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**REPORT OF A WHO
WORKSHOP ON
PREVENTION AND
CONTROL OF
RABIES IN BALTIC
COUNTRIES**

*Tallinn, Estonia,
14-15 February 1994*



WORLD HEALTH ORGANIZATION
VETERINARY PUBLIC HEALTH UNIT

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry, no matter how small, should be recorded to ensure the integrity of the financial statements. This includes not only sales and purchases but also expenses and income. The document provides a detailed list of items that should be tracked, such as inventory levels, accounts receivable, and accounts payable. It also outlines the procedures for reconciling these accounts and identifying any discrepancies.

The second part of the document focuses on the classification of expenses. It explains how to distinguish between capital expenditures and operating expenses, and how to allocate costs to different departments or projects. This section includes a table showing the various categories of expenses and the methods used to track them. The document also discusses the importance of proper documentation and the role of the accounting department in ensuring that all expenses are properly recorded and justified.

The final part of the document provides a summary of the key points discussed and offers some practical advice for implementing the recommended procedures. It stresses the need for consistency and accuracy in all financial reporting and encourages the use of modern accounting software to streamline the process. The document concludes by stating that a well-maintained accounting system is essential for the success of any business and that the information provided here is intended to help businesses achieve this goal.

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1. INTRODUCTION

Following up suggestions made during several WHO consultations and meetings¹ the WHO Regional Office for Europe and the Veterinary Public Health Unit of WHO Headquarters initiated activities to foster rabies control and prevention programmes in Baltic countries. To this end, a WHO workshop on Prevention and Control of Rabies, with special reference to vaccine procurement in Baltic Countries, was organized in Tallinn, Estonia, from 14-15 February 1994. The workshop was preceded by a mission conducted by Drs K. Stöhr² and Ch. Rupprecht³ to evaluate approaches for human and animal rabies prevention in Estonia (10-11 February 1994).

The main purpose of the workshop was to characterize the prevailing rabies situation in some Baltic countries (Estonia, Latvia, and Lithuania), to evaluate the current approaches and techniques as well as future demands for rabies prevention and control in humans and animals in these countries.

Specialists in rabies prevention and control in both humans and animals (Annex 1: list of participants) participated in the meeting and presented reports on the rabies situation and control methods in Estonia, Latvia and Lithuania (Annex 2). After the country reports, Drs Yolande Rotivel, Ch. Rupprecht, and K. Stöhr presented papers on "Approaches and Experiences in Post-exposure Treatment of Rabies in France", "Current Rabies Vaccines for Humans and Animals" and "Current Schemes of Pre- and Post-Exposure Treatment of Rabies in Humans", respectively.

Papers were discussed and two working groups were formed to review issues on rabies control in humans and animals in Baltic countries.

2. CONCLUSIONS

Rabies has been endemic in Estonia, Latvia and Lithuania for many years. Six persons have

¹ WHO Consultation on Vaccine Modernization in Baltic Countries, October 1992, Riga, Latvia (report EUR/ICP/EPI 030/A); WHO/Mérieux Foundation/OIE Seminar on Management and International Cooperation in Veterinary Programmes, June 1993, Annecy, France; WHO Consultation on Zoonoses Control in East European Countries, December 1993, Berlin, Germany (report WHO/CDS/VP/93.127).

² Veterinary Public Health, Division of Communicable Diseases, World Health Organization, Geneva, Switzerland

³ Centers for Disease Control, Atlanta, USA

died in the last 10 years. The rabies toll in the animal sector is substantial. In addition, each year 130-190 persons per 100 000 inhabitants see doctors after contact with rabies-suspect animals, which causes considerable public spending. In Latvia, for example, approximately 170 per 100 000 inhabitants undergo post-exposure treatment each year.

Foxes and raccoon dogs are the main terrestrial reservoirs. Even though the number of stray dogs apparently increased over the last decade, a spillover to dogs obviously did not occur.

vaccine used (Rabivac) and possible adverse effects. No pre-exposure treatment is performed at present, and the size of risk groups is incompletely known (Tab.1).

The above numbers are estimates and the numbers in other risk groups (e.g. animal handlers, wildlife officers, etc.) are unknown. Tests to determine rabies virus-neutralizing antibodies (RVNA) in human or animal sera are not available in these countries.

2.1.2 Post-exposure treatment

Organization

Rabies treatment is centralized in clinics for all Baltic countries, and is free of charge. Detailed records are kept for all patients. Marked differences in ascertaining indications for post-exposure treatment and various vaccine schedules point to the need for on-the-job-training of staff of these centres.

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2.1 Rabies control in humans

2.1.1 Pre-exposure treatment

Pre-exposure vaccination has very seldom been carried out in the past, due in part to the painful application procedure of the

Table 1. Estimated number of persons in risk groups

	Veterinarians	Rabies diagnostics laboratories
Estonia	650	25
Latvia	Unsure	120
Lithuania	approx. 1000	approx. 26

The number of visits after contact with rabies-suspect animals increased in all three countries concerned (Fig. 1) over the last 5 years (Estonia by 20%, Latvia by 46%, Lithuania by 150%), whereas the average number of post-exposure treatments remained almost at the same level (Fig. 2).

Most post-exposure treatments are started after contact with dogs, not wildlife. If the offending animal, such as a stray dog, is unavailable for observation or diagnosis, treatment is begun. Treatment is initiated immediately, regardless of the animal's health status and discontinued only if the animal remains healthy after 10 days, or if it dies and proves negative after laboratory diagnosis. Rabies-suspect animals are usually not euthanized, but instead are allowed to die prior to rabies diagnosis.

Fig. 2
Rate of persons actually treated after consultation

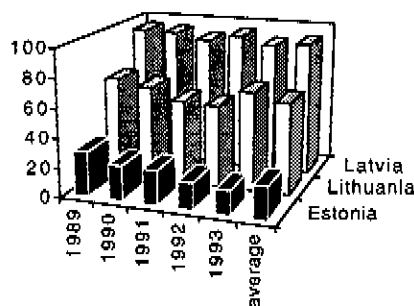
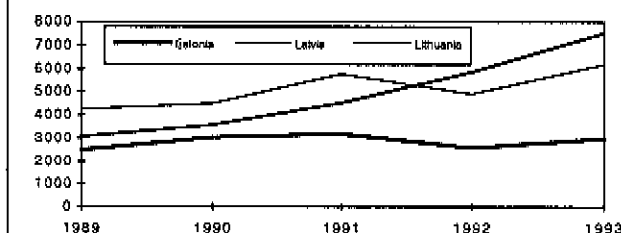


Fig. 1 Number of consultations after contact with rabies suspected animals



Biologicals

In all Baltic countries, Rabivac-Vnukovo-32 has been administered (multiple doses over a month sub-cutaneously in the abdominal region) for post-exposure rabies treatment for many years. Adverse effects have not been uncommon. Different mechanisms for tracing the source of potential rabies exposure and a variety of other reasons (proportion of vaccinated dogs and cats, etc.) have led to disparate treatment rates of patients presented for evaluation between countries. Whereas in Estonia about 23% of all patients who presented for evaluation received treatment, this figure was 62% in Lithuania and 92% in Latvia (Fig. 2).

Serum or rabies immune globulin (RIG) has been applied only sporadically in the past in Baltic countries (e.g. Latvia, 1993, in 10.5% of treatments). The only immuno-globulin available has been an unpurified product of equine origin (ERIG) produced in Charkov (Ukraine).

In some of the Baltic countries modern human cell culture vaccines are already available (donations from WHO/EURO - 5000 doses to Latvia and Estonia, 6000 to Lithuania), but possibilities for obtaining RIG are very limited.

2.2 Rabies control in animals

2.2.1 Data collection

Surveillance

Rabies is a notifiable disease in all three Baltic countries.

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Within each community or region, specially trained community veterinarians are primarily responsible for rabies surveillance, specimen submission and transport, but private veterinarians and citizens may also be involved. In general, all suspect animals are reported, but priority is given to animals which are at the origin of human and domestic animal exposures. National reports are collected and analyzed by the central government (Fig. 3).

Diagnosis

The fluorescent antibody test (FAT) is used in all three countries, with 8, 6 and 5 laboratories in Estonia, Latvia and Lithuania, respectively. In addition, Lithuania practises histological examination of brain specimens originating from animals not reported to have had contact with humans or domestic animals.

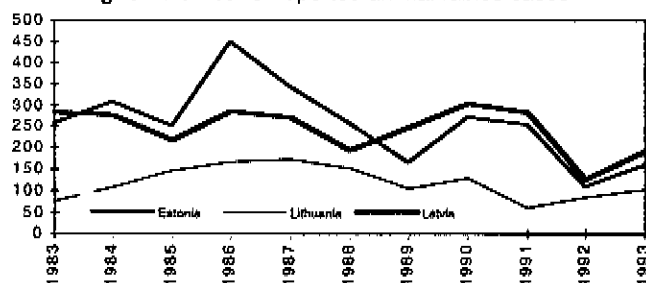
All FAT-negative specimens originating from offending animals are inoculated into mice and observed for 30 days. The current fluorescent antibody conjugate is of Russian origin. The quantity available in Estonia will suffice for 6-12 months. It must be used at fairly high concentration (e.g. 1:5) which leads to increased background fluorescence.

2.2.2 Animal control

Stray animals

Each local community committee is responsible for stray animal control. Local hunters may also

Fig. 3 Number of reported animal rabies cases



be used to kill or capture stray animals. In some cases, specialized groups are hired for stray dog and cat control, and special campaigns organized in case of outbreaks. In Latvia and Lithuania, individuals responsible for stray animal control are usually vaccinated.

Captured stray animals are usually held for 10, 5-6 and 2-3 days in Estonia, Latvia and Lithuania, respectively. Lithuania estimates that some 10 000 stray animals are destroyed annually. In Latvia approximately 3800 dogs and 8800 cats are captured each year.

Companion animals

Dog vaccination is mandatory in the three countries; cat vaccination is mandatory in Estonia and Latvia and recommended in Lithuania. Animals are usually identified after vaccination by a tag, registered and receive a certificate.

The vaccine is provided free, but there is a small charge to cover vaccination costs. During the meeting it was agreed that any veterinary rabies vaccine registered in one country would also be registered in the others. Currently, the Vnukovo 32, Rabisin, Intervet and Defensor vaccines are registered. Only authorized veterinarians are allowed to vaccinate domestic animals.

Statistics on herd immunity are poorly estimated, but are higher for dogs (~65%) than cats (~1%).

About 52 700 dogs and 1400 cats were vaccinated in Estonia in 1993; 112 200 dogs and 113 400 dogs/2900 cats were vaccinated in Latvia and Lithuania respectively.

Livestock

Estonia

An unvaccinated agricultural animal having contact with a rabid animal is euthanized or quarantined for only two months; the milk for human consumption is boiled; the animal is vaccinated. Other animals in contact with the exposed domestic animal are vaccinated.

Latvia and Lithuania

Exposed livestock are euthanized; the meat is used after cooking (but not the head and the tissues around the bite site). Other contact livestock are placed in quarantine for 3 months. The milk is used only after pasteurization (about 75°C).

2.2.3 Management of animals

All wild animals suspect for rabies are euthanized. All stray animals are considered potentially rabid if they cannot be captured or examined for rabies. Dogs and cats that expose humans are observed and confined for

10 days; unvaccinated animals with an owner are vaccinated at the end of the observation period; stray animals are euthanized.

2.2.4 Wildlife Control

Reduction of reservoirs

Hunting activities have apparently had no substantial influence on the wildlife rabies epidemic in the three countries. In Estonia about 2000 foxes and 2500 raccoon dogs are hunted annually (Fig. 4). Fox and raccoon dog population densities are estimated to have increased significantly over the last decade.

Oral immunization of foxes against rabies

Trials started as far back as 1983 in Latvia and Lithuania. The vaccine-baits (a modified live virus, obviously a Vnukovo-derivate called EVMTI-VVNKI-71, injected in fish pieces or minced meat) were placed in fox dens. A 25-50% reduction in animal rabies cases was reported. Lack of finances prevented continuing the campaigns in 1993. Information on safety, efficacy and innocuity of the vaccine used were not available at the time of the meeting.

3. RECOMMENDATIONS

3.1 General recommendations

WHO is requested to support the development and implementation of a five-year programme ultimately leading to the self-reliance of Baltic countries as regards biologicals necessary for rabies control. This programme should include:

- the supply of modern cell culture vaccines for humans to meet current urgent needs;
- training and education of specialists in vaccine production, rabies treatment and diagnosis; and
- oral immunization of wildlife against rabies.

Appropriate funding institutions and organizations should be approached by WHO.

3.1.1 Intersectoral communication and cooperation, especially among public health, veterinary and wildlife specialists is strongly recommended for successful rabies control.

3.1.2 In all three participating countries a national programme for the control of human and animal rabies should be elaborated by the members of the national rabies control committee. This committee should be

established in all Baltic countries. The rabies control programme should be endorsed by both the Ministry of Health and Ministry of Agriculture and legally enacted for the control of the disease in humans and animals.

One of the key sections of the programme would consist of a cost-benefit analysis of current activities and proposed alternative strategies.

3.1.3 Responsible institutions in the Baltic states are encouraged to coordinate rabies control and prevention activities in all sectors concerned, especially with regard to animal shipments, stray animal control, rabies biologicals procurement, and general principles for domestic animal monitoring.

National and local regulations concerning domestic animal rabies control should be compatible.

3.1.4 The Baltic countries should designate one of the existing laboratories as a regional reference centre for further training and virological investigations. The centre could also serve as a focal point for training in rabies diagnosis and control in the Baltic region. WHO could facilitate the establishment of such a centre on matters related to the mandate of the centre.

3.1.5 WHO is requested to coordinate future activities for the

training of specialists from the Baltic countries on rabies diagnosis, post-exposure treatment and oral immunization of wildlife against rabies. Workshops dealing specifically with the use of rabies biologicals, serology, epidemiology, and the economics of rabies control are particularly needed and should be organized as soon as possible.

3.1.6 WHO should organize a meeting with the Baltic states to discuss the practical aspects of oral immunization of wildlife against rabies in these countries. Prior to such a meeting, all data on safety, efficacy and monitoring of the vaccines currently in use for oral immunization of foxes in Latvia and Lithuania should be compiled by the responsible authorities and made available to WHO.

3.1.7 Training in the collection and economical analysis of data related to surveillance, diagnosis, stray animal control, euthanasia and vaccination should be arranged. WHO should suggest the necessary experts to be involved.

3.2 Specific recommendations

3.2.1 Rabies control in humans

Status of the biting animal

The number of post-exposure treatments could be adjusted if

due consideration is paid to the health status of the biting animal.

Canine rabies is not enzootic and as rabies in the Baltic countries appears to be wildlife-driven, careful assessment of the actual risk that a healthy domestic animal poses to the exposed person, could substantially decrease the number of post-exposure treatments. Vaccination prior to diagnosis need only begin when rabies is strongly suspected. To reduce over-administration of post-exposure treatment, national training courses should be organized to harmonize treatment protocols and schedules. Previous recommendations given by WHO in this regard (e.g. WHO Expert Committee on Rabies, Eighth report, Geneva, 1992, WHO Technical Report Series, No. 824)

and experiences of other countries should be considered.

Human biologicals

In the future, all post-exposure treatments should be conducted with modern cell culture vaccines; all transdermal rabies exposures should involve the use of RIG and vaccine.

Given the difficulties in biologicals procurement (vaccine and RIG), multi-site abbreviated treatment schedules (such as the 2-1-1 schedule) should be considered.

Based on the average number of post-exposure treatments applied from 1989 to 1993, the annual demand for rabies vaccines could be estimated as follows:

	Number of			Annual demand for vaccines for	
	Pre-exposure treatments	Post-exposure treatments		Pre-exposure treatments ^a (3 doses)	Post-exposure treatments (5 doses)
		Average 1989-1993	1993		
Estonia	1 000	651	503	3 000	3 255
Latvia	1 000	4 700	5 500	3 000	27 500
Lithuania	1 000	3 039	5 065	3 000	25 325

^a Estimated.

WHO and related organizations should assist in vaccine procurement and in training for rabies prevention, as appropriate.

Pre-exposure vaccination

Available data on post-exposure treatment should be analyzed to identify high risk groups for selective pre-exposure prophylaxis. Experience has shown that this will lead to a consequent reduction of the total quantity of vaccine doses required and eliminate the need for RIG in those individuals receiving pre-exposure treatment.

Human rabies prevention costs

Assessments of the costs of human pre- and post-exposure should be conducted jointly by the public health and veterinary services, to estimate the spending associated with rabies prevention, rather than to assess the rabies burden only on the basis of human mortality. This cost estimate, which should become one of the key parts of national rabies control programmes, will also be necessary for future discussions on the feasibility of oral rabies immunization campaigns in wildlife.

Serology

To further reduce the number of vaccine doses, testing for rabies

virus neutralizing antibodies (RVNA) is useful. For example, boosters for those at risk can be administered on the basis of serological status, rather than administered routinely.

It is recommended to establish, in one of the Baltic countries, a method for ascertaining the level of RVNA in persons previously given pre-exposure vaccination. This ability is also considered a pre-requisite for initiating campaigns of oral immunization of wildlife against rabies.

The offer of the National Public Health Institute and the Veterinary and Food Research Institute, Helsinki, Finland, to provide training in measuring RNVA titers is very much welcomed. The panel of WHO Collaborating Centres could also be supportive in this regard.

3.2.2 Animal rabies control

Considering possible budgetary constraints, surveillance priority should be given to those circumstances in which humans and domestic animals are exposed or potentially exposed, rather than to the submission and examination of specimens in which no such exposure occurred.

The quality of reagents used for rabies diagnosis should be improved and information regarding the availability, sensitivity and specificity of rabies

biologicals (such as conjugates) should be obtained.

Mandatory cat vaccination should be encouraged.

All unvaccinated domestic animals with clinical signs of rabies which are at the origin of a human or domestic animal exposure should be euthanized immediately. Unvaccinated domestic animals with lesions compatible with a bite suggestive of rabies exposure should be euthanized immediately or quarantined for six months, related costs being borne by the owner. Post-exposure vaccination

of naive domestic animals exposed to rabies is not recommended because no significant scientific evidence is available demonstrating its efficacy.

Only effective and humane methods for the reduction of the number of stray domestic animals should be used. Sufficient time should elapse between capture and euthanasia of strays to permit owners to retrieve their pets. To minimize unnecessary human post-exposure treatments, all efforts should be made to find and identify stray animals involved in suspect human rabies exposure. ■

ANNEX 1

LIST OF PARTICIPANTS

Estonia

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Dr Rimantas Valentelis, Head, Department of Organization of Immunization, Republican Center on Immunization, Roziu aleja 4a, Vilnius, 2001 Lithuania

Finland

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Secretariat

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Dr K. Stöhr, Veterinary Public Health, Division of Communicable Diseases, World Health Organization, 1211 Geneva 27, Switzerland (*Secretary*)

ANNEX 2

REPORTS ON THE RABIES SITUATION AND CONTROL METHODS IN ESTONIA, LATVIA AND LITHUANIA

Estonia

Human rabies control in Estonia (A. Jögiste)

Animal rabies control in Estonia (A. Pärtel)

Latvia

Rabies and its control in humans in Latvia (Anita Brīla)

Prevention and control of animal rabies in Latvia (Z. Andersons)

Lithuania

Prevention and control of human rabies in Lithuania (B. Morkunas and R. Valentelis)

Survey of animal rabies in Lithuania (K. Gedrimas and A. Dranseika)

General

Current rabies vaccines for humans and animals (Ch. Rupprecht)

Current schemes for pre- and post-exposure treatment of rabies in humans (K. Stöhr)

Approaches and experiences on post-exposure treatment of rabies in France (Y. Rotivel)

