

# Profile of human anti-rabies treatment in the 'agreste' region of Pernambuco State, Brazil, 2010-2012\*

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## Abstract

**Objective:** to describe the characteristics of reported human anti-rabies treatment in municipalities of the 'agreste' region of Pernambuco State, Brazil, 2010-2012. **Methods:** this was a descriptive study using data from human anti-rabies medical records filed on the Information System for Notifiable Diseases (Sinan). **Results:** 10,138 reported records of anti-rabies treatment were included; canines were the most involved species (68.1%), in good health condition (79.9%). Biting was the most common contact (83.8%), causing multiple injuries (58.3%), to hands/feet (39.4%), and deep wounds in 56.8% of cases; combined vaccine + serum administration frequency was found to be low (10.5%), even though 47.9% of injuries were considered severe and therefore required this prophylactic procedure. **Conclusion:** possible inadequate prophylaxis procedures were found, showing the need for health worker training aimed at ensuring correct human anti-rabies prophylaxis and the proper filling in of medical record files.

**Key words:** Rabies/prevention & control; Health Services; Disease Prevention; Epidemiology, Descriptive.

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## Introduction

Climate change induced by human activities can have an influence on the occurrence and resurgence of infectious diseases, such as leishmaniasis, dengue fever, hantavirus infection and rabies.<sup>1-3</sup> Scientific progress, such as vaccine development, can also modify the epidemiology of infectious diseases. This is the case of human rabies, for instance. The availability of an effective vaccine and the implementation of new strategies by health administrators enabled the refinement of urban rabies control, aiming its eradication. On the other hand, the pressure of human activities over the environment and the contact, increasingly close, between humans and wild animals influence the epidemiology of rabies in areas where the disease is endemic.<sup>4-7</sup>

*We can attribute the success of rabies control to the vaccination campaigns for dogs and cats and to the prophylaxis, with application of the post-exposure anti-rabies vaccination for humans.*

Researches on the epidemiologic situation of rabies in the Americas revealed that its incidence has suffered great reduction, especially since 1990.<sup>4,6</sup> The incidence of cases of rabies on humans reduced from 216 (1993) to 39 (2002). The reduction was also observed in cases of rabies on dogs. In 1993, there were 6,716 cases notified and in 2002, 1,311.<sup>3</sup> An analysis of tendency to rabies cases in the period of 1982 to 2003 showed a decrease in human cases from 355 to 35.<sup>6</sup> We can attribute the success of rabies control to the vaccination campaigns for dogs and cats and to the prophylaxis, with application of the post-exposure anti-rabies vaccination for humans.<sup>6</sup> In Brazil, like in the Americas, we can also observe the tendency towards reduction of rabies cases.<sup>8</sup>

Since the nineties from the 20<sup>th</sup> century, anti-rabies vaccination campaigns for dogs and cats were conducted periodically in most countries where human rabies is considered endemic.<sup>4</sup> Moreover, each year, approximately one million people exposed to potential transmitters of the rabies virus sought assistance and 30% received prophylactic treatment.<sup>4</sup> Thus, the number of human rabies cases transmitted by dogs in Brazil has suffered a considerable decrease. In contrast, cases of rabies

transmitted by wild animals has showed a relative increase over the past few years.<sup>4,9,10</sup>

In Pernambuco state, there were no cases of human rabies since 2006, despite the constant reports of cases of rabies in animals.<sup>8,11</sup> Cases of animal attack on humans, however, are frequently reported in the state, which indicates risk of occurrence of human rabies.

The present study aims to describe the characteristics in reports of human anti-rabies treatment and prophylactic measures adopted in municipalities of the Pernambuco 'agreste' mesoregion, from 2010 to 2012.

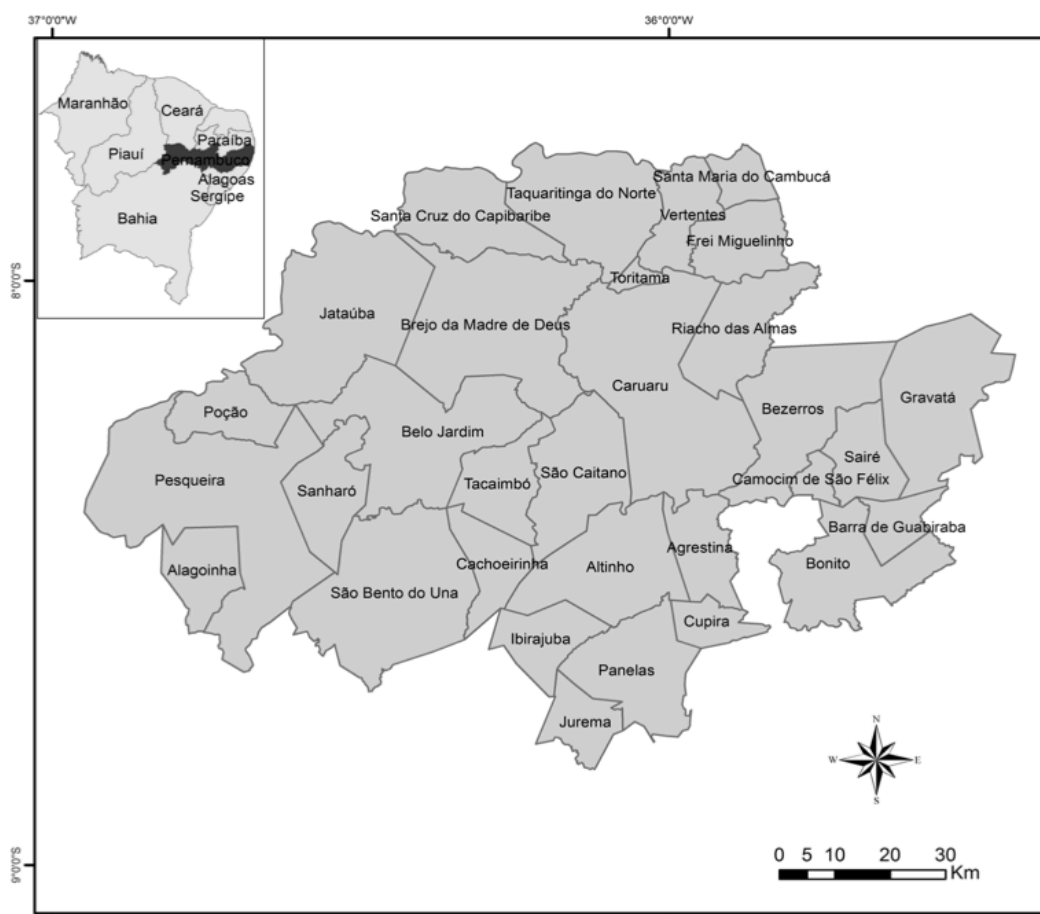
## Methods

We carried out a time series epidemiologic descriptive study about the assistance and conduct of post-exposure prophylactic anti-rabies treatment on humans in 32 municipalities of the 'agreste' mesoregion of Pernambuco state (Figure 1), Northeast, Brazil, in the period from 2010 to 2012, with data obtained from the Information System for Notifiable Diseases (Sinan).

It was calculated the relative and absolute frequency of the following variables:

- a) Attack
  - month of report;
  - anatomical position;
  - depth of the injury (deep, superficial or lacerating);
  - appearance of the injury (single, multiple or no injury);
  - and type of the attack (scratching, licking, biting and others).
- b) Attacked individual
  - gender; and
  - age.
- c) Species of the attacker
  - species (canine, feline, chiroptera, primates, foxes, domestic herbivores and others) and
  - initial physical condition (healthy, suspicious, rabid and dead/missing).
- d) Treatment
  - performed conduct (pre-exposure, dismissed of treatment, animal observation, observation and vaccine, vaccine, serum and vaccine, and plan of re-exposure);
  - interruption of treatment; and
  - reason for interruption of treatment (recommendation of health unit, abandonment of therapy or health unit transference).

Data were analysed with the softwares Microsoft Excel 2010 and TabWin version 3.2.



**Figure 1 – Map of the municipalities that assemble the IV Regional Management of Health, of the ‘agreste’ mesoregion of Pernambuco state**

The research was conducted according to the ethical principles of the resolution of the National Health Council (CNS) No. 466, of December 12<sup>th</sup>, 2012. The authors did not have access to data that allowed the identification of the individuals. Secondary data were obtained with authorization and knowledge from the IV Regional Management of Health of Pernambuco state.

## Results

In the period from 2010 to 2012, 10,138 patients undergone prophylactic anti-rabies treatment after a potential exposure to the virus. The period with the most occurrences of assistances was the third quarter (months of July, August, and September), with 26% of reported cases (Table 1).

Distribution among genders was greatly homogeneous, with 50.2% of individuals from the male gender. The

most affected age group was from 20 up to 64 years old, with 49.1% of cases (Table 1).

Dogs were responsible for 68.1% of the attacks, followed by felines (28.6%). Other species (chiroptera, foxes, primates, and others) totaled 3.2% of the reports. Among dogs and cats, approximately 80.0% were classified as healthy (Table 1).

The most frequent type of contact was biting (83.8%). We verified that 58.3% of the injuries were multiple and 39.8% were single. Deep injuries (56.8%) were more frequently reported, followed by superficial injuries (38.2%) and lacerating injuries (5.0%). Regarding the anatomical position, we observed that hands and feet were most affected (39.4%), followed by lower limbs (29.1%) (Table 1).

With respect to the prophylactic conducts, the majority of recommendations were associated to observation and vaccine (70.4%), followed by vaccination (13.6%),

**Table 1 – Main Characteristics of anti-rabies assistances performed in municipalities of the 'agreste' mesoregion of Pernambuco state, 2010-2012**

Characteristics	2010		2011		2012		Total	
	N	%	N	%	N	%	N	%
<b>Period of year (in quarters)</b>								
1st	790	26.0	857	23.8	869	24.8	2,516	24.8
2nd	757	25.0	863	23.9	878	25.1	2,498	24.6
3rd	734	24.2	993	27.6	894	25.6	2,621	26.0
4th	754	24.8	889	24.7	860	24.5	2,503	24.6
<b>Age range (in years)</b>								
0-19	1,234	40.7	1,418	39.5	1,369	39.0	4,021	39.7
20-64	1,471	48.4	1,765	48.9	1,748	50.1	4,984	49.1
≥65	330	10.9	419	11.6	384	10.9	1,133	11.2
<b>Gender</b>								
Male	1,497	49.2	1,801	50.0	1,791	51.2	5,089	50.2
Female	1,538	50.8	1,801	50.0	1,710	48.8	5,049	49.8
<b>Species of the attacker</b>								
Canine	2,065	68.0	2,401	66.7	2,437	69.6	6,903	68.1
Feline	852	28.1	1,082	30.0	964	27.5	2,898	28.6
Chiroptera	23	0.7	25	0.7	4	0.1	52	0.5
Primate	20	0.7	20	0.6	14	0.4	54	0.5
Foxes	17	0.6	16	0.4	14	0.4	47	0.4
Domestic Herbivores	06	0.2	5,0	0.1	18	0.5	29	0.3
Others	48	1.6	53	1.5	48	1.4	149	1.5
Ignored/in blank	4,0	0.1	0	0.0	02	0.1	06	0.1
<b>Physical condition of the animal</b>								
Healthy	2,353	77.5	2,850	79.1	2,894	82.7	8,097	79.9
Suspicious	391	12.9	330	9.1	273	7.8	994	9.8
Rabid	13	0.4	02	0.1	20	0.6	35	0.4
Dead/missing	272	9.0	410	11.4	306	8.7	988	9.7
Ignored/in blank	06	0.2	10	0.3	8	0.2	24	0.2
<b>Type of attack</b>								
Scratching	418	13.8	454	12.6	489	14.0	1361	13.4
Licking	29	0.9	51	1.4	72	2.1	152	1.5
Biting	2,550	84.0	3,045	84.5	2,897	82.7	8,492	83.8
Ignored/in blank	26	0.9	28	0.8	19	0.5	73	0.7
Other	12	0.4	24	0.7	24	0.7	60	0.6
<b>Injury</b>								
Ignored/in blank	53	1.8	60	1.6	58	1.6	171	1.7
Single	1,081	35.6	1,393	38.7	1,557	44.5	4,031	39.8
Multiple	1,898	62.5	2,143	59.5	1,869	53.4	5,910	58.3
No injury	03	0.1	06	0.2	17	0.5	26	0.2
<b>Depth</b>								
Deep	1,700	56.0	2,042	56.7	2,011	57.4	5,753	56.8
Superficial	1,105	36.4	1,402	38.9	1,370	39.1	3,877	38.2
Lacerating	230	7.6	158	4.4	120	3.5	508	5.0

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Table 1 – Conclusion

Characteristics	2010		2011		2012		Total	
	N	%	N	%	N	%	N	%
<b>Anatomical position</b>								
Mucosa	55	1.8	90	2.5	51	1.5	196	2.0
Head/neck	227	7.5	207	5.7	221	6.3	655	6.5
Hands/feet	1,223	40.3	1,392	38.6	1,380	39.4	3,995	39.4
Torso	106	3.5	236	6.6	227	6.5	569	5.6
Upper limbs	530	17.5	609	17	608	17.4	1,747	17.2
Lower limbs	883	29.0	1,063	29.5	1,006	28.7	2,952	29.1
Ignored/in blank	11	0.4	05	0.1	08	0.2	24	0.2
<b>Performed conduct</b>								
Pre-exposure	114	3.8	75	2.1	51	1.5	240	2.4
Dismissed of treatment	6	0.2	05	0.1	04	0.1	15	0.2
Animal observation	16	0.5	16	0.4	33	0.9	65	0.6
Observation+vaccine	2,176	71.7	2,531	70.2	2,428	69.3	7,135	70.4
Vaccine	370	12.2	497	13.8	513	14.7	1,380	13.6
Serum+vaccine	292	9.6	391	10.9	385	11.0	1,068	10.5
Plan of re-exposure	05	0.2	02	0.1	03	0.1	10	0.1
Ignored/in blank	56	1.8	85	2.4	84	2.4	225	2.2
<b>Interruption of treatment</b>								
Ignored/in blank	460	15.2	688	19.1	771	22.0	1,919	19.0
Yes	64	2.1	80	2.2	82	2.3	226	2.2
No	2,511	82.7	2,834	78.7	2,648	75.7	7,993	78.8
<b>Reason for interruption of treatment</b>								
Recommendation of health unit	15	0.5	0	0.2	06	0.2	30	0.3
abandonment of therapy	42	1.4	65	1.8	69	2.0	176	1.7
Health unit transference	07	0.2	06	0.2	07	0.2	20	0.2
<b>Total</b>	<b>3,035</b>	<b>100.0</b>	<b>3,602</b>	<b>100.0</b>	<b>3,501</b>	<b>100.0</b>	<b>10,138</b>	<b>100.0</b>

and use of serum combined with vaccine (10.5%). Only 0.2% of the analyzed cases were dismissed of treatment. Regarding the reports forms, 58.33% (7/12) had unfilled variables (left in blank) or with 'ignored' register of the data. We also verified that 2.2% of the patients interrupted the treatment, and the reason for the interruption was not stated on the report form (Table 1).

## Discussion

The research pointed out that the majority of anti-rabies prophylactic assistances occurred in July, August and September, corresponding with the holidays period, with a higher human mobility, like travelling and other activities taking place outside residences, which make individuals more exposed to animal contact and attacks.<sup>12,13</sup>

In the present study, we observed homogeneity in distribution of cases according to gender, while other similar studies had found predominance of assistance to individuals of the male gender.<sup>7,14,15</sup> Regarding the age range, adults between 20 and 64 years old were the most affected, data which is similar to other studies.<sup>16,17</sup> It is possible that adults are more prone to such attacks because of their daily work activities (the case of professionals with occupational hazards), their care for domestic animals and mobility through public roads.<sup>16,17</sup>

The majority of attacks were provoked by canine and feline species. Historically, cats and dogs were indicated as the main transmitters of human rabies. However, since the nineties, the occurrence of human rabies transmitted by wild animals has increased in Latin America, and in several regions of Brazil, where

the transmission of the rabies virus to humans by hematophagous bats has also increased and, in certain cases, has surpassed the transmission by canine species. For these reasons, even if attacks by wild animals were reported less frequently, we must observe its importance in transmission of rabies.<sup>4,6,9,18-22</sup>

In this research, we observed the predominance of biting, multiple and deep injuries. Probably, the population's awareness of the high risk of infection of the rabies virus through biting results in more searches for assistance after the occurrence of this type of possible exposure.<sup>14,23-25</sup> The most affected body parts of victims were hands and/or feet, because, we presume, these are regions related to defense positions of the victim or to the impulsive act of trying to hold/contain the animal at the time of the attack.<sup>14</sup>

We highlight that in only 10.5% of the assistances the serum and vaccine combination was recommended, although 47.9% of the reported cases were accidents considered serious (located on the head, hands/feet and mucosa; deep and multiple injuries; attacks by wild animals or dead/missing animals), which should be treated with the serum and vaccine combination. This finding, along with the inadequate filling of the report forms, suggests that part of the conducts performed in healthcare units are inappropriate for the types of attack, as it has been verified in other locations in Pernambuco state.<sup>7,26</sup>

We identified gaps in the filling of the report forms. For example, some reports had some variables left in blank or registered as data 'ignored', like 'Animal condition for purposes of conduct and treatment', 'Injury' and 'Recommended treatment', a situation that hampers the

process to evaluate the epidemiologic characteristics and the establishment of the correct conduct by the healthcare team.

In the region of the analyzed municipalities, we observed a slight percentage of interruption of the anti-rabies prophylactic treatment, probably due to the success of the decentralization of the assistance as a way to ease accessibility. Furthermore, it is not necessary to schedule the medical appointment.<sup>16,27-29</sup>

Health authorities should continue to concentrate their efforts in control measurements and eradication of rabies. We recommend the introduction of permanent training programs of healthcare teams for the correct filling of the human anti-rabies assistance report forms and educational health orientation. In addition to this, we recommend the integration of doctors to veterinary physicians, aiming to enable a careful analysis of the attack, animal condition and epidemiologic risk of the disease, so then the decision for the prophylactic measure will be adequately performed by the institution.

## Authors' Contributions

Santos CVB has contributed to the analysis of data, elaborating the map and table, and writing of the manuscript. Brandespim DF e Melo RB have contributed to raising and analysing data, elaborating the map and table, and writing the preliminary version of the manuscript. All authors participated in writing the manuscript, which had its final version approved and claimed responsible for all aspects of the work, ensuring its precision and integrity.

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