Diseases Subject to the International Health Regulations

Cholera, yellow fever, and plague cases and deaths reported in the Region of the Americas as of 31 October 1982.

Country and administrative subdivision	Cholera cases	Yellow fever		Plague cases
		Cases	Deaths	
BOLIVIA	–	*94*	*34*	*1*
Beni	–	1	–	–
Cochabamba	–	3	–	–
La Paz	–	2	2	1
Santa Cruz	–	88	32	–
BRAZIL	–	*21*	*21*	*44*
Bahía	–	–	–	1
Ceará	–	–	–	37
Maranhão	–	4	4	–
Mato Grosso	–	1	1	–
Mato Grosso do Sul	–	13	13	–
Pará	–	3	3	–
Pernambuco	–	–	–	6
COLOMBIA	–	*1*	*1*	–
Cundinamarca	–	1	1	–
PERU*	–	*11*	*11*	*4*
Loreto	–	6	6	–
Piura	–	–	–	4
San Martín	–	4	4	–
Ucayali	–	1	1	–
UNITED STATES	–*	–	–	*17*
Arizona	–	–	–	4
Colorado	–	–	–	2
New Mexico	–	–	–	8
Oregon	–	–	–	1
Texas	–	–	–	1
Wyoming	–	–	–	1

– None.
*Revised data.

Human Rabies Vaccination in the Americas

Human rabies is endemic in some parts of the Americas. During the 1970-1979 decade an average of 280 cases/deaths was reported per year *(1, 2)*.

Studies done in Brazil in 1976 found that 7.0 per cent of the country's population had been bitten, usually by pet dogs and cats *(3)*. If this percentage were projected onto the population of Latin America and the Caribbean, it could be estimated that about 26 million persons are bitten every year. Only a small percentage of the persons bitten have to be vaccinated against rabies.

The WHO Expert Committee on Rabies recommends that human rabies vaccine be administered only to per-

sons who have been exposed or who are at high risk of exposure. In these cases vaccination is regarded as rabies treatment. Because of the possibility of postvaccination reactions and complications, associated primarily with the administration of suckling mouse brain (SMB) vaccine, this treatment should be administered under medical supervision. In Brazil between 1975 and 1978 there was one severe postvaccination accident for every 24,568 doses administered *(3)*.

In addition to measures for the control of rabies in animals, programs for the prevention of human rabies should include proper treatment of 100 per cent of all persons exposed to the risk of contracting the disease with a potent and safe vaccine, using effective vaccination schedules *(4)*.

What follows is a review of information reflecting the current situation regarding the human rabies vaccine and vaccination schedules used in the Region.

Types of Vaccine

There are two types of inactivated rabies vaccine in use today:

- *Vaccine prepared in suckling mouse brain (SMB) (5).* Produced and used in the countries of Latin America (but not used in Canada or the United States), this vaccine is administered subcutaneously. The Pan American Zoonoses Center (CEPANZO) reports that 5,830,231 doses of SMB vaccine were produced for human use in Latin America in 1980.
- *Human diploid cell rabies vaccine (HDCV).* This vaccine is made only by the Mérieux Laboratories of France, and its use is permitted in Canada, the United States, and some countries in Latin America and the Caribbean. It is administered intramuscularly.

There are two other vaccines whose production and use have been discontinued:

- *Duck embryo vaccine (DEV).* This vaccine was used until 1981 in the United States and some Latin American countries; production was suspended in 1981, and it is no longer in use.
- *Semple vaccine prepared in rabbit brain.* Up to 1981 this vaccine was prepared and used in a single Central American country. The most recent information is that its production has been permanently discontinued.

Vaccination Schedules

Preventive treatment (pre-exposure vaccination)

The WHO Expert Committee on Rabies *(4)* recommends the administration of three doses of a potent vaccine to persons at high risk of exposure (veterinarians, persons who handle dogs, laboratory personnel working with rabies virus, speleologists, etc.) at intervals of five to seven days, followed by a booster dose one month after the last dose. It is also recommended that the antibody titer be checked three or four weeks after the last injection in the series. If no antibodies are detected, additional boosters should be administered until a satisfactory antibody response is obtained. In all other cases, booster doses should be given at intervals of one to three years. When a person who has been given pre-exposure immunization and has shown a good antibody response is again exposed to rabies, he should be given only one booster dose. Persons in whom no neutralizing antibodies are found in the wake of preventive treatment, should undergo the full vaccination series upon reexposure to infection.

The vaccination schedules for the different biologicals are as follows:

- *Suckling mouse brain (SMB) vaccine.* In CEPANZO studies of pre-exposure vaccination, a satisfactory response was observed following the administration of three doses, one every other day. In Mexico, preventive treatment consists in the administration of the vaccine on days 0, 5, and 10, with booster doses at 30 days and at one year.
- *Human diploid cell rabies vaccine (HDCV).* The Advisory Committee on Immunization Practices (ACIP) of the United States recommends three 1 ml injections, one each on days 0, 7, and 21 or 28. The Centers for Disease Control (CDC) of the United States recommend taking a serum sample two or three weeks after the last dose, which should yield an adequate antibody titer. If the antibody titer is not adequate, a booster should be administered and the CDC notified.
- *Booster doses.* Persons who work with the rabies virus (in vaccine research and production laboratories) should have their antibody titers checked every six months and be given boosters whenever needed to keep the antibody titer at an adequate level. Persons at continual risk of exposure to rabies should receive boosters or have their antibody titers checked every two years. If the titer is inadequate, a booster should be administered.

Postexposure rabies treatment

The rabies treatment schedule for exposed persons depends on the severity of the bites:

1. *Mild bites*

- *Human diploid cell rabies vaccine (HDCV).* WHO recommends schedules of six doses administered on days 0, 3, 7, 14, 30, and 90. The ACIP *(6)* recommends five doses on days 0, 3, 7, 14, and 28. If the five-dose schedule is used, it is recommended that a serum sample be taken for the determination of antibodies on the 28th day when the last dose is administered, or two or three weeks following the last dose.

Persons previously vaccinated against rabies can be given fewer doses depending on their antibody level. If a good antibody level was developed following the pre-exposure vaccination and the person is exposed to rabies, two boosters should be given on days 0 and 3. If a high antibody titer is not obtained, a full series should be administered.

- *Suckling mouse brain (SMB) vaccine.* Schedules using SMB vaccine are variable in Latin America. The main schedules used are:

a) *Classical schedule.* This consists of the administration of 14 doses and two boosters. Some countries in the Region have made slight changes in this schedule *(7)*:

Ecuador	14 doses plus 3 boosters
El Salvador	14 doses plus 2 boosters 10 and 20 days following the last dose
Mexico	14 doses
Paraguay	14 doses
Peru	14 doses plus 2 boosters

b) *Reduced schedule (8).* The availability of rabies vaccines of high antigenic potency such as those prepared in SMB and human diploid cell cultures has opened up the possibility of reducing the conventional number of doses. The WHO Expert Committee on Rabies *(9)* recommends that the vaccine be administered at a concentration of 1.5 per cent in 2 ml doses on days 0, 1, 2, 3, 4, 9, 13, 20, and 90 when antirabies serum is not given. If antirabies serum is given in addition, however, vaccinations should be administered on days 0, 1, 2, 3, 4, 9, 13, 23, 29, and 30. When using reduced schedules, the potency of each lot should be controlled in accordance with the recommendation of WHO reports *(9, 10)*.

The following countries in Latin America are using reduced schedules with some changes in the aforementioned original schedules *(7)*:

Argentina	7 doses plus 2 or 3 boosters
Brazil	7 doses plus 3 boosters on days 10, 20, and 30 following the last dose
Chile	6 doses plus 2 boosters
Colombia	7 doses plus 2 boosters 10 and 20 days following the last dose
Dominican Republic	7 doses plus 3 boosters 10, 20, and 90 days following the last dose
Guatemala	7 doses plus 3 boosters 10, 20, and 90 days following the last dose
Honduras	7 doses plus 2 boosters
Venezuela	7 doses plus 1 booster

2. *Severe bites*

When the bites are on the head or neck, or produce lacerations on any part of the body, it is recommended that human rabies immune globulin (RIG) or equine antirabies serum be administered as soon as possible after exposure (hypersensitivity to equine serum must be verified).

In cases of severe bites, antirabies serum is administered prior to the first dose of vaccine regardless of the vaccination schedule or vaccine type (SMB or diploid cell tissue culture) being used. For the treatment of rabies in Brazil, for example, victims of severe bites are given, in addition to serum, 10 doses of SMB vaccine plus three boosters on days 10, 20, and 30 following the last dose of the series.

In Costa Rica, the recommendation for cases of severe bites is the administration of antirabies serum followed by 14 doses of SMB vaccine plus three boosters on days 10, 20, and 60 following the last dose of the initial series.

In Mexico, hyperimmune antirabies serum is administered in conjunction with 14 doses of SMB vaccine and three boosters on days 10, 20, and 90 following the last of the series.

The prompt treatment of lesions is one of the most effective means of preventing rabies. They should be cleaned and washed with soap or detergent and plenty of water.

Epidemiological surveillance activities in programs for the prevention and control of human rabies should include studies to compare the efficacy of the vaccines and schedules in use. These studies should also examine the complications produced by the vaccines and their schedules in order to achieve the safest and most effective treatment possible.

References

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