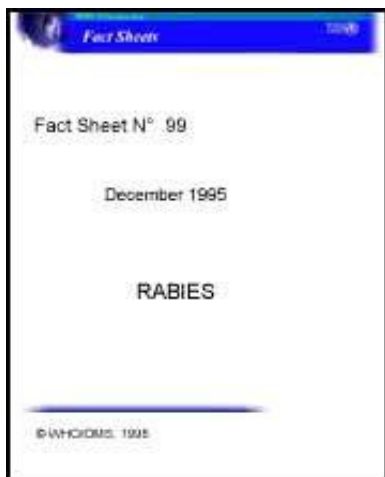
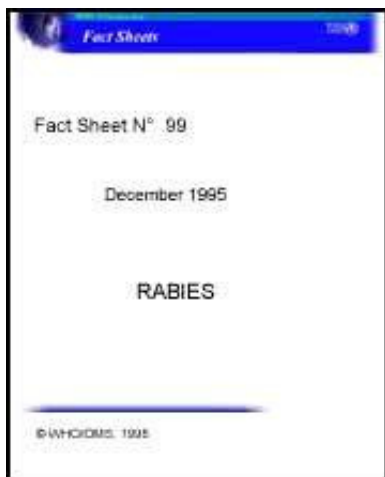


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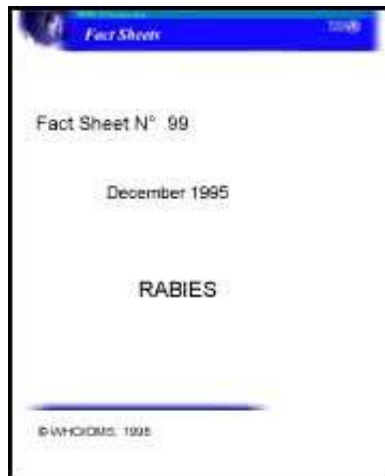
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  **RABIES**

## RABIES

**Rabies is a zoonotic viral disease. The causative agent is found in domestic and wild animals, and is transmitted to other animals and to humans through close contacts with their saliva (ie. bites, scratches, licks on broken skin and mucous membranes). Once symptoms of the disease develop, rabies is fatal to animals as well as humans and there is no cure for it.**

**In the natural course of the human disease the first symptoms are usually non-specific and suggest involvement of the respiratory, gastrointestinal or central nervous systems. In the acute stage which follows, signs of hyperactivity (furious rabies) or paralysis (dumb rabies) predominate. In both furious and dumb rabies, paralysis eventually progresses to complete paralysis followed by coma and death in all cases, usually due to respiratory failure. Death occurs during the first seven days of illness without intensive care.**

## **Incidence**

**Reliable data on rabies are scarce in many areas of the globe, making it difficult to assess its full impact on human and animal health. The number of deaths caused each year by rabies is estimated to be at least 40 000 worldwide, and as high as 70 000 if higher case estimates are used for densely populated countries in Africa and Asia where rabies is endemic. An estimated 10 million people receive post-exposure treatments each year after being exposed to rabies suspect animals.**

**Since 1990 the number of rabies cases in animals has been reduced by 80% in European countries that have conducted campaigns to orally immunize wildlife. With the help of this technique rabies should eventually be eliminated from its terrestrial reservoirs in Western Europe, possibly by the end of the decade. Dramatic decreases in human cases of rabies have also been reported during recent years in China, Thailand and Sri Lanka following implementation of programmes for improved post-exposure treatment of humans and the vaccination of dogs.**

## **Transmission**

**In developed countries, rabies is today found mainly in wild animal hosts, from which the disease spills over to domestic animals and humans. By contrast, in most countries of Africa, Asia and Latin America dogs continue to be the main hosts and are responsible for most of the rabies deaths that occur worldwide.**

**The most frequent ways that humans become infected with rabies is through the bite of infected dogs and cats, wild carnivorous species like foxes, raccoons,**

**skunks, jackals and wolves, and insectivorous and vampire bats. Cattle, horses, deer and other herbivores can become infected with rabies but rarely transmit the virus to other animals, although they may transmit the disease to humans.**

### **Post-Exposure Treatment**

**The most effective mechanism of protection against rabies is to wash and flush a wound or point of contact with soap and water, detergent or plain water, followed by the application of ethanol, tincture or aqueous solution of iodine. Anti-rabies vaccine should be given for Category 2 and 3 exposures (chart) as soon as possible according to WHO recognized regimens. Anti-rabies immunoglobulin should be applied for Category 3 exposures only. Suturing should be postponed, but if it is necessary immunoglobulin must first be applied. Where indicated, anti-tetanus treatment, antimicrobials and drugs should be administered to control infections other than rabies (box).**

<b>Category</b>	<b>Type of contact with suspect animal*</b>	<b>Recommended treatment</b>
I	Touching or feeding of animals. Licks on intact skin.	None, if reliable case history is available.
II	Nibbling of uncovered skin. Minor scratches or abrasions immediately, and stop if without bleeding. Licks on broken skin.	Administer vaccine 10-day observation or laboratory techniques confirm suspect animal to be rabies negative.**
III	Single or multiple	Administer rabies immunoglobulin and vaccine

transdermal bites or scratches.

Contamination of mucous membrane with saliva.

immediately, and stop if suspect animal confirmed as rabies negative.\*\*\*

**\* Exposure to rodents, rabbits and hares seldom, if ever, requires specific anti-rabies treatment.**

**\*\* If an apparently healthy dog or cat in or from a low risk area is under observation, the situation may warrant delaying the initiation of treatment.**

**\*\*\* Observation period only applies to dogs and cats. Other domestic and wild animals (except threatened or endangered species) suspected as rabid should be killed humanely and their tissues examined using appropriate laboratory techniques.**

**Source: Guidelines for post-exposure treatment in 8th Report of the WHO Expert Committee on Rabies, WHO Technical Report Series 824.**

**The use of highly purified horse immunoglobulins, which are safer than the heterologous products of the previous generation, should provide at least a partial solution to the problems of supply and cost of human immunoglobulin.**

**In case of human exposure to animals that are suspected of having rabies, immediate attempts should be made to identify, capture or kill the animal involved. In case of a Category 3 exposure, post-exposure treatment should be started immediately and can be stopped if the animal remains healthy after 10**

**days. Tissue samples should be taken from dead animals and sent to competent laboratories for diagnosis. The responsible veterinary services should be notified and information obtained on the epidemiological situation in the area.**

### **Vaccines and Immunization**

**Neural tissue rabies vaccines, which are still the most widely used vaccines today, involve the daily administration of injections over a period of 14 days, followed by booster shots. However, a variety of modern cell culture and embryonating egg vaccines, vaccination schedules and routes for vaccine administration (particularly the intradermal route) have been evaluated in humans in an effort to reduce the number of vaccinations and amount of vaccine required. In addition to the five-dose Essen regimen given on days 0, 3, 7, 14 and 28 in the deltoid muscles, the following reduced intradermal treatment regimens also fulfill WHO requirements:**

**The Red Cross 2-site intradermal method ("2-2-2-0-1-1") involves giving one id dose at each of two sites on days 0, 3, 7 and at a single site on days 28 and 90. The id dose per site is one fifth of the volume after reconstitution of a single immunizing im dose. The "8-0-4-0-1-1" consists of injecting 0.1 ml of human diploid cell vaccine divided between 8 intradermal sites (deltoids, anterior thighs, suprascapular and lower quadrant of the abdomen); on day 7, four 0.1 ml id injections (deltoids and thighs); and a single 0.1 ml id booster on days 28 and 90. Intradermal injections should be administered by staff well trained in this technique. After reconstitution, vaccine vials should be stored between 4- 8 C and the total contents should be used as soon as possible.**

### **Conclusions**

**Rabies elimination programmes focused mainly on mass vaccination of dogs are largely justified by the future savings of discontinuing prevention programmes. In developing countries with serious canine rabies problems, the economic burden provides a particularly strong rationale for elimination. While safer and more economical post-exposure treatments are desirable, their broadened availability will only increase the economic burden of the disease. If rabies is not eliminated, expenses related to prevention of the disease in both humans and animals are likely to increase dramatically in developing countries.**

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