Introduction

Surveillance, in the veterinary or medical context is the monitoring of disease patterns to facilitate action. It encompasses field identification of diseases, laboratory confirmation, and dissemination of the information to the relevant authorities. It is, in turn, used in understanding disease processes, predicting disease occurrence and for making decisions on control or prevention of the disease.

Rabies has been present continuously since 1950 (see "Rabies control in dogs in Zimbabwe", page 134). Initially, diagnosis of rabies was carried out by histological tests and mouse inoculation. In 1967 the fluorescent antibody test was introduced and this soon replaced the histological test as the main diagnostic test in use for rabies (Foggin, 1988). In Zimbabwe, the case identification and reporting systems for rabies have been relatively efficient since the first introduction of the disease in 1950. This has allowed detailed studies of the patterns of rabies from the beginning of the outbreak (Foggin, 1988). During the mid-1980's the reporting system was computerised.

Structure of the Zimbabwe Department of Veterinary Services

There are three important branches of the Zimbabwe Department of Veterinary Services, not including the directorate, which are involved with rabies surveillance.

Firstly, the Field Branch, which identifies suspect rabies cases and submits the appropriate specimens to the laboratory. Three main levels of staff are involved in the disease identification procedure. Veterinarians are located at provincial or district level and are responsible for, apart from diagnostic functions, the major decision making processes at this level. Animal health inspectors (AHI's) are responsible for much of the routine livestock examination and disease monitoring, particularly in commercial farming and urban environments. Veterinary extension assistants (VEA's) are responsible within the communal areas for disease monitoring and extension work. They are based at Animal Health Management Centres (AHMC's), which are distributed strategically within each of the communal areas.

Secondly, the Diagnostics and Research Branch, under which falls the Rabies Unit, is responsible for diagnosis and reporting of confirmed cases and the management of the Rabies Surveillance database. The Rabies Unit is located at the Veterinary Research Laboratory in Harare. Its functions are overseen by a veterinarian and a technologist.
Finally, the Training Branch, which is responsible for the training of the field staff in identification of suspect rabies cases and the correct specimen sampling procedure.

Specimen sampling and submission

Specimens for rabies confirmation are submitted, as whole carcasses or as heads, by members of the public to veterinary offices. Alternatively, suspect rabid animals are collected by members of the staff of the Department. All provincial and district veterinary offices and AHN4C's are provided with post-mortem facilities and the equipment necessary for the removal and preservation of brains.

Kits for the preservation and transport of brain specimens are made up at the Rabies Unit in Harare and are transported to the provincial and district offices and to the AHMC's. The kits consist of wooden boxes painted red and the word "RABIES" printed boldly on the box. Fifty percent glycerol-saline and 10 percent formal-saline are placed separately into two half-litre glass jars (Consul, South Africa) which are placed into metal containers. The containers are placed into the boxes. To assist in preservative identification colour-coded labels, green for glycerol saline and white for formal-saline, are attached to each of the glass jars and the metal containers.

The whole brain is removed from the skull. It is bisected through the midline and one half is preserved in the 50 percent glycerol-saline solution, while the second half is preserved in the 10 percent formal saline solution. A Rabies Field Report form giving the name, address and contact numbers of the sender, details of the case and information on human contacts, is enclosed within the kit.

The kit is transported by rail or freight service to the Rabies Unit where the diagnosis is carried out. Delays in the transport of brain specimens often occur and are a major cause of poor quality specimens. Delays may happen before placing the brain into the preservative, where logistical problems occur in getting the head to a veterinary office or AHN4C which has a rabies kit or after preservation, in getting the full kit to a railway station or freight office. The former problem is usually the most serious in Zimbabwe, as this is where the longest delay will occur, and where most deterioration in specimen quality will occur. In rural areas which have poor infrastructure, veterinary personnel may carry specimens on buses, bicycles and by foot for several days before they get placed on a freight vehicle for transport to Harare.

Diagnosis

The Rabies Unit is manned every day of the week for rabies diagnostic tests. It is the only laboratory in Zimbabwe which routinely carries out such tests. Specimen kits are collected daily at railway and freight service depots.

The fluorescent antibody test (FAT) is the main test carried out for diagnosis of rabies. The mouse inoculation test (MIT) is used as a backup test on FAT-negative and inconclusive specimens. In addition, other non-routine procedures are occasionally used, including
histological staining of paraffin embedded specimens, enzyme digestion of formalin-fixed specimens and skin biopsies on human ante-mortem cases.

**Reporting**

Results are initially reported to the sender of the specimen by telephone, usually within 24 hours of receiving the specimen. Results are reported as "positive", "negative by FAT", "uncertain, test to be repeated" or "unsuitable". If the mouse inoculation test subsequently shows the specimen to be positive, the sender is informed immediately by telephone. The "unsuitable" report is usually made with highly decomposed specimens or with formalin-fixed specimens where the FAT, following digestion, is negative.

The epidemiologically relevant details of each specimen are entered into a database (dBase 3 Plus, Ashton Tate) file. The fields of this file include specimen number, date received, sender's reference number, species, results of the different tests and the grid reference and locality of origin of the specimen. From the database a weekly report is generated which is sent to all the provincial and district veterinary offices. In addition, a quarterly report is generated for all the medical and veterinary authorities, the hospitals and the private veterinary practitioners. Both of these reports include a map of the case locations, generated by the Epidemiology Section of the Veterinary Research Laboratory.

On a quarterly basis, survey forms are sent out to all the hospitals to obtain information on the number of human rabies cases diagnosed, the number of patients receiving post-exposure prophylaxis and the numbers of vaccine and immunoglobulin doses used by the hospitals during the quarter. This information is compiled and reported in the quarterly report, giving total numbers used throughout the country. The questionnaire return rate for this survey is between 30 and 40 percent.

**Reference**