Case study:
Dog rabies vaccination as the main strategy to control human rabies in Puebla, Mexico
Cover: One of the dogs benefited by the government of Puebla, Mexico, who organizes an annual campaign where owners can bring their cats and dogs for vaccination against rabies and castration to help manage its welfare and the population’s.

Above: Image showing the collaborative effort of the Secretariat of Health officials and the community members to vaccinate cats and dogs against rabies.
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Rabies, an almost invariably fatal but preventable viral disease, causes more than 55,000 human deaths annually, particularly in the African and Asian regions. The virus is transmitted to humans through direct contact with the saliva from an infected animal, for example through broken skin. Humans usually get rabies from dog bites.

Mexico, located in North America, has not been an exception: in the 1970s and 1980s, an average of 60 cases of human rabies and 250,000 cases of dog rabies were being reported annually. This serious public health problem was addressed decisively by federal and state health authorities. As a result of a significant coordination effort between a variety of institutional sectors, and the implementation of a free mass dog rabies vaccination campaign, the number of human cases dropped to zero by 2010. Also, the number of dog cases were reduced to 20 by 2012.

Puebla, located in East-Central Mexico and with a population of more than 6,000,000 people, severely suffered the consequences of rabies, as did the rest of the country. However, in the 1970s the State Government implemented a rabies eradication program, thanks to which Puebla is now on the verge of being declared a “canine rabies-free territory.” This case study focuses on the positive evolution registered in Puebla by virtue of their strong rabies program, and how canine vaccination was used as the cornerstone of success.
The problem
Rabies was a severe health problem in Puebla

In a period of 40 years, from 1970 to 2000, Puebla registered 150 cases of canine rabies annually and a total of 203 human deaths. In the 1970s neither the State Government nor the health services had the technical or administrative infrastructure to adequately address the health impact that rabies was causing. Measures were taken in a random, isolated and disorganized manner. There was no specific work plan and the estimated dog population was unknown. Also, there was no clear knowledge of the rabies status, which made it impossible to effectively address the disease.

At the same time, razzias⁴ were common practice in Puebla. These procedures do not attack the problem of uncontrolled dog population growth and, to make matters worse, they damage the image of the local authorities.

⁴ Razzias are mass attacks on stray dogs, a common practice in Mexico to control the dog population.
The number of human and canine rabies cases reported annually in Puebla during the 1970s is but a reflection of the randomness of the actions taken at that time. It also shows authorities seeking immediate, partial and incomplete solutions. However, by the end of the 1980s, the state recognized that in order to effectively solve the problem it was necessary to adopt a new approach.

The Rabies Control Program: Veterinarians take the lead

One of the major decisions taken by the Health Ministry of Puebla was to appoint Dr. Manuel Balderas, a Medical Veterinary Zootechnician, as state coordinator of the Rabies Control Program. After analyzing the situation, Dr. Balderas proposed a comprehensive work plan to address the problem. At that time, it was already evident that the best way to protect humans from the disease was to protect dogs from getting rabies in the first place. Hence, the overarching strategy of Puebla’s work plan was to implement free mass dog rabies vaccination campaigns.

In 1990, Puebla launched the National Canine and Feline Rabies Vaccination Weeks, as a way of implementing a mass dog vaccination campaign. The initiative demanded a great deal of organization and training and completely replaced the scattered vaccination practices held in the past. The “vaccination weeks” continue to take place annually, twice a year, in March and September.

In 1992, the state started a Voluntary Donation Program, as a means to raise public awareness regarding responsible pet ownership. The program highlighted the risks of being around dogs that have not been protected against zoonotic infections and the problem of overpopulation caused by poor canine care and dog abandonment. Given the considerable amount of dogs roaming the streets of Puebla, the Health Ministry and the municipalities thought it was best to receive unwanted dogs than to let people abandon them on the streets, maintaining a vicious cycle of uncontrolled reproduction.

In 1994, the epizootiological surveillance program was set in motion. This meant that brain samples of animals in the vicinity of rabies foci would be closely monitored.

The hard work slowly paid off. By the mid 1990s, it was clear that the number of people and dogs affected by the disease had been reduced. However, it was also clear that, in order to reach further progress, the Health Ministry would need the support of more rabies-trained professionals.

Between 1994 and 1997, in response to a petition from the State Coordinator to the State Governor, 10 more veterinarians were recruited to serve as Coordinadores Jurisdiccionales de Zoonosis [Zoonoses Jurisdictional Coordinators]. The petition included hiring more administrative staff and more canine control officers.

The jurisdictional coordinators’ main tasks were to make sure dogs were vaccinated against rabies, manage all rabies foci and provide medical care to those that had been attacked by a dog. Also, they had to perform lobbying activities in order to get the support of the municipalities. Their help was essential for the continuation of a comprehensive and effective program. It is worth mentioning that at a certain point veterinarians also started training medical personnel, paramedics and health promoters regarding the rabies prevention and control activities that had to be performed at the state level.
After six years of uninterrupted work, it became clear that the operational capacity had reached its limit regarding the achievement of the program’s vaccination goals. Focus is then shifted to the issue of dog population control. In 2000 the State Government recruited 40 additional medical veterinary zootechnicians and started a permanent free surgical neutering program for pets. The objective of this program, as well as that of the voluntary donation initiative, was to stabilize the canine population in areas considered critical, and also to encourage responsible pet ownership emphasizing the fact that dogs are also “part of the family.” The sterilization practices helped change the distorted image the old practice of razzias had created of the dog control officers and the rabies control program staff.

It is important to note that people’s doctors tended to vaccinate people out of fear of rabies. In other words, they administered rabies post-exposure prophylaxis to everyone that had been attacked by a dog, whether the animal was infected or not, for fear that they would die of rabies. To counter this practice, “ZOO 24” (Zoonoses in 24 hours), a strategy aimed at minimizing the percentage of rabies post-exposure treatments applied to humans after a bite, was created in 200512. That way, since 2000 the number of treatments administered has decreased by 92%, resulting in considerable savings in public resources13. Also, since 2000, the number of people attacked by a dog or that have been in contact with an animal suspected of having rabies has diminished by 79%. Such a successful outcome is the result of sustained measures applied directly to dogs (a viral reservoir), the adequate and up-to-date rabies medical attention available now, and the numerous educational efforts that have been carried out regarding bite prevention and responsible ownership.

Table 1.
Relation between people attacked by suspected rabid animals and initiation of rabies post-exposure prophylaxis (PEP) treatment. From 2000 to 2018*, in five-year totals.

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<tr>
<td><strong>Total PEP treatments administered</strong></td>
<td>24,443</td>
<td>8,408</td>
<td>5,119</td>
<td>1,920</td>
</tr>
<tr>
<td><strong>Total Number of people that have been attacked or that have had contact with a rabid animal</strong></td>
<td>64,564</td>
<td>35,202</td>
<td>24,901</td>
<td>13,949</td>
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In 2005, a new strategy is set in motion: the “CIPOPEGAZOO” (Comprehensive Zoonoses Control in Cats and Dogs), which is aimed at sterilizing 70% of the canine and feline populations of a target community. This means working closely with the communities’ health authorities and health promoters, carrying out dog population surveys, doing outreach work and implementing the neutering campaign. Now the communities share much of the responsibility that used to be entirely in the hands of the Municipal Zoonoses Unit, which leads to an increase in the stakeholders’ ownership of the program.

Also, a responsible pet ownership strategy is put in place by the municipalities. In parallel, the Department of Zoonoses initiates a series of advocacy activities aimed at issuing municipal responsible ownership regulations and creating canine attention units and/or municipal canine attention brigades.

The implementation of the New Zoonoses Intervention Model (the NUMIZOO strategy) began in 2010. The idea was to have veterinary doctors lend some services in collaboration with the municipalities for the future “municipalization” of these services. Later on, jurisdictions and municipalities started coordinating their own initiatives regarding management, consulting and supervision at health centres and local government facilities. This coordination effort between veterinarians and municipalities turned out to be crucial because it increased the operational capacity needed to prevent and control any rabies outbreaks.

Another factor that has played a key role in maintaining positive results is the exchange of successful experiences within the state and with other states. These exchanges take place in workshops where representatives of the Ministry of Health share projects, plans and actions considered to be successful in their regions, as well as the means by which they have achieved their goals and objectives.

Certainly, rabies is under control in Puebla. But it is important to remain vigilant. In order to prevent rabies from becoming a reemerging disease, continued attention [rabies vaccination] should be given to rabies-enzootic areas. Humane dog management population tools, like sterilization, responsible pet ownership and vaccination campaigns are key to stabilizing dog populations, which in turn will allow vaccination coverage to reach at least 70% of the total dog population.

Actions implemented in Puebla to control rabies are similar to actions taken by other Mexican states and even by other countries in the Americas. However, experience has shown that what works for an area doesn’t necessarily work for another. Each region, in Puebla or in any other part of the world, has its own environmental, demographic and socioeconomic specificities. This means each program must be tailored-made in order to adjust to these variables.

“The strategies outlined in the Rabies Program annual plans have kept on evolving. This means that the actions are constantly being updated and modified, especially if the results show to be different than expected. Since 2016, the participatory processes have gained so much strength that recently elected local authorities, at the request of the communities, are ready to resume the canine and feline vaccination and sterilization activities.”

- MVZ. Alfredo Mejía Solís, Zoonosis Program
As soon as the rabies program was set in motion, Puebla saw a decline in human and canine rabies cases. However, the far-reaching change came in 2010 when human cases dropped to zero and canine cases showed an 89% decrease.

The number of immunizations delivered is also a clear sign of the impact and effectiveness of the program. At the beginning of the 1990s, over 60,000 vaccines were being delivered annually. By 2003, and thereafter, the operational capacity amounts to 1,500,000 vaccines delivered annually.

**Impact**

By 2010, human rabies showed a 100% reduction in Puebla while canine rabies had decreased by more than 89%
Conclusion

Dog vaccination, as part of a holistic program, is the cornerstone to preventing dog-transmitted human rabies

It’s been 19 years since Puebla saw the last human death from a rabid cat or a rabid dog (since the year 2000), and it’s been 11 years since rabies was diagnosed in either of these pets. The lowering incidence in canine rabies and the absence of human cases in Puebla shows the efficiency and the efficacy of the programs implemented there by the Health Ministry’s Zoonoses Unit. There is no question that the vaccination of dogs has been instrumental in the eradication of dog-transmitted human rabies in Puebla. Equally important has been the sustained coordination effort carried out by the Health Ministry and the local communities. Indeed, this effort gave the communities the opportunity to own the process and, at the same time, enhanced the possibilities of the program of having a much greater impact.

Acknowledgements

World Animal Protection thanks the people in charge of Puebla’s Zoonosis Programme for the information supplied. Without their help, this case study, which aims at inspiring other governments in their fight to eradicate rabies with humane and effective solutions, would not have been possible.

For additional information, please contact:
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Below: March for the National Rabies Vaccination Week.
Annexes

Table 1.

Technical information

Mass vaccination campaigns against rabies are carried out by vaccination brigades in public places, such as schools, public squares, or house-to-house, depending on local needs.

Vaccination campaigns that take place in March and September last for a week.

The vaccination campaign goal is to reach at least 70% of the dog population.

Vaccination teams include veterinarians, canine control officers and community volunteers trained for that purpose.

The implementation of the campaign is planned first at the state, jurisdictional and municipal levels and then at the community level, in a joint effort by the Health Ministry, the local governments and the community leaders.

The rabies program now has the support of several NGO’s that lend their time and volunteers.

Table 2.

What to do in case of a rabies outbreak

Even though vaccination campaigns are regularly carried out, sporadic outbreaks of the disease could occur. An operational response initiates when a public health laboratory sends a note confirming a positive result. Public health officers go the affected area and take the following measures:

• Coordinate actions with local authorities and community health centres. Identify primary and index cases.
• Search for individuals that have been in contact with the positive case. Post-exposure rabies prophylaxis treatment should start as quickly as possible.
• Search of dogs suspected of being rabid and of dogs that have been in contact with the positive case. Suspected animals are confined and subjected to a 10-day observation period. Infected animals are humanely euthanized.
• Mass anti-rabies vaccination campaign begins. Vaccination points may be established in public areas so that pets can be brought in, or a 3-person vaccination brigade may administer house-to-house vaccination. The whole community must be covered; priority should be given to borders and remote places.
• Vaccinators take the opportunity to conduct a dog population survey and to update human and dog population estimates for that specific location.
References and explanatory notes


4. Razzias: massive raids held in order to eliminate stray dogs.

5. An intensive vaccination campaign reaches a high coverage rate in a short period of time and focus primarily in endemic areas.

6. Vaccination takes place in March in order to prevent the rabies peak that use to affect Puebla annually during the second and third quarter of the year. Vaccination in September is a booster week that seeks to protect dogs that weren’t old enough to be vaccinated in March (those born between March and September or that need a booster).

7. A municipality is the entity that governs a “municipio”. The “municipios” are the small administrative territorial divisions of a State.

8. Puebla is divided in 10 health jurisdictions each one integrated by several municipalities. Each of the veterinary doctors was in charge of a jurisdiction.

9. Canine control officers are in charge of vaccinating dogs; promoting and disseminating the rabies program; giving advice to people’s doctors and paramedical personnel in health centres; conducting surveys and questionnaires; paying house visits to people who had been attacked by a dog and visiting also aggressive dog owners, and writing weekly and monthly reports. Currently, in addition to the above, they have the task of promoting a responsible pet ownership policy, animal welfare, taking dogs off the streets and handling owners’ voluntary pet donations.

10. Management of rabies foci: Vaccination activities that take place in a location where one or more than one cases of probable rabies have been determined as such by epidemiological research.

11. Health promoters are employees of the Secretariat of Health that work directly with the communities in human health issues.

12. Puebla has shown, through field experiences, that there is a high probability of finding an attacking dog in less than 24 hours, which will allow for the dog observation. The ZOO 24 strategy seeks to re-train people doctors so they can correctly decide whether to administer a rabies-exposure prophylaxis treatment based on the reasons of the bite and on the dog’s rabies vaccination history.

13. A rabies post-exposure prophylaxis treatment may cost between $250 and $400.

14. Team of two vaccinators that visit every household in a given community.

15. Given the vaccination policies enforced today, aggressive dogs are not euthanized but kept in confinement and under observation for a 10-day period. Animals are euthanized only if they meet the conditions of a suspected animal such as: epidemiological risk area, no vaccination history, no known owner, and signs and symptoms suggestive of rabies.

16. In the occurrence of an outbreak, work in rural areas must cover a periphery of 5 km; in urban areas the periphery should be of 2 km.
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