different countries in the ratio "total human population: reports of people assailed".

The ratio of inhabitants assailed each year for the region as a whole was 1 out of every 641 inhabitants. The lowest ratios were reported in Cuba (256), El Salvador (296) and Chile (419). On the other extreme were Uruguay (8,005), Costa Rica (2,390), Colombia (1,807), Bolivia (1,668) and Honduras (1,420). Table 14 shows the values calculated per subregion.

4.2 People treated for rabies

Sixteen of the 21 Latin American countries supplied information for each of the years covered by the period under study regarding the number of people that received full antirabies treatment and those that, for whatever reason, discontinued their treatment. However, Guatemala only provided figures for 1993 and the Dominican Republic only registered the cases in which full treatment was administered. Argentina, Haiti and Panama did not include any information in this respect in their reports.

Based on these data, it was established that during the 1990-1993 period, 1.13 million people began antirabies treatments, with an annual average of 282,507 people (Table 15). Considering the number of people assailed reported by the countries that submitted information, 42.3% of them began antirabies treatment. There are significant differences among the subregions and countries in this aspect.

Within the subregions, the highest percentages were recorded in the Brazilian subregion (57.2%) and the Central American Isthmus (43.5%), and the lowest were recorded in the Latin Caribbean and the Southern Cone (7.6% and 27.9%, respectively). The variations become more evident in a comparison per countries.

Hence, for example, in Costa Rica only 0.7% of the subjects assailed by animals began treatment, in Cuba it was 7.3%, El Salvador 33.9%, Peru 47.3%, Brazil 57.2% and Ecuador 81.5%.

As regards to the people completing their treatments, the available data show that, for the whole region, a relatively high percentage, 82.0%, completed therapy. Among the subregions, the highest percentage of completed treatments corresponds to the Southern Cone (95.4%) and Brazil (87.8%), and the lowest percentages are Mexico (65.4%) and the Andean Subregion (70.3%). (Table 15).

As to the frequency of dropouts - either because the people did not return to complete the treatment or by medical prescription - the highest percentages were recorded in Uruguay (49.3%), Venezuela (44.5%) and Colombia (40.9%). On the other hand, Costa Rica and Honduras reported the lowest percentage (0 and 1.9%, respectively).

The questionnaire distributed to the countries also requested information as to whether the people who had died of rabies had or had not received antirabies treatment. No information was provided in this connection for 29 of the 900 cases of death caused by rabies during the 1990-1993 period. Of the remaining 871 subjects, a very high percentage (94.72%) had not received any treatment at all, versus 46 treated patients. However, among those who had received treatment, the latter was often incomplete or untimely. This information is consistent with the data corresponding to the epidemiological background of people who died as a result of rabies, submitted by the countries to INPPAZ. This Institute possesses 761 case histories for the period under analysis and, from the information contained therein, it may be inferred that 114 people had begun treatment, but only 15 of them underwent treatment according to the applicable rules and recommendations.

4.3 Availability of biological products

The adequate care of people exposed to rabies depends largely on the quality and availability of biological compounds (vaccines and hyperimmune serum) to carry out the treatment.

The analysis performed using the information available for 1992 and 1993 shows that the production of antirabies vaccines for human beings reached almost 4.7 million doses each year, all of which were produced in the brains of sucking mice (NTO). Twelve countries manufactured these vaccines: Argentina, Bolivia, Brazil, Colombia, Cuba, Chile, Ecuador, Guatemala, Honduras, Peru, Dominican Republic and Venezuela. Moreover, eight countries imported almost a quarter of a million doses per year of the vaccine, mostly from within their own

region, except for 5,224 doses in 1992 and 2,967 doses in 1993, which were produced in diploid cells (TCO) (Table 16).

Table 17 shows the availability of the vaccine (addition of production plus imports, less exports) per subregion. This table shows that the annual number of available doses exceeded 4.8 million doses per year, a figure which is considerably higher than the actually reported applied doses of 1.18 million in 1992 and 1.78 million in 1993 (Table 17).

The vaccine used is almost exclusively the one produced in the brains of sucking mice, since during the two year period only 5,034 doses produced in diploid cells were administered.

With regard to the utilization of hyperimmune serum, the reports from the countries indicate that eleven of them used it during the 1992-1993 period, namely Argentina, Bolivia, Brazil, Colombia, Cuba, Ecuador, Guatemala, Honduras, Mexico, Nicaragua and Peru. Hyperimmune serum is only produced in Brazil, Colombia and Peru.

5. Vaccination of Dogs

One of the basic strategies of the Regional Dog-Transmitted Rabies Control Program in Latin America has been the implementation of massive antirabies dog-vaccinating campaigns to achieve adequate coverage in order to limit the spreading of the infection and, consequently, avoid the human exposure to the illness. Several factors were analyzed to assess the progress of national vaccinating programmes and the fulfillment or non-fulfillment of the proposed goals.

5.1 Availability and use of canine antirabies vaccines

Information for the 1992-1993 two year period pertaining to 20 countries was analyzed, taking into account national production, exports and imports, and whether the latter involved purchases or donations.

Thirteen countries reported having produced the antirabies vaccine for dogs during the period. These were: Argentina, Bolivia, Brazil, Colombia, Cuba, Chile, Ecuador, Guatemala, Honduras, Mexico, Peru, the Dominican Republic and Venezuela. The leading producers were Argentina, Brazil, Colombia and Mexico, although the latter country's production is almost entirely destined to cover the local requirements.

The vaccine available in these countries for use in dogs is mainly produced in cell cultures, and represents 71.7% and 61.6% of the production in 1992 and 1993, respectively.

The global availability of vaccines amounted to 40.8 million doses in 1992 and 39.0 million doses in 1993. Table No. 18 shows information regarding the number of locally produced, imported and exported doses in the different subregions. The information supplied by the different countries reflects that the amount of doses produced locally should have been sufficient to meet the domestic requirements, considering that during 1992 and 1993, 78 million doses of the vaccine were produced. During the two-year period under analysis, the production exceeded by 70.6% and 39.4%, respectively, the overall canine population in the affected areas (which amounts to 35.5 million) and the total reported number of applied doses, leaving significant excess quantities of this biological which probably remained unused (Table No. 19). Nonetheless, some countries have experienced gaps in the availability and timeliness of the purchase of vaccines.

A comparison of the utilization of the available vaccines in the different regions shows that the largest surplus in the supply occurred in the Brazilian subregion (15.83 million doses in 1992 and 6.28 million doses in 1993). In the Andean Zone, the supply exceeded the number of doses administered by 1.24 million in 1992 and by 820,000 in 1993 and was generated, in this particular case, by the Colombian production. The only significant surplus in the supply within the Southern Cone occurred in 1993 (2.3 million), generated by the Chilean and Argentine production.

In this subregion, Paraguay is the most undersupplied country, usually obtaining its vaccines by donations from Brazil and Argentina.

The Central American Isthmus reported a supply of 3,075,650 doses of the vaccine during the two year period under analysis, which were produced in Honduras (1.2 million) and Guatemala (78,300 doses). The remainder comprises purchases and donations of vaccines imported from the Dominican Republic, Mexico and France. The utilization of vaccines reported for the same two year period amounted to 1,548,599 doses, which indicates that somewhat over 1.5 million doses were not administered during the period.

The Latin Caribbean, Cuba and the Dominican Republic cover their own requirements with their domestic production, leaving a surplus for export.

5.2 Canine Vaccination Coverage

All the countries, with the sole exception of Haiti, provided information regarding the number of dogs vaccinated. This information showed that vaccination was achieved for 23.9 million dogs in 1992 and for 28.0 million in 1993 in all the countries. From these total figures, 77.0% of

the vaccinations in 1992 and 81.0% in 1993 were performed in the areas affected by rabies. (Table 20).

Fifteen countries supplied figures corresponding to the number of vaccinations provided for dogs in unaffected areas (Argentina, Belize, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Honduras, Mexico, Panama, Peru, the Dominican Republic and Uruguay), using 5.51 and 5.31 million doses in each of the years (Table 21). The total canine population in these countries' unaffected areas is estimated in 12.56 million, which implies that 43.9% of the dogs in these territories were vaccinated.

In 1993, 77.5% of the canine population in the affected areas was vaccinated, whereas in 1992 vaccination was reduced to 68.8%.

This coverage varies from one country to another. For example, in 1992 Bolivia vaccinated 34.2% of the dogs in the infected area; Colombia vaccinated 60.3%; Ecuador, 32.4%; Peru, 39.0%; Brazil, 56.0%; Guatemala, 9.6%; Honduras, 34.1%; Mexico, 71.5%; Nicaragua, 21.4%; and Paraguay, 20.5%. It is worth highlighting that El Salvador did not carry out any vaccinations in 1992, and its infected area is comprised of a canine population of 750,000.

In 1993, Brazil, Bolivia, Ecuador, Honduras, Peru and the Dominican Republic stepped up the coverage of their canine vaccination in the affected areas to 41.0%, 51.3%, 65.3%, 69.3%, 39.7% and 80.9%, respectively. That same year, Argentina vaccinated as much as 70.9% of the dogs in the country's affected areas. In Colombia, on the other hand, canine vaccination dropped to 30.6%, as compared to 60.3% achieved during the previous year.

6. Epidemiological Surveillance and Control of Outbreaks of Canine Rabies

Three indicators were selected for this component, the final effect of which reflects the higher or lower incidence of cases. These were related to the attention to sources of infection, the elimination of dogs to control rabies episodes and the confirmation of the diagnosis through laboratory tests.

6.1 Reports of outbreaks of infection

Five of the 21 countries, Belize, Chile, Costa Rica, Panama and Uruguay, indicated that no outbreaks had been reported during the 1992-1993 two-year period. Argentina only provided information for the year 1993; Brazil, Guatemala, Haiti and Venezuela did not include this information in their reports, although it is known that cases of canine rabies were reported in these countries. Therefore, in 1992 eleven countries supplied information regarding the cases of rabies in dogs: Bolivia, Colombia,

Cuba, Ecuador, El Salvador, Honduras, Mexico, Nicaragua, Paraguay, Peru and the Dominican Republic. In 1993 the same countries supplied this information, in addition to Argentina. The reported sources of infection amounted to 12,174 in 1992 and 19,952 in 1993, of which, for each of the years cited, 77.2% and 66.7% corresponded to Mexico (Table 22).

Upon comparing these figures with the cases of rabies reported by the eleven countries mentioned previously - 5,372 in 1992 and 5,228 in 1993 - it is inferred that the latter represent 44.1% and 26.2% of the total number cases reported. This can be attributed to several factors. One possible reason is that not all of the reported cases actually turned out to be rabies episodes. Another explanation is that the number of cases reported by some countries relates exclusively to laboratory confirmed diagnoses, which under-estimates the actual incidence of the infection.

6.2 Research of Sources of Infection

As shown in Table 22, research covered 84.6% of the somewhat over 32,000 reports on sources of infection received during the 1992-1993 two-year period by the services in charge of the rabies programs. The purpose of this research work is to recommend and apply the appropriate sanitation measures to prevent the spreading of rabies and the related occurrence of new cases. However, the actual percentage of cases looked into should be higher, since Ecuador, for example, only supplied information regarding the reported sources of infection, and not on how many of them were looked into.

6.3 Controlled Sources of Infection

This is an indicator intended to "measure" the quality of sanitary intervention in connection with "episodes not leading to new cases in relation to the source."

The available data reflect that only a low percentage of the investigated sources of infection was effectively controlled (33.4% in 1992 and 24.6% in 1993) (Table 22).

However, it is possible that, for different reasons, the data provided by the countries do not accurately reflect the real situation, inasmuch as, if only a fraction of the sources was controlled (less than one third), the infection could have been expected to spread much more, causing a higher incidence of the illness, which is not the picture presented by the information regarding canine cases. Hence, this indicator is probably inadequate for the objectives pursued.

6.4 Elimination of dogs

In 1992 and 1993, 524,852 and 668,537 dogs were eliminated, respectively, pursuant to the measures implemented to control the sources of infection. These figures do not include the following countries: Argentina, El Salvador, Guatemala and Haiti, while Venezuela only provided information for 1993 (Table 23).

It is obvious that, except for the Andean Zone and the Latin Caribbean, where the amount of dogs eliminated increased considerably, the figures corresponding to the other subregions do not reflect significant changes during the years under consideration.

This could imply that these figures include other causes for the elimination of dogs apart from the control of sources of rabies infection, since the fluctuations from one year to another are not related to the changes observed in the number of sources of infection controlled during one given period.

6.5 Diagnosis confirmed through laboratory testing

The information provided by the different countries on diagnosis based upon laboratory tests is presented in Table 24. The latter shows that during the 1992-1993 two-year period and for the region as a whole, over one fifth of the total of 52,632 samples having undergone laboratory testing showed a positive result to rabies.

The percentage of positive results varies from one region to another. The highest percentages are found in the Central American Isthmus, the Southern Cone and the Latin Caribbean, where 50% of the samples showed a positive result. In the other subregions the percentages were as follows: Brazil, 8.6%; Mexico, 12.1% and the Andean Zone 34.0% (Table 24).

Regarding Mexico, information included in the publication "National Rabies Prevention and Control Program", Documentary Review, 1989-1994, shows that during the five-year period under study, 67,354 brains were sent to the laboratory, of which 15,300 (22.7%) were positive to rabies. This percentage is almost twofold as compared to the figure for the 1992-1993 period.

7. Resources

7.1 Human Resources

Nineteen countries provided information concerning the human resources involved in rabies programs during 1993, both occasionally

and on a full time basis. In spite of the fact that in some cases these figures cannot be regarded as true and/or accurate, the total figure amounted to 18,745.

The reports published by several countries, show that in some cases these figures do not include the staff employed by health and agriculture services and other institutions that were occasionally involved in specific tasks at a given time.

One fifth (3,773) of the total staff mentioned previously is comprised of professionals, of which 823 (21.8%) are veterinarians and 361 (9.6%) are medical doctors. Nevertheless, these percentages must actually be higher, since some reports only mention the total number of professionals, without specifying their qualifications or specialization.

The technical staff and inspectors employed amounted to 4,159; administrative staff accounted for 397; and 10,416 persons were included under the caption "others".

Excluding the category "other kinds of staff", which appears to be the group that most frequently includes the highest number of "temporary" staff, the countries with the greatest number of people involved in controlling the illness were Colombia, Honduras, Argentina, Peru, Brazil, Guatemala and El Salvador. Obviously, a significant part of the staff involved in rabies related activities also perform other functions within the Health or Agriculture Programs, which explains the high number of personnel reported by Honduras, for example.

7.1.1. Training

Fifteen countries supplied some information regarding the areas in which staff training activities were carried out during the 1990-1993 period, and identified the aspects which require training in the future. The topics on which most countries had carried out training between 1990-1993 were Epidemiological Surveillance, Program Management, Diagnosis and Control of Sources of Infection.

The areas most frequently identified in connection with training requirements were: Epidemiological Surveillance, Program Management, Campaign Planning, Diagnosis, Control of Sources of Infection, Vaccine Quality Control, Social Communication and Education and Care of Subjects Exposed to the Risk of Rabies Infection (Table 25).

7.2 Infrastructure of Rabies Services

The survey of countries with regard to infrastructure aimed at obtaining information on the existence of Laboratories for the Diagnosis of Rabies that use the immunofluorescence technique, Official Laboratories for Biological Compounds Quality Control, Centers for Animal Observation and Health Care Centers that provide care for people exposed to the risk of rabies infection (Table No. 26).

7.2.1 Laboratories for the Diagnosis of Rabies

All 21 countries in the region, with the exception of three of them (Belize, Haiti and Uruguay) possess at least one laboratory where diagnosis is performed by immunofluorescence.

In all, at the end of 1993 there were 105 laboratories that met this condition; 26 in Brazil, 21 in Mexico, 11 in Colombia, 9 in Argentina and Venezuela, 7 in Peru, 4 in Ecuador and El Salvador, and 3 in Bolivia and Guatemala. Each of the remaining countries reported the existence of 1 laboratory.

7.2.2 Laboratories for Quality Control of Biological Compounds

Sixteen countries (Argentina, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Chile, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Paraguay, Peru, the Dominican Republic and Venezuela) reported the existence of an official laboratory for performing quality control of biological compounds, specifically for antirabies vaccines. All these countries possess at least one such laboratory, with the exception of Argentina, Brazil and Venezuela which have two (2), and Cuba which has four (4).

7.2.3 Centers for the Observation of Animal Suspects

Eleven countries reported the existence of Centers for the Observation of Animals Suspected to have Rabies, with a total of 253 such centers reported. Cuba and Brazil own the greatest number of such centers. Some countries in which rabies is endemic and widespread throughout the territory do not possess any such centers (El Salvador and Nicaragua).

7.2.4 Health Centers that provide Care for People Exposed to the Risk of Rabies Infection.

The information provided by thirteen of the countries regarding the availability of health centers capable of providing care for people exposed to rabies indicates the existence of 28,762

centers in all. Cuba has the highest number of centers (22,021), followed by Chile (with 2,710 centers), Honduras (839), Nicaragua (839), Peru (737) and Colombia (527).

The number of health care centers bears no relationship with the incidence of rabies or its geographical distribution in the countries, nor is it related to the number of persons treated. Chile, for example, which has not reported any cases of rabies transmitted by dogs for the last four years, possesses 2,710 health centers for treatment and provides health care for 10,322 persons per annum in average.

In contrast, Bolivia, which has a long history of canine and human rabies and reported an average of 4,839 subjects assailed and 2,848 patients treated annually during the 1991-1992 period, only has 19 Centers that provide care to people affected by rabies. It is worth pointing out that the lack of health services has been and continues to be one of the leading factors of human deaths caused by rabies.

7.3 Financial Resources

In 1993, somewhat over 12 million dollars were allocated to rabies control programs, of which 95.7% were provided by national funds and the remaining 4.3% were contributed by foreign sources. In seven of the countries (Argentina, Cuba, Mexico, Panama, the Dominican Republic and Venezuela), 100% of the financial resources were contributed by national funds. In most cases, the foreign funds corresponded to antirabies vaccines (Table 27).

8. Regional Information System for Epidemiological Surveillance of Rabies in America

A Regional Information System on Rabies in the American Continent has been operating in all member countries, jointly with the Panamerican Health Organization PAHO/WHO. This system is based on National Rabies Information and Epidemiological Surveillance Systems in each country, which act as **reporting units** - one per country, and one **central unit**, the PAHO/WHO, through the Panamerican Institute for the Protection of Food and Zoonosis (INPPAZ).

Information is sent by the countries to the INPPAZ regularly and systematically on a weekly and monthly basis and it is then distributed to all the reporting units and to approximately 600 users in the entire region once it has been processed and analyzed (Weekly Epidemiological Reports, Biannual Journal of "Epidemiological Surveillance of Rabies in the American Continent (VERA) and Special Reports).

These reports include the document prepared by each country, based on the "Status of Rabies" Report, for the meeting of National Rabies Control Program Directors held every two years.

The System's main objectives are the following:

- * To collect, process and distribute information that provides an updated global view of the distribution and trend of rabies in the American Continent.
- * To submit regular and timely reports to governments in order to keep the areas free of rabies infection, combat epidemics and root out the illness.
- * To identify investigations applied to the resolution of specific problems, based on the information supplied by each country.

The V Meeting of National Program Directors (held in the Dominican Republic in February 1995) conducted an evaluation of the System's functioning, whereby its structure and organization were ratified (Figure 6), as were the related procedures and records, which are, namely:

- * Weekly Epidemiological Report on Human and Canine Rabies.
- * Monthly Report on Rabies in Human Beings and Animals.
- * Epidemiological Report: Rabies in Human Beings.
- * Annual National Country Survey on Rabies.
- * Special Reports.
- * Journal of Epidemiological Surveillance of Rabies in the American Continent (VERA).

* * * * *

ANNEXES
TABLES AND FIGURES

TABLE N° 1

**LATIN AMERICA: Area ⁽¹⁾, Estimated Human ⁽²⁾ and
Canine ⁽³⁾ Population per Subregions**

SUBREGION	Area (000'2 Kms ²)		Estimated Population (in 000's)			
			Human (1995)		Canine (1993)	
	N°	%	N°	%	N°	%
Andean	4563,1	23,1	100,334	21,3	10,153,1	20,4
Southern Cone	4056,4	20,6	56,582	12,0	5,825,4	11,7
Brazil	8456,5	42,9	161,382	34,2	15,005,8	30,1
Central American I.	509,3	2,6	33,082	7,0	3,816,0	7,7
Mexico	1923,0	9,8	93,670	19,9	12,465,2	25,0
Latin Caribbean ⁽⁴⁾	190,5	1,0	26,186	5,6	2,542,0	5,1
Total	19,698,8	100,0	471,236	100,0	49,807,5	100,0

⁽¹⁾ Source FAO: Refers to areas of land, without including interior waterways

⁽²⁾ Source: "Las Condiciones de Salud en las Américas" OPS. Pub.Científica N° 549. Ed. 1994.
(Health Status in America. PHO.)

⁽³⁾ Source: Reports from the countries.

⁽⁴⁾ Not including Puerto Rico.

**LATIN AMERICA. AREA, ESTIMATED HUMAN AND CANINE POPULATION
PER SUBREGIONS AND COUNTRIES**

SUBREGION/ COUNTRY	Area ⁽¹⁾ (000's Kms ²)	Human Population ⁽²⁾ (1995)		Estimated Canine Population (in 000's) ⁽³⁾
		Total (in 000's)	% Urban	
Andean	4 563,1	100 334	74,0	10 153,1
Bolivia	1 085,5	8 074	54,4	909,6
Colombia	1 038,7	35 101	72,7	3 354,2
Ecuador	276,8	11 822	60,6	1 614,7
Peru	1 280,0	23 854	72,2	2 212,8
Venezuela	882,1	21 483	92,9	2 061,8°
Southern Cone	4 653,1	56 580	84,0	5 825,4
Argentina	2 736,7	34 264	87,5	3 260,9°
Chile	748,8	14 237	85,9	1381,3°
Paraguay	397,3	4 893	50,7	663,2
Uruguay	173,6	3 186	90,3	520,0
Brazil	8 456,6	161 382	78,7	15 005,8°
Central America I.	509,3	33 082	48,4	3 816,0
Belize	22,8	209	52,5	24,0
Costa Rica	50,7	3 424	49,7	431,0
El Salvador	20,7	5 768	46,7	750,0
Guatemala	108,4	10 621	41,5	1114,4
Honduras	111,9	5 968	47,7	646,6
Nicaragua	118,8	4 433	62,9	533,1
Panamá	76,0	2 659	54,9	316,9
Mexico	1 923,0	93 670	75,3	12 465,2
Latin Caribbean	190,5	26 186	62,4	2 542,0
Cuba	114,5	11 091	76,0	1 090,7°
Haiti	27,6	7 180	31,6	689,3°
Dominican Rep.	48,4	7 915	64,6	762,0°
Total Latin America	19 698,8	471 234	75,5	49 807,5

⁽¹⁾ Source FAO: Refers to areas of land without including interior waterways.

⁽²⁾ Source: "Las Condiciones de Salud en las Américas" OPS. Pub.Científica N° 549. Ed. 1994.
(Health Status in the Americas. PHO.)

⁽³⁾ Source: Reports from the countries.

⁽⁴⁾ Inhabitant:dog ratio 10:1, based upon 1993 human population.

TABLE N° 3

**AREA AND ESTIMATED HUMAN AND CANINE POPULATION
EXISTING IN ZONES AFFECTED BY
DOG TRANSMITTED RABIES
COUNTRIES AND SUBREGIONS. LATIN AMERICA 1993 (*)**

SUBREGION/COUNTRIES	N° of Countries	Affected Area		Population Existing in Affected Areas (000's)			
				Human		Canine	
		000's Kms ²	%	N°	%	N°	%
Andean	5	8 189,4	48,0	61 076,3	60,9	7 063,9	69,6
Southern Cone	4	488,8	10,5	11 753,0	20,8	1 300,4	23,1
Brazil	1	6 443,7	73,1	126 689,3	83,4	12 668,9	83,1
Central America I.	7	301,4	59,2	22 699,2	68,6	2 652,4	69,5
Mexico	1	1 133,3	57,6	67 228,3	78,0	10 481,4	84,1
Latin Caribbean	3	66,0	34,6	13 160,6	51,2	1 287,6	50,7
Total Latin America	21	10622,6	53,9	302 552,7	64,2	35 454,6	71,5

(*) Report from countries: "Situation of Rabies". Presented at the V Meeting of Directors of National Rabies Programs, Santo Domingo, Dominican Rep., 1995.

TABLE N° 4

**AREA AND ESTIMATED HUMAN AND CANINE POPULATION
EXISTING IN ZONES AFFECTED BY DOG TRANSMITTED RABIES
COUNTRIES AND SUBREGIONS. LATIN AMERICA 1993 (*)**

SUBREGION/ COUNTRIES	Affected Area		Population Existing in Affected Areas (000's)			
			Human		Canine	
	000's Kms ²	%	Nº	%	Nº	%
Andean Zone	8,189,4	48,0	61,076,3	60,9	7,063,9	69,6
Bolivia	821,2	92,8	6,339,3	98,7	909,6	99,1
Colombia	474,3	41,5	19,904,4	55,5	2,234,4	66,6
Ecuador	146,1	56,4	10,186,1	90,8	1,455,2	90,8
Peru	491,2	38,2	17,514,2	78,0	1,751,4	78,0
Venezuela	256,6	28,1	7,132,4	33,2	713,3	34,6
Southern Cone	488,8	10,5	11,753,0	20,8	1,300,4	23,1
Argentina	346,9	12,5	3,803,6	11,7	380,4	11,7
Chile	24,4	3,3	5,555,9	40,9	577,8	42,5
Paraguay	117,5	29,6	2,395,5	49,0	342,2	51,6
Uruguay	0,0	0,0	0,0	0,0	0,0	0,0
Brazil	6,443,7	73,1	126,689,3	83,4	12,668,9	83,1
Central America I.	301,4	59,2	22,699,2	68,6	2,652,4	69,5
Belize	5,2	2,9	58,2	26,2	6,5	26,0
Costa Rica	0,0	0,0	0,0	0,0	0,0	0,0
El Salvador	114,3	100,0	5,768,0	100,0	750,0	100,0
Guatemala	108,4	100,0	10,621,0	100,0	1,114,4	100,0
Honduras	36,6	30,4	2,999,4	58,1	374,9	58,1
Nicaragua	36,8	29,5	3,252,6	76,5	406,6	77,7
Panama	0,0	0,0	0,0	0,0	0,0	0,0
Mexico	1,133,3	57,6	67 228,3	78,0	10,481,4	84,1
Latin Caribbean	66,0	34,6	13,160,6	51,2	1,287,6	50,7
Cuba	0,0	0,0	0,0	0,0	0,0	0,0
Haiti	27,6	100,0	7,180,0	100,0	689,3	100,0
Dominican Rep.	38,4	79,3	5,980,6	78,4	598,3	78,4
Total Latin America	10,622,6	53,9	302,552,7	64,2	35,454,6	71,5

(*) Report from countries: "Situation of Rabies". Presented at V Meeting of Directors of National Rabies Control Programs, Santo Domingo, Dominican Rep., 1995.

TABLE N° 5

**CASES OF HUMAN RABIES
TOTAL PER SUBREGIONS. LATIN AMERICA
BIENNIUM 1990-1991 AND 1992-1993**

SUBREGIONS	BIENNIUM					
	1990 - 1991		1992 - 1993		Variation	
	N°	%	N°	%	N°	%
Andean Zone	170	36,7	180	41,2	10	5,9
Southern Cone	7	1,5	6	1,4	- 1	- 14,3
Brazil	143	30,9	110	25,2	- 33	- 23,1
Central America I.	17	3,7	67	15,3	50	294,0
Mexico	117	25,3	64	14,6	- 53	- 45,3
Latin Caribbean	9	1,9	10	2,3	1	11,1
Total Latin America	463	100,0	437	100,0	- 26	- 5,6

TABLE N° 6

RABIES IN HUMAN BEINGS
NUMBER OF CASES PER SUBREGION AND COUNTRY
LATIN AMERICA 1990 - 1994

SUBREGION/ COUNTRIES	Annual Average		YEARS ⁽³⁾				
	Decade 1970-1979 ⁽¹⁾	Decade 1980-1989 ⁽²⁾	1990	1991	1992	1993	1994 ⁽⁴⁾
Andean Zone	52	93	95	75	92	88	60
Bolivia	3	12	8	11	25	16	6
Colombia	12	18	12	5	8	5	2
Ecuador	18	23	12	20	36	31	11
Peru	12	34	62	37	22	34	41
Venezuela	7	6	1	2	1	2	0
Southern Cone	11	7	2	5	3	3	2
Argentina	8	1	0	0	0	0	1
Chile	1	0	0	0	0	0	0
Paraguay	2	6	2	5	3	3	1
Uruguay	0	0	0	0	0	0	0
Brazil	100	84	73	70	60	50	22
Central America I.	23	37	9	8	30	37	30
Belice	1	1	0	0	0	0	0
Costa Rica	1	0	0	0	0	0	0
El Salvador	10	17	3	7	19	15	13
Guatemala	4	9	3	1	6	20	13
Honduras	4	7	2	0	2	0	1
Nicaragua	2	3	1	0	3	2	1
Panama	1	0	0	0	0	0	2
México	62	65	69	48	35	29	24
Latin Caribbean	7	7	3	6	4	6	5
Cuba	2	0	1	1	0	1	0
Haiti	2	3	1	3	3	4	3
Rep. Dominicana	3	4	1	2	1	1	2
Total Latin America	255	293	251	212	224	213	143

⁽¹⁾ Source: Boletín "Vigilancia Epidemiológica de la Rabia en las Américas." (Bulletin: Epidemiological Surveillance of Rabies in America) CEPANZO. Vol. XII. 1980.

⁽²⁾ Source: Regional Elimination Program for Urban Rabies: Progress Report on the 1980-1993 Decade Evaluation. RIMSA 7/18. April 1991

⁽³⁾ Source: Boletín "Vigilancia Epidemiológica de la Rabia en las Américas." (Bulletin: Epidemiological Surveillance of Rabies in America) INPPAZ. Vol. XXV. June 1994 and Report from Countries, V Meeting of Directors.

⁽⁴⁾ Monthly Reports from Countries Attending INPPAZ

TABLE N° 7

**RABIES IN HUMAN BEINGS: ANNUAL REGISTERED CASES ¹
AND CASES WITH IDENTIFICATION OF INFECTION SOURCE ².
LATIN AMERICA. TOTAL AND SUBREGIONS. 1990 - 1993***

SUBREGIONS	YEARS									
	1990		1991		1992		1993		TOTAL	
	TCR ¹	TCIF ²	TCR	TCIF	TCR	TCIF	TCR	TCIF	TCR	TCIF
Andean Zone	95	48	75	46	92	85	88	69	350	248
Southern Cone	2	2	5	5	3	3	3	3	13	13
Brazil	73	47	70	55	60	50	50	40	253	192
Central America I.	9	7	8	6	30	24	37	28	84	65
Mexico	69	65	48	49	35	33	29	28	181	175
Latin Caribbean	3	2	6	4	4	2	6	3	19	11
Total	251	171	212	165	224	197	213	171	900	704

* INPPAZ Data Base and Report from Countries attending V Meeting of Directors of National Rabies Programs

⁽¹⁾ TCR: Total cases registered.

⁽²⁾ TCIF: Total cases with identification of infection source.

TABLE N° 8

**CASES OF HUMAN RABIES:
TOTAL NUMBER AND WITH IDENTIFICATION OF INFECTION SOURCE.
LATIN AMERICA AND SUBREGIONS. 1990 - 1993 ***

SUBREGION/ COUNTRIES	TOTAL	SOURCE OF INFECTION					
		TCIF **		DOGS	CHIROPTER ANS	CATS	OTHERS
		N°	%				
Andean Zone	350	248	70,9	215	9	11	13
Southern Cone	13	13	100,0	12	0	0	1
Brazil	253	192	75,9	148	26	10	8
Central America I.	84	65	77,4	54	2	3	6
Mexico	181	175	96,7	153	14	4	4
Latin Caribbean	19	11	57,9	10	0	0	1
Total Latin America	900	704	78,0	592	51	28	33

Source: Report from the countries attending the V Meeting of Directors of National Rabies Control Programs and INPPAZ data base.

** TCIF: Total number of cases with identification of infection source.

TABLE N° 9

**RABIES IN ANIMALS:
DISTRIBUTION OF CASES PER CLASS
LATIN AMERICA. 1990 - 1993 ⁽¹⁾**

YEAR	N° OF CASES IN ANIMALS			
	Household Pets ⁽²⁾	DAEI ⁽³⁾	Wild Animals	Total
1990	17,090	2,236	236	19,662
1991	11,590	1,621	794	14,005
1992	6,077	1,873	480	8,930
1993	6,700	2,319	343	9,362
Total Latin America	41,557	8,049	1,853	51,459

⁽¹⁾ Source: Boletines "Vigilancia Epidemiológica de la Rabia en las Américas". (Bulletin: Epidemiological Surveillance of Rabies in America.) INPPAZ/OPS/OMS. Vols. XXII to XXV.

⁽²⁾ Household Pets: including dogs and cats

⁽³⁾ ADIE: Economically worked tame animals (bovine, caprine, equine, ovine and hog species).

TABLE N° 10

**RABIES IN ANIMALS:
DISTRIBUTION OF CASES PER CLASS.
LATIN AMERICA. TOTAL AND PER SUBREGIONS. 1993 ***

SUBREGION/ COUNTRIES	CASES IN ANIMALS						TOTAL
	Household Pets		DAEI		Wild Animals		
	N°	%	N°	%	N°	%	
Andean Zone	3,492	94,5	153	4,1	49	1,3	3, 694
Southern Cone	426	73,9	130	22,6	20	3,5	576
Brazil	391	17,0	1,886	82,2	17	0,7	2, 294
Central America I.	969	82,5	138	11,7	67	5,7	1, 174
Mexico	1,288	91,6	0	0,0	118	8,4	1, 406
Latin Caribbean	134	61,5	12	5,5	72	33,0	218
Total Latin America	6, 700	71,6	2 319	24,8	343	3,7	9, 362

* Source: Boletín "Vigilancia Epidemiológica de la Rabia en las Américas" (Bulletin: Epidemiological Surveillance of Rabies in America). INPPAZ/OPS. Vol. XXV. 1994.

TABLE N° 11

**DISTRIBUTION (PERCENTAGE) OF REPORTED CASES⁽¹⁾
OF RABIES IN ANIMALS PER SPECIES AND PER YEAR
LATIN AMERICA. 1990 - 1994 ⁽²⁾**

ANIMAL SPECIES	1990		1991		1992		1993		1994	
	Total	%	Total	%	Total	%	Total	%	Total	%
TOTAL	19,728	100,0	13,782	100,0	9,296	100,0	9,719	100,0	7,684	100,0
Dogs	16,462	83,4	10,948	79,4	6,622	71,2	6,638	68,4	4,956	64,5
Cats	794	4,0	419	3,0	321	3,5	419	4,3	349	4,5
Bovines	2,110	10,7	1,428	10,4	1,578	16,9	1,831	18,8	1,492	19,4
Oth. ADIE	126	0,7	193	1,4	295	3,2	488	5,0	424	5,5
Wild	236	1,2	794	5,8	480	5,2	343	3,5	463	6,0

⁽¹⁾ Including clinical cases and cases confirmed by laboratory testing.

⁽²⁾ Reports from countries: Situation of rabies as presented at the V Meeting of Directors of National Rabies Control Programs and "Boletines de Vigilancia Epidemiológica de la Rabia en América Latina" (Bulletins on Epidemiological Surveillance of Rabies in Latin America) [INPPAZ]

TABLE N° 12

RABIES IN DOGS: Number of reported cases ⁽¹⁾
COUNTRIES AND SUBREGIONS. LATIN AMERICA 1990 - 1993

SUBREGION/ COUNTRIES	Cases reported per year				
	1990	1991	1992	1993	Average
Andean Zone	3,160	2,251	2,935,	3,147	2 870
Bolivia	1,065	1,101	1,712	1,213	1 273
Colombia	338	216	124	86	191
Ecuador	802	418	665	1,002	722
Peru	833	430	348	772	596
Venezuela	122	86	86	74	92
Southern Cone	156	402	365	337	315
Argentina	57	34	68	101	65
Chile	2	0	0	0	>0
Paraguay	97	212	297	236	211
Uruguay	0	0	0	0	0
Brazil	823	461	699	688	668
Central America I.	524	405	418	959	577
Belice	7	0	0	0	2
Costa Rica	0	0	0	0	0
El Salvador	44	85	87	135	88
Guatemala	107	75	62	276	130
Honduras	354	242	255	453	326
Nicaragua	12	3	14	95	31
Panama	0	0	0	0	0
Mexico ⁽²⁾	11,676	7,351	2,077 *	1,398 *	2,249 *
Latin Caribbean	123	78	128	109	110
Cuba	32	22	36	26	29
Haiti	85	40	50	50	57
Dominicana Rep.	6	16	42	33	24
Total Latin America	16,462	10,948	6,622	6,638	6,792

⁽¹⁾ Source: Report on the Situation of Rabies prepared by the countries for the V Meeting of Directors of National Rabies Control Programs.

⁽²⁾ Clinical cases for the years 1990 and 1991, of which the cases confirmed by diagnosis upon laboratory testing amount to 3.044 and 2.470 respectively.

⁽³⁾ Source: Data from "Boletines Anuales de Vigilancia Epidemiológica de la Rabia en las Américas." (Annual Bulletins on Epidemiological Surveillance of Rabies in America). INPPAZ/OPS/OMS

* Only confirmed by laboratory testing.

TABLE N° 13

RABIES IN BOVINES: Cases reported per country ⁽¹⁾
LATIN AMERICA 1990 - 1993

SUBREGION/ COUNTRIES	YEARS			
	1990	1991	1992	1993
Andean Zone	223	284	222	182
Bolivia	s/i	s/i	10	17
Colombia	47	41	48	44
Ecuador	27	25	15	28
Peru	32	20	6	16
Venezuela	117	198	143	77
Southern Cone	48	62	95	130
Argentina	s/i	s/i	s/i	s/i
Chile	0	0	0	0
Paraguay	48	62	95	130
Uruguay	0	0	0	0
Brazil	1,771	1,881	2,870	2,997
Central America I.	68	57	65	129
Belice	0	1	1	0
Costa Rica	7	3	1	2
El Salvador	10	17	23	45
Guatemala	23	26	22	36
Honduras	11	5	6	4
Nicaragua	2	1	0	2
Panama	15	4	12	40
Mexico	898 *	s/i	210 *	s/i
Latin Caribbean	11	12	9	8
Cuba	10	9	9	7
Haiti	s/i	s/i	s/i	s/i
Rep. Dominicana	1	3	0	
Total Latin America	3,019	2,296	3,471	3,446

⁽¹⁾ Source: Report on the Situation of Rabies prepared by the countries for V Meeting of Directors of National Rabies Control Programs

* Bulletins VERA/INPPAZ/OPS/OMS

TABLE N° 14

**ANNUAL AVERAGE OF PERSONS ATTACKED
AND TOTAL HUMAN POPULATION RATIO
SUBREGIONS: LATIN AMERICA
1990 - 1993 ⁽¹⁾**

SUBREGION	ANNUAL AVERAGE PERSONS ATTACKED N°	RATIO TOTAL PUPULATION : PERSONS ATTACKED
1.- ANDEAN	136,686	734
2.- SOUTHERN CONE	99,135	571
3.- BRAZIL	300,007	538
4.- CENTRAL AMER.I.	35,275	742
5.- MEXICO	90,015	1,041
6.- LATIN CARIBBEAN	58,324	326
Total Latin America	719,441	641

¹ Excluding Haiti and Panama.

TABLE N° 15

**NUMBER OF PERSONS INITIATING (I.T.) AND COMPLETING
(C.T.) ANTIRABIES TREATMENT PER SUBREGIONS.
TOTAL P.A. AND AVERAGE PER PERIOD.
LATIN AMERICA. 1990 - 1993**

Subregion	1990		1991		1992		1993		AVERAGE		
	I.T.	C.T.	I.T.	C.T.	I.T.	C.T.	I.T.	C.T.	C.T.		
									N°	%	
Andean	45,301	30,173	36,271	24,667	33,708	23,818	59,231	43,946	43,628	30,651	70.3
Southern Cone ⁽¹⁾	14,124	13,333	12,205	11,364	17,355	16,692	18,298	17,742	15,496	14,783	95.4
Brazil	193,589	170,839	123,853	108,359	175,255	155,070	193,640	168,411	171,584	150,669	87.8
Central America I. ⁽²⁾	15,801	11,302	16,183	11,587	13,344	9,501	16,058	11,488	15,346	10,970	71.5
Mexico	36,638	25,372	31,860	21,762	32,166	20,882	27,419	15,756	32,021	20,943	65.4
Latin Caribbean ⁽³⁾	5,069	3,821	4,053	3,289	4,437	3,920	4,168	3,763	4,432	3,698	83.4
Total Latin America	310,522	254,840	224,425	181,028	276,265	229,883	318,814	261,106	282,507	231,714	82.0

⁽¹⁾ Not including Argentina

⁽²⁾ Not including data from Panama; Guatemala only filed data for 1983: treatment completed: (6.541) dropouts: (2.719), amounting to 9.260 persons having initiated treatment. For calculation purposes, the same figures were added to each year of the period.

⁽³⁾ Not including Haiti. Besides, the Dominican Republic reported the number of treatments completed, without indicating the number of dropouts. For calculation purposes it was considered that there were no dropouts, thus overestimating the % of treatments completed on the total number of treatments initiated.

TABLE N° 16

**HUMAN ANTIRABIES VACCINE.
LOCAL PRODUCTION AND IMPORTS.
SUBREGIONS. LATIN AMERICA
1992 - 1993**

SUBREGIONS	Production (doses)		Imports (doses)	
	1992	1993	1992	1993
Andean	748,753	834,008	46,052	30,202 ⁽¹⁾
Southern Cone	374,138	495,400	50,600 ⁽²⁾	60,600 ⁽²⁾
Brazil	2,073,360	2,022,940	0	0
Central American I.	140,000	220,000	143,586 ⁽³⁾	171,442 ⁽⁴⁾
Mexico	1,172,766	912,800	4 000 ⁽⁵⁾	0
Lat. Caribbean	186,136	205,807	0	0
Total Latin America	4,695,153	4,690,955	244,238 ⁽⁶⁾	262,244 ⁽⁷⁾

Including:

- (1) 200 doses of cell originated vaccine (TCO).
- (2) 600 doses of TCO vaccine.
- (3) 624 doses of TCO vaccine.
- (4) 2.167 doses of TCO vaccine.
- (5) 4.000 doses of TCO vaccine.
- (6) 5.224 doses of TCO vaccine
- (7) 2.967 doses of TCO vaccine.

TABLE N° 17

**HUMAN ANTIRABIES VACCINE :
AVAILABILITY ⁽¹⁾ AND ADMINISTRATION (DOSES).
SUBREGIONS. LATIN AMERICA.
1992 - 1993**

SUBREGIONS	Availability (doses)		Administration (doses)	
	1992	1993	1992 ⁽⁴⁾	1993 ⁽⁵⁾
Andean	763,753	834,208	261,193	482,886
Southern Cone	424,678	556,000	132,185	122,352
Brazil	2,023,360	1,962 940	258,040	783,806
Central American I.	283,586 ⁽²⁾	391,442 ⁽³⁾	,56,508	29,994
Mexico	1,176,766	912,800	427,822	322,854
Latin Caribbean	171,136	205,807	41,995	37,201
Total Latin America	4,843,279 ⁽²⁾	4,863,197⁽³⁾	1,177,743	1,779,093

⁽¹⁾ Production within subregion + imports from outside subregion, less exports outwards from subregion.

⁽²⁾ Includes 142.962 doses imported from other subregions without reporting source; hence, these were included twice so that the actual regional availability amounts to 4.700.317 doses.

⁽³⁾ Includes 169.275 doses imported from other subregions without reporting source; hence, the actual availability amounts to 4.693.922 doses.

⁽⁴⁾ Not including Guatemala, Haiti, Panama and Venezuela.

⁽⁵⁾ Not including El Salvador, Guatemala, Haiti, Panama and Venezuela.

TABLE N° 18

**AVAILABILITY OF CANINE ANTIRABIES VACCINE.
SUBREGIONS. LATIN AMERICA.
1992 - 1993**

SUBREGIONS	1992			1993		
	Number of doses			Number of doses		
	Local Production	(Imports) (Exports)	Availability	Local Production	(Imports) ⁽¹⁾ - (Exports)	Availability
Andean	5,115,235	, 270,000	5,385,235	4,181,350	536,750	4,718,100
Southern Cone	1,398,766	143 000	1,541,766	3,956,500	283,360	4,239,860
Brazil	24,101,320	- 413,000	23,688,320	17,948,740	- 500,000	17,448,740
Central American I.	678,300	285,360 ⁽²⁾	963,660	600,000	1,511,990 ⁽³⁾	2,111,990
Mexico	7,813,890	0	7,813,890	9,714,420	- 327,000	9,387,420
Latin Caribbean	1,386,950	0	1,386,950	1,149,862	- 10,000	1,139,862
Total Latin America	40,494,461	285,360	40,779,821	37,550,872	1,495,100	39,045,972

⁽¹⁾ Source: Reports from countries attending V Meeting of Directors of National Rabies Control Programs

⁽²⁾ Imported from France;

⁽³⁾ Includes 150.000 doses from France. The sources for the remaining doses have not been reported, so that the global availability within the region would be overestimated in case the same should proceed from other subregions within Latin America.

TABLE N° 19

**AVAILABILITY AND ADMINISTRATION OF
CANINE ANTIRABIES VACCINES.
SUBREGIONS. LATIN AMERICA.
1992 - 1993**

SUBREGIONS	1992		1993	
	Number of doses		Number of doses	
	Available	Administered	Available	Administered
Andean	5,385,235	4,143,487	4,718,100	3,898,146
Southern Cone	1,541,766	1,429,112	4,239,860	1,896,452
Brazil	23,688,320	7,861,572	17,448,740	11,170,601
Central American I.	963,660	523,650	2,111,990	1,024,949
Mexico	7,813,890	9,310,890	9,387,420	9,272,532
Latin Caribbean	1,386,950	640,542	1,139,862	740,734
Total Latin America	40,779,821	23,909,253	39,045,972	28,003,414

CANINE ANTIRABIES VACCINATION
AS REPORTED IN AFFECTED AND
UNAFFECTED AREAS.
SUBREGIONS. LATIN AMERICA.
1992 - 1993

SUBREGIONS/ COUNTRIES	NUMBER OF VACCINATIONS PER YEAR (in 000's)					
	1992			1993		
	Affected Area	Unaffected Area	Total	Affected Area	Unaffected Area	Total
1. Andean Zone	3,034,903	1,108,584	4,143,487	3,313,871	584,075	3,897,946
2. Southern Cone	241,503	813,695	1,055,103	373,043	1,071,690	1,444,733
3. Brazil	7,098,794	762,778	7,861,572	10,251,715	918,886	11,170,601
4. Central America I.	321,588	202,062	523,650	815,319	209,630	1,024,949
5. Mexico	9,110,888	0	9,110,888	9,272,532	0	9,272,532
6. Latin Caribbean	605,797	34,745	135,919	716,137	24,597	261,931
Total Latin America	19,698,476	2,898,385	22,596,861	23,914,096	2,791,311	26,705,407

s.i.: no information provided

n.c.: not applicable

TABLE N° 21

**REPORTS IN AFFECTED AND
UNAFFECTED AREAS.
COUNTRIES. LATIN AMERICA.
1992 - 1993**

SUBREGIONS/ COUNTRIES	NUMBER OF VACCINATIONS					
	1992			1993		
	Affected Area	Unaffected Area	Total	Affected Area	Unaffected Area	Total
Andean Zone	3,034,903	1,108,584	4,413,487	3,314,071	584,075	3,898,146
Bolivia	310,969	0	310,969	373,043	0	373,043
Colombia	1348,236	936,902	2,285,138	684,596	406,394	1,090,990
Ecuador	471,523	43,141	514,664	745,825	22,953	768,778
Peru	693,807	128,541	822,348	1,143,092	154,728	1,297,820
Venezuela	210,368	0	210,368	367,515	0	367,515
Southern Cone	345,000	1,084,112	1,429,112	494,750	1,401,702	1,896,452
Argentina	275,000	718,555	993,555	373,750	1,187,000	1,560,750
Chile	0	342,088	342,088	0	197,135	197,135
Paraguay	70,000	0	70,000	121,000	0	121,000
Uruguay	n,c	23,469	23,469	n,c	17,567	17,567
Brazil	7,098,794	762,778	7,861,572	10,251,715	918,886	11,170,601
Central America I.	321,588	202,062	523,650	815,319	209,630	1,024,949
Belize	n,c	10,716	10,716	n c	11,146	11,146
Costa Rica	n c	16,220	16,220	n c	14,858	14,858
El Salvador	0	0	0	242,340	132,119	374,459
Guatemala	106,915	n c	106,915	206,712	n c	206,712
Honduras	127,670	170,217	297,887	259,794	22,507	282,301
Nicaragua	87,003	s i	87,003	106,473	s i	106,473
Panama	n c	4,909	4,909	n c	29,000	29,000
Mexico	7,497,511	1,813,379	9,310,890	7,582,511	1,690,021	9,272,532
Latin Caribbean	101,168	539,374	640,542	237,334	503,400	740,734
Cuba	0	504,629	504,629	0	478,803	478,803
Haiti	s i	s i	s i	s i	s i	s i
Rep.Dominicana	101,168	34,745	135,913	237,334	24,597	261,931
Total Latin America	18,398,964	5,510,289	23,909,253	22,695,700	5,307,714	28,003,414

s.i: no information provided

n.c: not applicable

TABLE N° 22

**REPORTED, RESEARCHED AND CONTROLLED CASES OF
SOURCES OF RABIES INFECTION.
SUBREGIONS. LATIN AMERICA.
1992 - 1993 ***

SUBREGIONS	Number of Sources (1992)			Number of Sources (1993)		
	Reported	Researched	Controlled	Reported	Researched	Controlled
Andean Zone ⁽¹⁾	1,517	644	509	4 481	1,347	915
Southern Cone	297 ⁽²⁾	17	0 ^(2, 3)	240	32	0 ^(2, 3)
Brazil	s/i	s/i	s/i	s/i	s/i	s/i
Central American I. ⁽⁴⁾	731	719 ⁽²⁾	643	1,374	1,331	1,326
Mexico	9,402	9,402	2,358	13,312	13,312	1,612
Latin Caribbean	227	227	177	145	145	131
Total Latin America	12,174	11,009	3,687	19,952	16,167	3,984

* Source: Reports from countries on local status of rabies

Not including:

- ⁽¹⁾ Venezuela
- ⁽²⁾ Argentina
- ⁽³⁾ Paraguay
- ⁽⁴⁾ Guatemala, Panama y Haiti
- s/i No information provided.

TABLE N° 23

**NUMBER OF CANINES ELIMINATED.
SUBREGIONS. LATIN AMERICA.
1992 - 1993**

SUBREGIONS	Canines Eliminated		
	1992	1993	%
Andean	139,595	226,295	62,1
Southern Cone	87,352	77,262	- 11,6
Brazil	45,180	45,238	0,1
Central American I.	39,954	37 859	5,3
Mexico	130,542	125,911	- 3,5
Latin Caribbean	82,229	155,972	89,7
Total Latin America	524,852	668,537	27,4

TABLE N° 24

**CANINE RABIES DIAGNOSIS: N° OF SAMPLES
SENT TO LABORATORY
AND POSITIVE RESULTS.
SUBREGIONS. LATIN AMERICA.
1992 - 1993**

SUBREGIONS	1992			1993		
	Number of samples sent	Results (+)		Number of Samples sent	Results (+)	
		Nº	%		Nº	%
1. Andean	126	1,810	43,9	7,228	2,454	34,0
2. Southern Cone ⁽¹⁾	513	297	57,9	508	252	49,6
3. Brazil	6,572	699	10,6	7,958	688	8,6
4. Central America I.	920	240	26,1	1,347	707	52,0
5. Mexico	9,402	2,358	25,1	13,312	1,612	12,1
6. Lat.Caribbean ⁽²⁾	409	241	58,9	337	165	49,0
Total	21,942	5,645	25,7	30,690	5,878	19,2

⁽¹⁾ Not including data for Argentina 1992 and for Chile regarding number of samples sent during 1992-1993

⁽²⁾ Not including data for Haiti.

TABLE N° 25

TRAINING REQUIREMENTS PER AREA
IN LATIN AMERICA. 1994 (*)

Training Area	N° of Countries Interested	N° of Subjects (**)
Direction of Programs	9	75
Diagnosis	8	17
Epidemiological Surveillance	11	1 833
Control of Sources	9	1 803
Education and Social Communication	8	315
Vaccine Quality Control	5	8
Campaign Planning	9	242
Health Care for Subjects at Risk	11	1 500

(*) Brazil, Haiti, Mexico, Uruguay and Venezuela have not provided background regarding the issue of "training".

(**) NPRA = N° of persons requiring training.

TABLE N° 26

**INFRASTRUCTURE FOR RABIES CONTROL PROGRAMS:
LABORATORIES, CANINE OBSERVATION CENTERS
AND HEALTH CARE FOR HUMAN BEINGS.
COUNTRIES AND SUBREGIONS.
LATIN AMERICA 1993.**

SUBREGION/ COUNTRIES	N° of Laboratories		N° of Centers	
	Diagnosis (w/I.F.)	Biological Quality Control	Canine Observation	Human Health Care Centers
Andean Zone	34	6	31	1 328
Bolivia	3	1	3	19
Colombia	11	1	17	527
Ecuador	4	1	1	45
Peru	7	1	10	737
Venezuela	9	2	s/i	s/i
Southern Cone	11	4	3	3 217
Argentina	9	2	Municipal	426
Chile	1	1	1	2 710
Paraguay	1	1	1	63
Uruguay	0	0	1	18
Brazil	26	2	47	s/i
Central Americ.I.	11	4	3	2 540
Belize	0	0	1	33
Costa Rica	1	1	1	177
El Salvador	4	1	0	432
Guatemala	3	1	1	257
Honduras	1	1	0	839
Nicaragua	1	0	0	802
Panama	1	s/i	s/i	s/i
Mexico	21	1	54	3 756
Latin Caribbean	2	5	170	22 021
Cuba	1	4	169	22 021
Haiti	0	0	s/i	s/i
Rep.Dominicana	1	1	1	s/i
Total Lat.America	105	22	307	32 852

w/IF immunofluorescence
s/i no information provided

TABLE N° 27

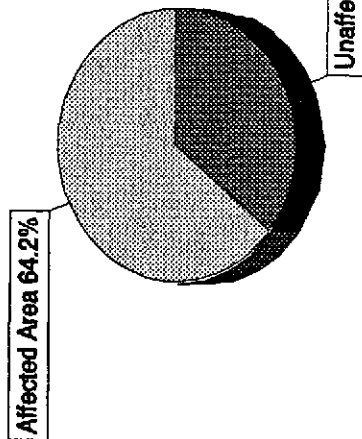
**FINANCIAL BACKING PER SOURCE OF FUNDS
COUNTRIES AND SUBREGIONS.
LATIN AMERICA 1993**

SUBREGION/ COUNTRIES	National		Foreign		Total
	U\$s	%	U\$s	%	U\$s
Andean Zone	3,160,705	89,9	358,500	10,2	3,519,205
Bolivia	150,000	67,1	73,500	32,9	223,500
Colombia	743,750	93,0	57,000	7,1	800,750
Ecuador	400,000	80,0	100,000	20,0	500,000
Peru	1,860,462	93,0	128,000	6,4	1,988,462
Venezuela	6,493	100,0	0	0,0	6,493
Southern Cone	1,085,260	99,5	6,000	5,4	1,091,260
Argentina	900,000	100,0	0	0,0	900,000
Chile	s/i	s/i	s/i	s/i	s/i
Paraguay	105,260	94,6	6,000	5,4	111,260
Uruguay	80,000	100,0	0	0,0	80,000
Brazil	s/i	s/i	s/i	s/i	s/i
Central America.I.	832,159	84,7	150,215	15,3	982,374
Belice	2,000	20,0	8,715	80,0	10,715
Costa,Rica	70,000	91,5	6,500	8,5	76,500
El Salvador	252,500	83,0	50,000	17,0	302,500
Guatemala	219,588	79,7	56,000	20,3	275,588
Honduras	36,147	81,0	8,000	18,2	44,147
Nicaragua	161,924	88,5	21,000	11,5	182,924
Panama	90,000	100,0	0	0,0	90,000
Mexico	6,077,380	100,0	0	0,0	6,077,380
Latin Caribbean	400,352	100,0	0	0,0	400,352
Cuba	330,902	100,0	0	0,0	330,902
Haiti	s/i	s/i	s/i	s/i	s/i
Rep. Dominicana	69,450	100,0	0	0,0	69,450
Total Latin America	11,555,856	95,7	514,715	4,3	12,070,571

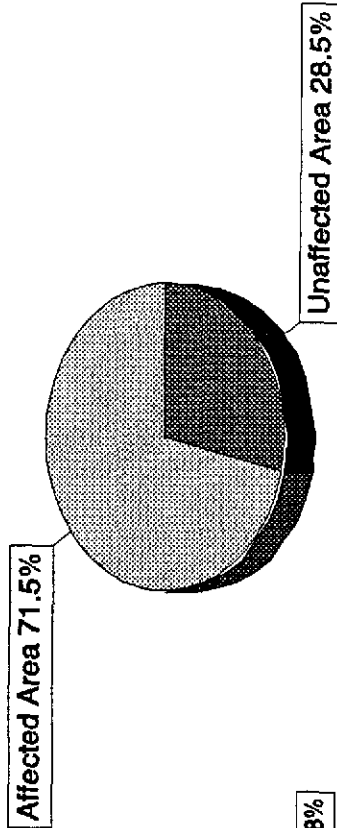
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Figure 1:
Estimated Human and canine population (percentage) existing
in areas affected and unaffected by dog transmitted rabies.
Latin América.

Human Population



Canine Population



**Figure 2: Human Rabies:
Evolution of Frequency.
Latin America: Average Decades 1970-79 and Total Annual
Figures for Period 1990-94.**

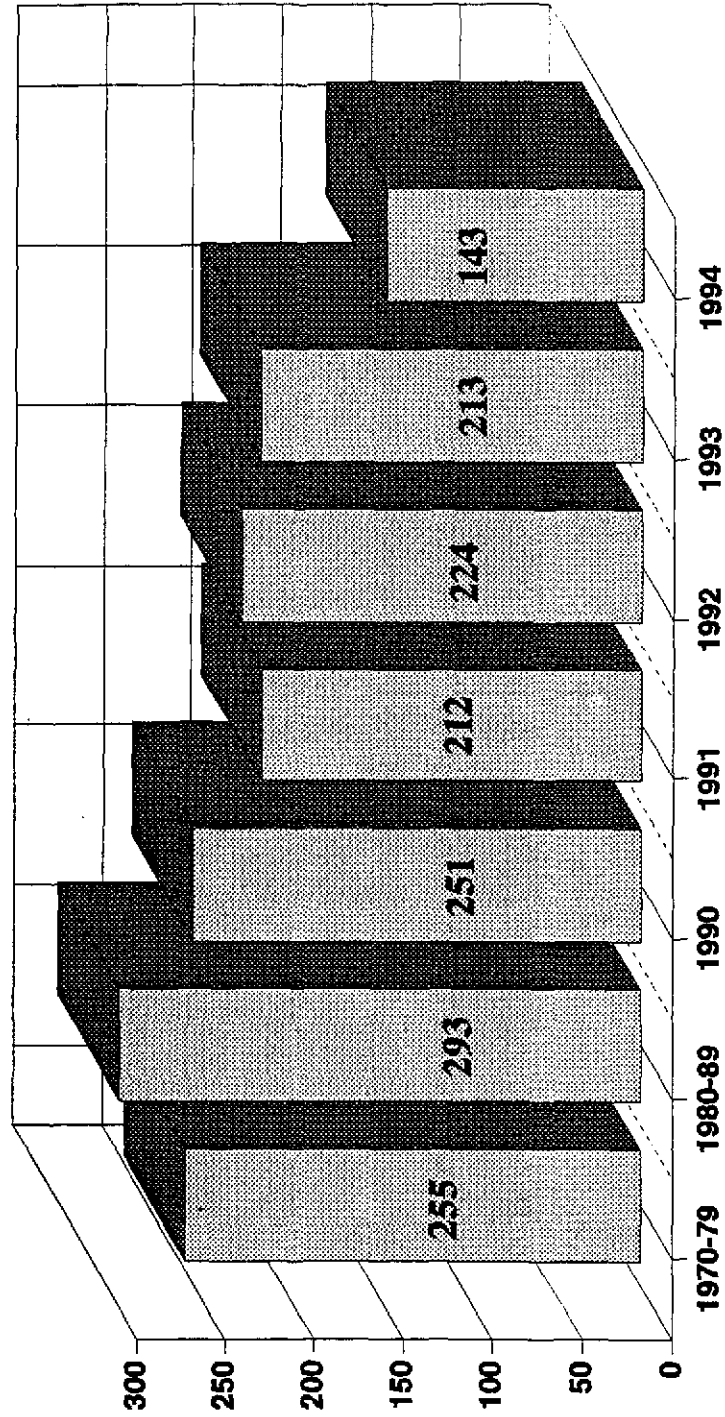
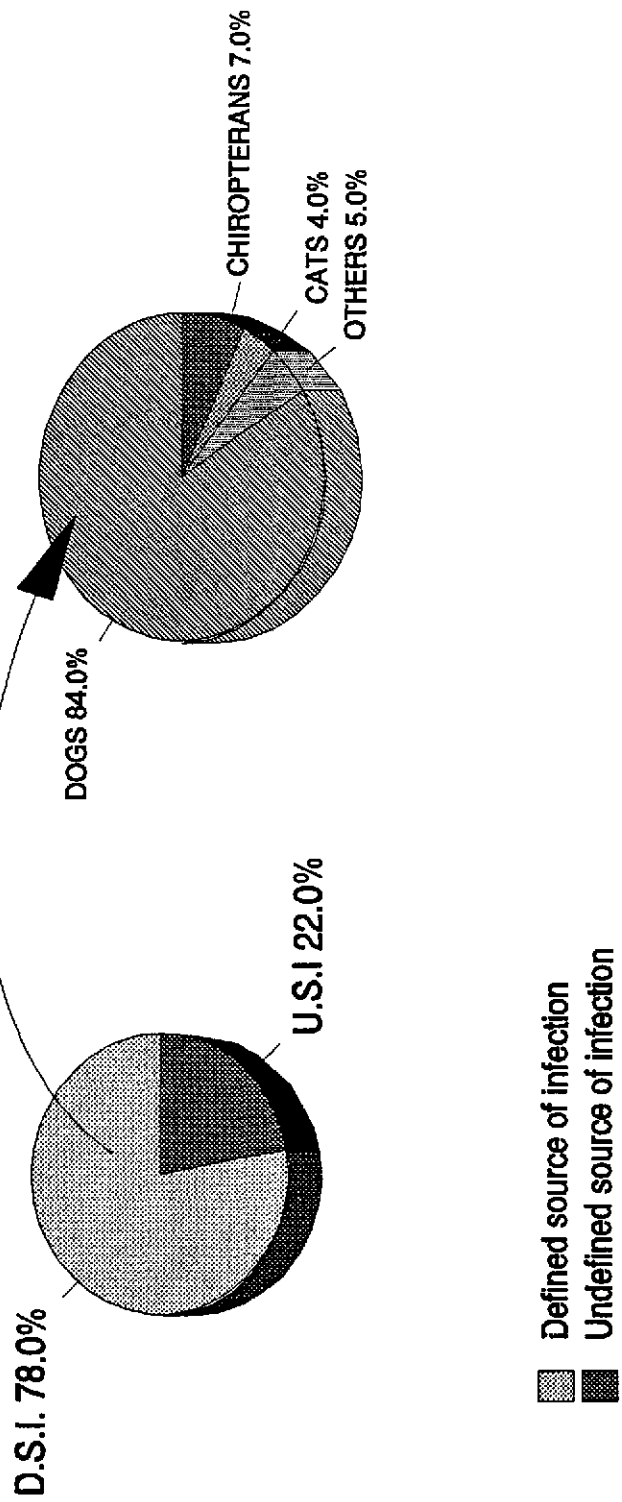
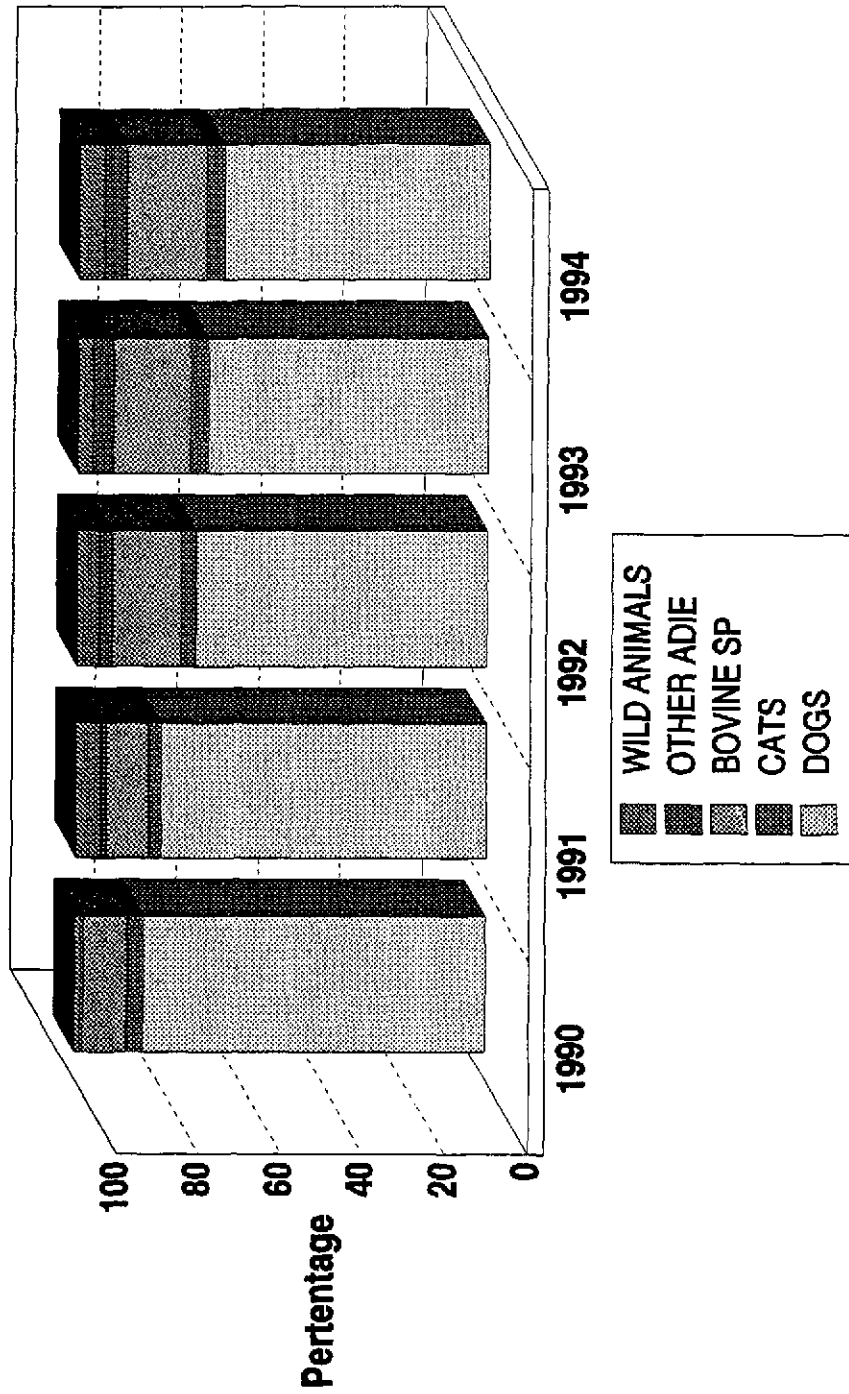


Figure 3: HUMAN RABIES.
Percentage-wise distribution of main sources of infection.
Latin America 1990-1993*



* Source: INPPAZ/HCV/PHO Data Bases.

**Figure 4: Animal Rabies. Incidence of Diagnosis.
Latin América. 1990-1994.**



**Figure 5: Rabies in Dogs:
Evolution of Frequency.
Latin América: Average Decades 1970-79 , 1980-89 and Total Annual
Figures for Period 1990-94.**

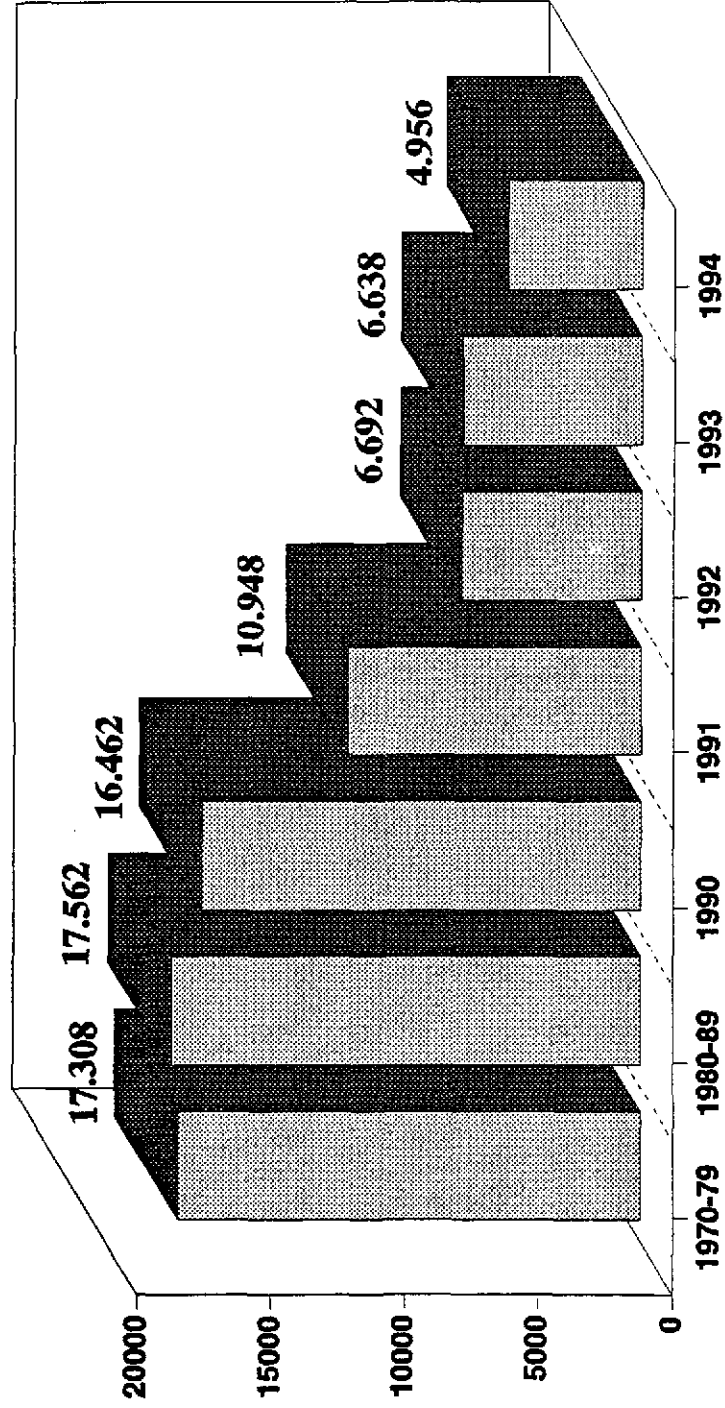


Figure 6: CONTINENTAL INFORMATION SYSTEM FOR EPIDEMIOLOGICAL SURVEILLANCE OF RABIES.

