Literature references and comments from the questionnaires for the WSR 1998

List of abbreviations

comp. - compulsory
EEO - vaccines of embryonating eggs origin
FAT - fluorescent antibody test
forb. - forbidden
hist. - histological technique
MIT - mouse inoculation test
N/A - not applicable
NTO - vaccines of neural tissue origin
opt. - optional
PCR - polymerase chain reaction
post-exp. - post-exposure
TCO - vaccines of tissue culture origin
TCI - tissue culture isolation
unkn. - unknown
World Survey of Rabies Nº 34 for the year 1998

1. Introduction

The Thirty-fourth World Survey of Rabies (WSR) for the year 1998 is based on data received from 110 countries and territories out of 193 WHO Member States (191 Member and 2 Associate Members) which were sent the questionnaire. In addition, other official sources (Annex 12) were used, expanding its coverage to 161 countries and territories. The survey reports on five major topics:

1. Rabies situation and trends for 1998
   - Human and animal rabies cases and methods of confirmation (Table 1 and Table 2)
   - Presence/absence by country (Annex 1)
   - Elimination/introduction of rabies
   - Main rabies epidemiological patterns (Annex 2)
   - Trends and geographical distribution (Annexes 3, 6 and 7)

2. Rabies post-exposure treatments (Table 3, Annex 4)

3. Rabies vaccine production and imports
   - Human vaccines (Table 4)
   - Animal vaccines (Table 4)

4. Diagnostic techniques in medical and veterinary laboratories, (Annex 4)

5. Rabies vaccine application to dogs and other animal species, including oral immunization (Annex 5)

As usual, this issue of the WSR offers access through Annexes 2, 3, 4 and 5 to the original data, to complement the results usually contained in Tables 1 to 4.

The annexes include information on:
- The main rabies epidemiological patterns
- The post-exposure treatment rate (per 100 000 inhabitants) 1
- Diagnostic techniques most commonly used for rabies diagnosis
- Countries where oral immunization of foxes and other carnivores is carried out (Annex 5)

The references and comments (Annex 12) give information about secondary data sources used in this issue of the WSR and explanations received from the countries, which answered the 1998 WSR questionnaire.

Note: Comments received from the reporting countries can be found in Annex 12. They are not included as notes in tables or annexes as done in previous issues.

New in this issue is a map about Bat rabies cases worldwide during the years 1993-1998 (see Annex 9).

The editors would like to thank all those who contributed (mainly national diagnostic institutes and Ministries of Health and/or Agriculture) to this issue and count on their continued collaboration for
the preparation of WSR issues to come and the further development of RABNET (Annex 11), the new electronic rabies surveillance and information system. Currently 67 national rabies reference laboratories have received their password to participate in RABNET. This electronic databank is accessible over the World Wide Web. Many of them are already entering rabies data regularly. This electronic databank will successively replace the printed version of the World Survey of Rabies and give so actual information about the rabies situation in most of the WHO member states.

2. Summary of replies received

2.1 Rabies situation and trends for 1998

2.1.1 Number of human deaths due to rabies by source of animal exposure and method of confirmation (Table 1)

Africa
As in previous years most of the reported human deaths from rabies (91%) were still diagnosed on clinical grounds only. The main source of exposure were dogs with 79%. In 17% of all reported cases the source of exposure was unknown but thought to follow a dog bite.

Americas
The Americas notified a total of 87 rabies deaths, which is 27 cases less than reported in 1997. The number of human deaths due to rabies seems to be decreasing during at least the last 3 years.

Asia
The highest incidence continued to be observed in Asia with 33 075 reported human deaths due to rabies. Most of them (estimated 30 000) occurred in India. Rabies diagnosis was mainly made on clinical grounds only.

Europe
With 7 deaths, Europe notified less than 0.1% of all reported rabies mortality in the world. All cases were reported from the Russian Federation. World-wide the number of human rabies deaths is estimated to be between 35 000 and 50 000 annually.

2.1.2 Number of animal cases by species and method of confirmation (Table 2)

Africa
The total number of reported animal rabies cases was 4 365. In 65% of these cases the diagnosis was confirmed by laboratory testing. The majority of the laboratory confirmed cases occurred in dogs (50%) followed by domestic ruminants (26%).

Americas
With 14 611 animal rabies cases the Americas reported 45% of total number of cases in the world. The USA alone notified 7 961 animal rabies cases followed by Brazil with 3 178 cases. This is an indication of the level of active surveillance in this region as well as of the under reporting in other parts of the world. Twenty-five percent of all laboratory confirmed cases were diagnosed in dogs. Rabies was mostly reported in wildlife in the United States of America (USA) whilst dog rabies prevailed in the Caribbean and Latin America. The number of cases diagnosed in bats was the highest compared with the other continents. Most cases in bats were diagnosed in the USA with 992 out of 1 076 cases for the whole of the Americas.

Asia
The majority of rabies diagnoses in animals were laboratory confirmed. The dog was the main species affected (85% of the total number of laboratory confirmed animal rabies cases). The
Philippines reported with 1,828 laboratory confirmed cases the highest number of rabies cases followed by Thailand with 1,314 cases.

**Europe**

The total number of cases reported in animals was 6,108 in 1998. All reported animal cases were confirmed by laboratory techniques. Wildlife remains the main rabies reservoir in Europe. The vast majority of rabies cases occurred in foxes (50%). Ruminants were affected in 18% of the cases and dogs accounted for 13% of the total cases reported, followed by cats (10%). Poland and Russia reported like last year the highest number of animal rabies cases of all European countries.

2.1.3 **Presence/absence of rabies by country/territory** (see Annex 1)

2.1.4 **Elimination/introduction of rabies**

None of the 110 countries or territories that replied to this WSR questionnaire for 1998 reported elimination of rabies. None of the countries and territories reported introduction of rabies.

2.1.5 **Main epidemiological patterns**

Dog rabies accounted for 66%, wildlife 28% and bat rabies 6% in the 71 countries and territories, which reported on the epidemiological pattern of the disease. Dog rabies prevailed in Africa with 100%, Asia with 85% and the Americas with 56%. Wildlife rabies was the main pattern in Europe with 84%. Detailed information (by country, by continent) is given Annex 2.

2.1.6 **Geographical distribution and trends**

Annex 3 and annexes 6, 7 and 8 (maps) provide information on the distribution of the disease in a given country or territory (i.e. rabies present in the entire territory, in limited areas or in border areas) and on the trend of the disease (stable, increasing, decreasing). According to the questionnaire, increase or decrease means at least a 10% variation against the number of rabies cases reported during the preceding year.

2.2 **Human rabies post-exposure treatment**

The number of persons treated against rabies and the animal species involved in human exposure in 1998 are given in Table 3 Number of persons treated against rabies by source of animal exposure and type of treatment. The column "Difference" in Table 3 shows the difference between the reported total number of persons receiving vaccine, vaccine & serum, serum alone or an unknown treatment and the reported total number of persons treated following exposure.

Dogs were at the origin of exposure in 94% of the human post-exposure treatments administered in Africa, 85% in the Americas, 96% in Asia, and 74% in Europe. The treatments, which followed exposure to wildlife species, were of relatively low incidence.

Worldwide Rabies post-exposure treatment consisted mainly in the application of vaccine alone (94%). In Africa and Asia 99% of the post-exposure treatment consisted of vaccine alone, whereas it represented only 36% of the total in Europe.

*In China alone about 5 million people are estimated to be vaccinated annually. India estimated the annual number of post-exposure treatments at approximately 1,000,000 whereas Bangladesh reported around 60,000 post-exposure treatments per year.*

Anne 4 provides number of post-exposure treatments in humans per 100,000 inhabitants.

2.3 **Vaccine production and imports**

Data provided by country and region are given in Table 4 entitled "Human and animal rabies vaccines produced domestically and imported".
2.3.1 Human vaccines
Seventy-three countries and territories answered the WSR questions on human rabies vaccine production and imports. According to these replies, 11 countries or territories produced human rabies vaccine in 1998.
Nearly all human rabies vaccine doses manufactured in these 11 countries were produced on neural tissue (for information on the vaccine types and quantities - see Table 4). Only three countries produced rabies vaccines on cell culture.
Fifty-six countries reported importing human vaccines (see Table 4 for type and quantity), 85% were of cell culture origin, and 1% of neural tissue origin. Approximately 14% of the vaccines imported were manufactured on embryonating eggs compared to 2% in 1997.

2.3.2 Animal vaccines
Twenty-seven (24%) out of 110 countries or territories, which returned the questionnaire, reported producing animal rabies vaccines.
Fourteen countries (52%) produced vaccines prepared on cell culture, 11 countries (41%) on neural tissues and 10 countries (37%) on embryonating eggs. Seven countries produced more than one type of vaccine.
72% of the total quantity of veterinary rabies vaccines was produced on cell culture, whereas 26% stemmed from neural tissue and less than 2% were produced on embryonating eggs.
Sixty countries or territories reported importing animal rabies vaccines. About 89% of these vaccines were prepared on cell culture.

2.4 Diagnostic techniques used in medical and veterinary laboratories (Annex 4)
Forty-four countries and territories provided information on the diagnostic techniques used in medical laboratories and seventy-five on those used in veterinary laboratories.
As in previous years the Fluorescent Antibody Test (FAT) was the technique most widely used to diagnose rabies in humans (42 out of 44 countries and territories) and in animals (71 out of 75).

2.4.1. Medical laboratories
Forty-two out of forty-four laboratories used the FAT for confirming rabies in humans. Many (20) of them used it together with the Mouse Inoculation Test (MIT) and 7 laboratories used FAT, MIT and histological techniques for rabies diagnostic. Only one country applied histological techniques alone.
The Tissue Culture Inoculation Test (TCI) was carried out in 9 countries, one country replied using an ELISA and two using a Polymerase Chain Reaction (PCR) test.

2.4.2. Veterinary laboratories
FAT was applied in 72 out of 75 countries and territories, which provided information on the diagnostic techniques used in veterinary laboratories. FAT was the only test used for rabies diagnostic in animals in sixteen countries and territories. FAT was applied together with MIT in 18 out of 75 countries and territories. About 9% (7 out of 75) of the countries used FAT together with histological techniques and about 11% (8 out of 75) together with other techniques. Twenty-three countries and territories used more than two types of diagnostic techniques.
MIT and/or histology for rabies diagnosis were exclusively used in only 5% (4 out of 75) of the veterinary laboratories. Fourteen countries reported using the TCI whereas two other countries utilised ELISA techniques, two a PCR-test, one Immunohistology and one Immunoperoxidase Test.
2.5 Vaccine application in animals (Annex 5)
Regarding dog immunisation against rabies, vaccination is compulsory in 11 out of 21 (52%) countries from Africa, which replied to this question, 7 out of 23 (30%) countries located in Asia, 19 out of 25 (36%) European countries.
In 3 countries from Africa, 1 from the Americas, 3 from Asia and 8 from Europe dog vaccination is compulsory under certain circumstances (see Annex 5). In many of the rabies free countries dog vaccination is generally forbidden and exceptionally allowed for exporting or importing animals. Estimates of the number of dogs immunised in 1998 and estimates of the vaccination coverage (in %) by country and territory are given in Annex 5.

Dog population size may have been underestimated in many countries.