Eradication of Rabies in the Philippines

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RABIES is an important zoonosis. While it is primarily a disease of animals, it can be transmitted to man by bites of infected animals. Of all the infectious diseases that afflict man, rabies is the most dreadful and gruesome. Once the disease becomes manifest, medical science is helpless. One can only watch as the patient succumbs to an agonizing and horrible death. The fatality rate for rabies is almost always 100 percent; but despite being a fatal disease, rabies is easily preventable.

Rabies is one of the reportable human diseases in the Republic of the Philippines. The annual reported incidence of deaths from 1958 to 1968 ranged from 155 to 383, with a mortality rate of 0.4 to 1.2 per 100,000 population (table 1), and all known sources of exposure being the dog (*1*). The preponderance of cases occurred among children of school age and among adolescents (table 2). The mortality rate for rabies was higher than for poliomyelitis, whooping cough, or typhoid fever. Globally, the Philippines ranked second in human deaths from rabies (*2*).

While rabies virus has been isolated from a large number of animals, not all of these animals can transmit the infection. From the viewpoint of human infection, the dog is the most important reservoir and transmitter of rabies. In some countries, however, wildlife rabies has become a major problem as the underlying reservoir for maintaining the disease. The vampire bat of Mexico and Central and South America (*3*); skunks in the midwestern and far western United States (*4*); foxes along the Ohio-Mississippi River Valleys and in the southwestern United States (*5*); mongooses, polecats, and civet cats in South Africa (*6, 7*); wolves and foxes in arctic and subarctic areas of the Northern Hemisphere (*8*); and jackals, foxes, wild dogs, mongooses, and civet cats in India (*9*) have maintained and transmitted the rabies virus. The establishment of rabies in wildlife populations in other countries has compounded the rabies problem and raised it to alarming magnitudes.

Rabies is enzootic in all continents except Australia and Antarctica. Many countries, including Great Britain, Cyprus, and New Zealand, and the State of Hawaii have also been historically free from rabies because of stringent regulations, which are rigidly enforced, concerning the entry of dogs and cats.

No effective treatment has yet been made available for rabies despite the achievements of modern medical science. The prophylactic measure de-

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signed by Louis Pasteur in the 19th century is the routine procedure still used for the protection of human beings exposed to rabies, with only slight modifications in the original vaccine and methods of administration.

Reservoirs in the Philippines

In the 1970's rabies remains one of the serious public health problems in the Philippines. The disease is enzootic in dogs; about 25,000 have died annually of rabies (*10*). Sporadic outbreaks of rabies have been reported in other animals like carabaos (*11*), cattle (*12*), swine (*13*), and cats (*14*), usually following exposure to rabid dogs. Unlike in other countries, however, rabies so far has not established itself in wildlife populations, and the disease, as an enzootic, has been confined to dogs.

The wildlife population of the Philippines is generally small because of extensive hunting and the destruction of natural habitats. In effect, the thresholds of wildlife populations are probably too low to support an epizootic. Only animals living in and around human habitations are plentiful; namely, rats and bats (*15*). Limited studies have shown that rats and bats do not transmit rabies in the Philippines (*14,16–18*).

Although the number and distribution of wildlife are limited, a potential reservoir of rabies is present locally because of the widely distributed mongooses, *Viverra tangalunga,* in Mindanao, Luzon, Palawan, and adjacent islands; and civet cats, *Paradoxurus philippinensis,* in Luzon and the Visayas. Although vampire bats have not been reported, insectivorous bats, including the common *Cynopterus brachyotis,* are present in the same localities.

Considering the local presence of potential wildlife reservoirs and the dynamic and changing pattern of the rabies organism in adapting itself to a new host spectrum, there are strong reasons to believe that the disease may eventually establish itself in wildlife hosts if the present trend is unabated.

Table 1. Reported human deaths from rabies and rate per 100,000 population, the Philippines, 1958–68

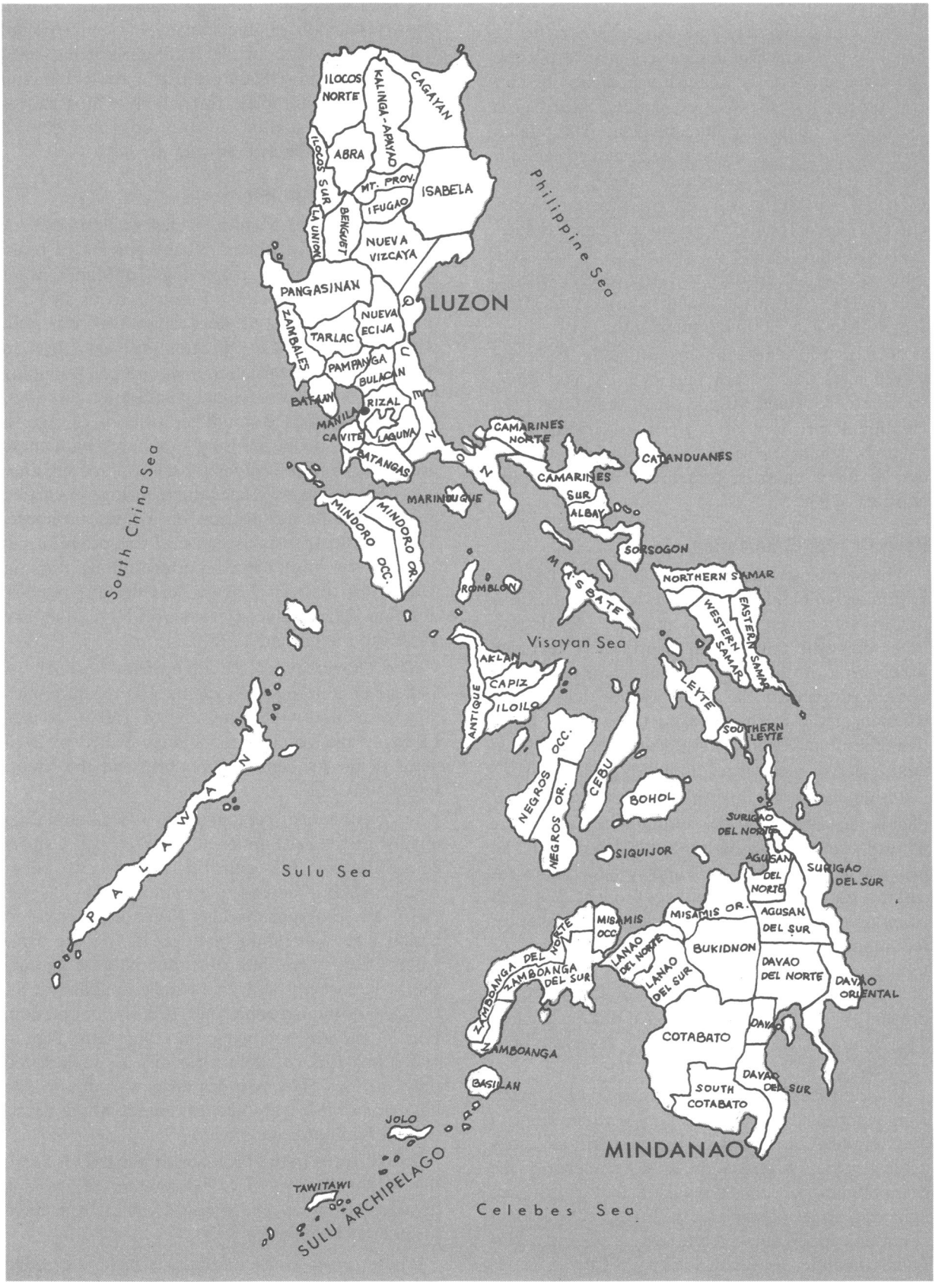
Year	Deaths	Rate
1968	216	0.6
1967	155	.4
1966	198	.6
1965	227	.7
1964	383	1.2
1963	315	1.0
1962	277	.9
1961	284	1.0
1960	265	1.0
1959	212	.8
1958	215	.8

Incidence Among Human Beings

Unlike other communicable diseases in the Philippines, such as tuberculosis, gastroenteritis, and pneumonia, the annual incidence of rabies is not high. The low and undramatic rate indicates a disease of minor importance. Because of this, rabies has been given the lowest priority by the local health authorities. Mortality statistics are, how-

Table 2. Human rabies cases reported, by age and sex, the Philippines, 1966–68

Age group (years)	1966			1967			1968		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Less than 1				1	1	.....	2	1	1
1–4	26	20	6	24	17	7	11	10	1
5–9	29	22	7	21	14	7	46	33	13
10–14	23	15	8	13	8	5	31	22	9
15–19	6	6	0	9	6	3	10	8	2
20–24	12	8	4	10	6	4	6	4	2
25–29	15	10	5	8	5	3	9	9	.....
30–34	10	8	2	6	2	4	11	9	2
35–39	13	12	1	9	6	3	14	8	6
40–44	12	6	6	10	8	2	8	5	3
45–49	12	7	5	10	6	4	11	9	2
50–54	5	3	2	9	4	5	15	12	3
55–59	16	12	4	6	2	4	14	11	3
60–64	4	4	.....	5	4	1	4	3	1
65–69	4	3	1	2	1	1	6	5	1
70 or over	11	7	4	12	4	8	8	6	2
Total	198	143	55	155	94	61	206	155	51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ALBAY
MARINDUQUE
MINDORO OCC.
MINDORO OR.
SORSOGON
ROMBLON
MASBATE
NORTHERN SAMAR
WESTERN SAMAR
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BASILAN
SOUTH COTABATO
JOLO
MINDANAO
TAWITAWI
SULU ARCHIPELAGO
Celebes Sea
Sulu Sea
PALAWAN
South China Sea
Philippine Sea

ever, misleading as an indicator of the importance of rabies.

The human anxiety following exposure to rabies and the extensive clinical regimen of prophylactic vaccination, the anguish accompanying clinical illness, and the socioeconomic losses caused by human rabies are unequivocal. The annual economic losses from human exposure to rabies in the Philippines have amounted roughly to millions of pesos. Furthermore, with the kind of vaccine currently used (Semple's phenolized brain tissue), postvaccinal reactions of neurological and fatal outcome have occurred more frequently than actual deaths from rabies. Reports have varied from 1 in 600 to 1 in 7,000 immunizations (*19*).

Nearly 100,000 Filipinos annually have received a partial or complete series of anti-rabies vaccine (*1*). About 90 percent of the human vaccination series have been given to persons bitten by dogs, about 5 percent by cats, and the remainder by other animals, principally monkeys, pigs, and rats (*20*).

Potential for Eradication

The source of human rabies in the Philippines is primarily dogbites. The cycle of transmission is mainly dog-to-dog, dog-to-human, and dog-to-other domestic animals. It seems, therefore, that vaccination of dogs would be sufficient to effect a control program in the country since the ultimate solution of the rabies problem rests on the effective control and eventual eradication of the disease from reservoir and vector animal populations (*21*).

Rabies could be not only controlled but completely eradicated in the Philippines. There are natural transmission barriers and deterrents. The geographic division of the country into islands facilitates an island-by-island approach. Between communities there are natural barriers of distance, mountains, and jungles. A sociological barrier of killing stray dogs for meat exists. Separation of the country from Asia by water would help to prevent the re-entry of rabies once it is eradicated. The apparent absence of wildlife reservoirs has confined the problem of rabies to dogs.

In countries where sylvan rabies is not a problem, the most important weapon in rabies control and eradication is mass vaccination of dogs against rabies. Vaccination of 80 percent of the dog population is considered sufficient to bring an epizootic under control (*22*). In Japan (personal communication, 1964, from Dr. M. Kitaoka, National Institute of Health, Tokyo), Taiwan (*23*), and the Malay Peninsula of Malaysia (*24*) rabies has been eradicated through mass vaccination of dogs, restriction of dog movement, and elimination of stray dogs. In the Philippines it has been demonstrated in select areas that mass vaccination of dogs against rabies, restriction of dog movement, and elimination of stray dogs can control rabies and ultimately eradicate it.

Limited Control Efforts

In the City of Manila, rabies was enzootic in dogs in the early 1930's. Ninety percent of brain specimens examined from dogs in Manila were positive for rabies (*25*). From 1930 to 1934, a total of 145 cases of dog rabies was reported, with a range of 14 to 38 cases per year (*26*). In the late 1950's, legislation was enacted providing for the compulsory annual vaccination of dogs, licensing of dogs 3 months or more of age, a penalty for anyone refusing to comply with these provisions, and provisions for control and elimination of stray dogs. Vaccination of dogs is carried out in the different districts on a house-to-house, block-by-block basis. Because of this program, no rabies cases have been reported among dogs in Manila for the past 7 years, and the dog population has been reduced from 30,000 in the late 1950's to the present 10,000.

The University of the Philippines, through its College of Veterinary Medicine, has recently initiated a campuswide program of rabies control based on the vaccination of dogs owned by residents of the academic community and the shooting of stray dogs.

A community campaign to vaccinate dogs against rabies in Dumaguete City reached 80 percent of them in the central part of the city, effectively breaking the endemic pattern of the disease (*27*). The program was also based on mass vaccination and registration of dogs. Before the campaign, there were 50 cases annually of animal rabies in the city and an average annual rate of 0.5 case of human rabies per 100,000 population. For 33 months following the campaign, Dumaguete was free of rabies; the disease reappeared only in dogs. The reappearance was due to the incursion of infected dogs from areas where vaccinations had not been given.

In six towns in the Province of Negros Oriental, the vaccination of 85 to 94 percent of the dog populations effectively removed rabies from them for at least 19 months.

These rabies control programs have succeeded

in forcing the disease to the border areas, where occasional cases have occurred as a result of the incursion of unvaccinated dogs from neighboring cities and provinces. The threat of re-entry persists. The vaccinated area is able to resist the onslaught of rabies from the unvaccinated area and to maintain an equilibrium only so long as 80 percent of its dog population remains protected.

That rabies can be eradicated in the Philippines with the island-by-island approach was demonstrated in Siquijor, a small Visayan island across from Dumaguete City in Negros Oriental. Vaccination of 85 percent of the total dog population and a control program at ports of entry have maintained its rabies-free status since 1969.

The success of these communitywide, citywide, and islandwide rabies control programs, coupled with the favorable local epidemiologic factors mentioned earlier, proves that rabies can be controlled and ultimately eradicated from the Philippines through a nationwide program. All it will take is a national rather than local effort to mass-vaccinate dogs against rabies and to institute strict control and quarantine measures concerning the movement of dogs, both on an interisland and an international basis. A national eradication program is therefore in order, considering that locally directed programs will succeed only in forcing the disease to the border areas, where occasional cases could occur and a threat of re-entry persist.

National Eradication Program

Unlike other diseases in which human beings act as reservoirs in maintaining endemicity, once rabies is eradicated from dogs the major reservoir of man's exposure is eliminated. Malaria, schistosomiasis, and other diseases linger in an area for years and years despite available control measures. Not even one-tenth of the amount that has been invested in the eradication of malaria and schistosomiasis, which runs to millions of pesos and involves sophisticated programs, would have to be spent for a "crash" program to eradicate rabies in the Philippines. In a program that we proposed to the Philippine Government—for funding by the U.S. Agency for International Development, the U.N. Development Program Special Fund, and the World Health Organization—it was speculated that the eradication of rabies in the country could be achieved in 2½ years (*28*).

Aid in the amount of $551,400 is being sought: provision of initial vaccine supplies and materials to be used in the vaccination campaign, $485,200; transport facilities; $15,000, equipment and supplies for the local production of LEP (low egg passage) avianized antirabies vaccine, $45,200; and microscopes for fluorescent antibody diagnosis, $6,000 (*29*). The basic approach will be mass vaccination, registration, and licensing of dogs, elimination of stray ownerless dogs, provision for strict control and adequate quarantine measures on the movements of dogs both on an interisland and an international basis, an extensive campaign of public health education, provision of adequate facilities for rapid diagnosis of rabies, and continuing surveillance and proper reporting of cases of human and animal rabies. We believe that we may live to see the eradication of rabies in the Philippines in our generation.

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Unlike in other countries, the disease has not established itself in wildlife populations. Nevertheless, although limited, a potential reservoir of wildlife rabies is present in mongooses and civet cats. The primary source of human rabies in the Philippines is dogbite.

In select areas like the City of Manila, Dumaguete City, the University of the Philippines campus, and the Island of Siquijor, rabies has been controlled through mass vaccination of dogs, restriction of dog movements, vaccination at ports of entry, and elimination of stray dogs. The success of these local control programs, and the favorable epidemiologic factors mentioned, shows that rabies could be controlled and ultimately eradicated in the Philippines through a nationwide program. The cost has been estimated at $551,400.