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## ***NORTHERN IRELAND MEMORANDUM ON RABIES***

### **PREVENTION AND CONTROL**

**April 2001**

**DEPARTMENT OF HEALTH, SOCIAL SERVICES AND PUBLIC SAFETY**

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## **FOREWORD**

This Memorandum, which replaces the edition issued in August 1977, has been prepared in the light of the recommendations of the World Health Organisation (WHO) Expert Committee on Rabies 1992, and the Report by the Advisory Group on Quarantine, chaired by Professor Ian Kennedy.

The Kennedy Group's analysis showed that there would be no significant increase in the already very small risk of importing rabies into Great Britain were cats, dogs and certain other species coming from the European Union and other specified rabies-free islands and countries, allowed to enter Great Britain without quarantine using an alternative vaccine based system. Under these circumstances, cats and dogs and certain other species resident in Great Britain would also be able to return after being abroad temporarily in these countries.

The Kennedy Report concluded that the requirement for quarantine should be abandoned for cats, dogs and certain other species entering Great Britain from these countries. In its place, the Report proposed a system ensuring that each animal met specific requirements in respect of identification, vaccination against rabies, blood testing and treatment against particular parasites, together with certification.

The recommendations of the Kennedy Report will have implications for Northern Ireland. Great Britain, Northern Ireland and the Republic of Ireland have historically had complementary rabies control policies.

Following consultation, the Government announced that the Pet Travel Scheme (PETS) would be introduced no later than April 2001 and that a pilot would start before April 2000. The pilot started on 28 February 2000 and is designed to test the practical arrangements before the main scheme is implemented. The pilot is restricted to pet cats and dogs from western European countries and assistance dogs from Australasia. The publication of an up-to-date Memorandum on Rabies is therefore timely.

The Memorandum for Northern Ireland is based on that prepared by the Department of Health in conjunction with the Ministry of Agriculture, Fisheries and Food, the Health Protection Agency (formerly Public Health Laboratory Service), the Health and Safety Executive, and others. The Advisory Committee on Dangerous Pathogens was consulted and endorsed the contents.

This Memorandum is intended primarily for use by the local public health services, especially Consultants in Communicable Disease Control. They will wish to follow the action described in Chapter 4 in particular.

But the document is being made available to others in the medical and allied professions and to anyone with an interest, and is being published on the Department of Health, Social Services and Public Safety website at [www.dhsspsni.gov.uk](http://www.dhsspsni.gov.uk)

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April 2001

# CHAPTER ONE

## Background

1.1 Rabies is an acute viral infection of the central nervous system that is almost invariably fatal once symptoms develop. Although post-exposure treatment is available prior to symptoms, once symptoms develop there is no treatment. The infection is maintained in animal populations and transmitted to man primarily via the bite of an infected animal, or, rarely, through contamination of broken skin or mucous membranes.

### Rabies in animals

#### *Susceptibility and epidemiology*

1.2 Rabies has been recorded in most warm-blooded animals, domesticated and wild, which become infected through contact with affected animals, usually carnivores. While all mammals are believed to be susceptible to rabies, the continued existence of the disease depends on a 'lead' vector species maintaining the virus within its own population. The disease may then be transmitted to other species and to man. Susceptibility is influenced by a variety of factors including the quantity and strain of the virus introduced, the transmission route, and the species of the recipient host.

#### *Rabies in Great Britain*

1.3 Great Britain has been free of rabies for most of this century; the last case of indigenous animal rabies occurring in 1922. The last recorded cases of rabies outside quarantine were in 1969 and 1970 when two imported dogs died after recently completing 6 months quarantine. Since 1970 there have been two dogs which have died in quarantine with evidence of rabies in the brain. Neither originated in Western Europe. The most recent case of rabies in Great Britain was a Daubenton's bat infected with European Bat Lyssavirus 2, found in Newhaven, Sussex, in May 1996. The country of origin of the bat is not known. No confirmed cases have previously been found in bats in Great Britain.

1.4 Because of the existence of the disease in Continental Europe and elsewhere there has been concern at the risk of rabies being reintroduced into Great Britain. The main threat of introduction of rabies is still from illegal importation of an infected carnivore (most likely a dog, cat or fox), or possibly a bat, arriving by commercial or private transport from any part of the world where rabies occurs. According to existing knowledge and experience, non-carnivores pose a very low risk.

1.5 During 1998, 64 dogs and 35 cats were reported as illegally landed in Great Britain. In addition there were 16 reported incidents of illegal landings of other rabies susceptible animals.

1.6 If the virus were to be introduced to wildlife in Great Britain, then the fox would be the most likely vector species. However, the greatest risk to humans would be from contact with infected domestic dogs and cats. Most other small wild animals and farm animals can also be readily infected, but non-predatory animals such as cattle, sheep, pigs and horses rarely transmit the disease to animals of other species, including humans.

#### *Rabies in Northern Ireland*

1.7 The last reported case of rabies in Ireland was in 1903 and there have been no reported cases in Northern Ireland since 1923.

#### *Rabies in Europe*

1.8 Rabies has spread throughout parts of Central and Western Europe during the last 50 years. Foxes are the main host, but other mammals may be infected, including dogs and cats, cattle, horses, badgers, martens, deer, sheep, goats and racoon dogs. The incidence of endemic, fox-adapted, rabies in Western Europe has fallen dramatically over the past 10 years and it appears to have been virtually eliminated from the EU. This has been largely due to the success of co-ordinated wildlife vaccination programmes, together with the availability of effective commercial vaccination for domestic animals. Some EU member states have continued to report occasional cases of rabies in domestic animals imported from non rabies-free countries over recent years. In Eastern Europe rabies remains prevalent, and in Turkey the serious threat of dog-adapted rabies persists in urban areas.

1.9 The classical rabies virus is not present in reservoir species of bats in Europe, although it does occur in bats elsewhere in the world. However, disease caused by rabies-related viruses, European Bat Lyssaviruses (EBL), has been reported in insectivorous bats from several European countries. Bats suffering from these viruses show signs of disorientation, unco-ordination and occasionally aggression.

1.10 These rabies-related bat viruses do not appear to readily infect terrestrial mammals. There are no known recorded cases of natural transmission to other animal species, despite a relatively widespread prevalence in bats. However, there have been very rare fatal human infections in individuals working closely with bats, following biting incidents. Three human deaths have occurred in Europe in the past 30 years associated with EBL. Limited cross-protection has been shown experimentally between classical rabies vaccines and EBL, and so it is recommended, as a precaution, that pre-exposure vaccination is given to people likely to be at risk of exposure through the close handling of bats.

### *Rabies in the rest of the world*

1.11 Rabies is endemic in all continents except Antarctica and Australasia, although individual countries (often peninsulas or islands) are reported to be rabies free. In the United States of America, skunks, racoons and bats account for 85% of cases of animal rabies. In Asia, Africa, Central and South America rabies is endemic in feral dogs. In Mexico and Central and South America vampire bats carry the classical rabies virus.

1.12 Although Australia remains officially rabies free, a virus that is serologically very closely related to the rabies virus has recently been recovered from several species of bat on that continent. It has been responsible for at least one human death.

### *Recent developments*

1.13 In 1994, the Channel Tunnel provided a new link between Great Britain and the rest of Europe. The Ministry of Agriculture, Fisheries and Food were involved in the negotiations on the building of the tunnel and anti-rabies measures were incorporated in its construction to prevent the possible illicit entry of rabies-susceptible animals. The opening of the Channel Tunnel has therefore not significantly increased the risk of rabies being spread to Great Britain.

1.14 In the light of recent scientific advances, the issue of whether quarantine is still required has been reviewed. In September 1998, the Advisory Group on Quarantine, chaired by Professor Ian Kennedy, published its report<sup>(1)</sup>. It concluded that there would be no significant increase in the already very small risk of importing rabies were cats, dogs and certain other species resident in Great Britain to be allowed to travel, to and from certain qualifying countries, under specified conditions, without having to undergo quarantine. The proposed alternative to the quarantine system requires animals to be identifiable, vaccinated against rabies, blood tested to confirm immunity, treated against specified parasites, and certified as such.

1.15 These recommendations have provided the basis for the Pet Travel Scheme (PETS), starting with a pilot from 28 February 2000. Pet cats and dogs qualify for exemption from quarantine under the in Great Britain (but not in Northern Ireland) pilot scheme if certification confirms that they are: microchipped; vaccinated against rabies; blood tested; and treated against ticks and the fox tapeworm; and have not been outside the qualifying countries in the six months before entry to Great Britain. Details of Government Policy, Legislation and PETS can be found in **Appendix 1**.

### *Clinical Signs of rabies in animals*

1.16 Incubation periods in animals vary greatly, due to the interaction of virus and host factors together with the size and location of the bite. The incubation period in dogs is usually between three and eight weeks. Once the virus reaches the central nervous system the main clinical symptoms can appear. These may vary depending on the region of the brain that is affected. They can last from less than a day to over a week. There are three main stages:

- a) Prodromal stage - the animal becomes irritable, anxious, uneasy, sensitive to noise and light, and may display loss of appetite and bite the original wound site.
- b) Excitement stage ("furious" rabies) - irritability gives way to overt aggressiveness and fits. The animal attempts to bite objects and other animals; may want to break loose from any restraint; the eyes take on a staring expression; there may be copious salivation; the lower jaw tends to sag; and there may be a change in voice. Animals do not show signs of hydrophobia.
- c) Paralytic stage ("dumb" rabies) - a progressive paralysis of limbs and body sets in, causing staggering and respiratory distress; this is quickly followed by coma and death.

1.17 In the earlier stages a common factor is that the animal undergoes a change of temperament. A normal, friendly animal may become snappy and seek to avoid its owner's company; whereas timid animals may become less restrained and unnaturally approachable. This is the common feature of wild animals, making them a particular hazard to children who, while delighting in their apparent 'friendliness' become exposed to infection.

1.18 The stages may be of variable duration, so that earlier signs may not be apparent and an animal may only show the terminal stages of the disease. Cats are more likely to develop furious rabies than dogs or foxes. The overall period from onset of clinical signs to death rarely exceeds 10 days.

### *Transmission*

1.19 The saliva of animals may be infectious for three to five days (exceptionally up to two weeks, or up to 29 days in foxes) before frank clinical signs appear. Saliva remains infectious until the animal dies, but viral excretion in the saliva may be intermittent.

## **Rabies in Humans**

### *Epidemiology*

1.20 The WHO World Survey of Rabies for the year 1997 reported that, worldwide, the number of human rabies deaths is estimated to be between 35,000 and 50,000 annually<sup>(2)</sup>. The highest numbers are reported from Asia, and particularly from India.

1.21 Cases of human rabies are relatively rare in countries with ready access to post-exposure immunisation and wound treatment. The 1997 WHO Survey indicated that in Europe alone some 50,742 individuals were given rabies prophylaxis in 1997 following exposure to domestic or wild animals<sup>(2)</sup>. Thirteen human deaths from rabies were recorded during the same period, with 10 of these occurring in the Russian Federation.

### *Rabies in humans in the United Kingdom*

1.22 The last human death from indigenous rabies in Great Britain was in 1902. Deaths continue to occur from time to time in people infected by rabid animals abroad. Such instances are, however, rare; 20 deaths have been reported since 1946. None had received post-exposure prophylactic treatment. The last of these was in October 1996. A 19 year old man died in a London hospital having returned three weeks previously from Nigeria where he had been bitten on the ankle by a stray dog.

1.23 A considerable number of people, however, present for medical advice on their return to Great Britain with a history of exposure to an animal abroad. In 1997, 472 individuals referred to the Central Public Health Laboratory (CPHL) received post-exposure vaccine with or without specific immunoglobulin, mainly following dog bites in rabies-endemic countries. In Northern Ireland, on average, one person per year seeks post-exposure vaccine.

### *Transmission*

1.24 People are exposed to rabies when they come into physical contact with the rabies virus. However, not all exposures to rabid animals lead to infection, and according to Hattwick & Gregg<sup>(3)</sup>, not all those infected develop the disease.

1.25 Dog and cat bites are the main source of infection in humans. Although an animal bite with virus-containing saliva is the usual mode of infection in man, transmission of the virus can also occur through mucous membranes though not, as far as is known, through intact skin.

1.26 Airborne transmission of infection is thought to have occurred in two men who inhaled virus aerosols generated in caves inhabited by rabid bats and in a laboratory worker who became infected while rabid sheep brains were being ground for vaccine production<sup>(4)</sup>.

1.27 Accidental transmission of rabies by tissue transplant has been reported from France, Iran, the USA and Thailand, but has not occurred in Great Britain. Seven patients are known to have received corneal transplants from patients who died of unsuspected paralytic rabies. Six of the seven patients developed rabies with an incubation period between 22 and 39 days<sup>(5)</sup>. The seventh patient had her corneal transplant just before the donor's diagnosis was made; she received post-exposure rabies immunoglobulin and vaccination and remained well.

### *Clinical characteristics*

1.28 The incubation period of the disease in man is generally two to eight weeks, but may range between nine days and two years or more. The period tends to be shorter for bites to the face and neck than for bites to the legs.

1.29 The onset of illness is insidious. A history of animal bite or other exposure is important, but is not always obtained. Early symptoms may include paraesthesia around the bitten area. Fever, headache, nausea and a sense of apprehension have also been described. The disease may then present with spasms in response to tactile, auditory, visual or olfactory stimuli, or with hydrophobia, intermittent episodes of excitement, hallucinations and maniacal behaviour, progressing to paralysis and coma, or as an ascending flaccid paralysis with sphincter involvement and sensory disturbances<sup>(6)</sup>. Death resulting from respiratory and bulbar paralysis is almost inevitable once clinical symptoms have appeared.

1.30 The disease has to be differentiated from tetanus, hysteria, bulbar poliomyelitis, Guillain-Barre syndrome and other causes of ascending paralysis. Since imported cases have been noted in rabies-free countries, WHO recommends that it is included in the differential diagnosis of all those who present with neurological signs.

## CHAPTER 2

### Prevention of Rabies in Humans

#### Pre-exposure (prophylactic) immunisation

2.1 Pre-exposure immunisation with human diploid cell rabies vaccine (HDCV) should be offered to the following groups of people:

#### People who should be offered pre-exposure immunisation

- Laboratory workers handling the virus.
- Those who in the course of their work may be at risk of exposure to infection due to the regular handling of imported animals that may not have completed quarantine or where appropriate, have not fulfilled the requirements of the Pet Travel Scheme e.g.
  - at animal quarantine centres;
  - at zoos;
  - at research and acclimatization centres where primates and other imported animals are housed;
  - at ports, e.g. certain Customs and Excise Officers and DARD Portal inspectors;
  - carrying agents authorized to carry imported animals.
- Veterinary, scientific and technical staff in the DARD Veterinary Service and Science Division.
- Officers appointed by district councils under the Dogs (Northern Ireland) Order 1981. Inspectors appointed by local authorities under the Animal Health Act 1983.
- Licensed bat handlers.
- Workers in enzootic areas abroad, who by the nature of their work are at special risk of contact with rabid animals (e.g. veterinary staff or zoologists).
- Health workers who are likely to come into close contact with a patient with rabies.

2.2 The vaccine currently in use (HDCV) is a freeze-dried suspension of Wistar rabies virus strain PM/WI 38 1503-3M cultured in human diploid cells and inactivated by beta-propiolactone. The potency of the reconstituted vaccine is not less than 2.5 International Units per 1 ml dose. It contains traces of neomycin. Details on vaccine use for pre-exposure prophylaxis can be found in **Appendix 2**.

### *Adverse reactions*

- 2.3 HDCV may cause local reactions such as redness, swelling or pain at the site of injection within 48 hours of administration. Systemic reactions such as headache, fever, muscle aches, vomiting, and urticarial rashes have been reported. Anaphylactic shock has been reported from the USA and Guillain-Barre syndrome from Norway. Reactions may become more severe with repeated doses. It contains traces of neomycin. Suspected adverse reactions should be reported to the Committee on Safety of Medicines using the yellow card system.

### *Contraindications*

- 2.4 There are no absolute contraindications to HDCV, but if there is evidence of hypersensitivity, subsequent doses should not be given except for necessary post exposure treatment.
- 2.5 Pre-exposure vaccine should only be given to pregnant women if the risk of exposure to rabies is high.

### **Advice to Travellers Abroad**

- 2.6 Pre-exposure immunisation is also recommended for those living or travelling in enzootic areas who may be exposed to unusual risk of being infected or are undertaking especially long journeys in remote parts where medical treatment may not be immediately available. More detailed country by country advice is contained in the UK Health Departments' book 'Health Information for Overseas Travel'<sup>(7)</sup>.
- 2.7 Directors of Public Health should ensure that local travel health advice and literature cover the prevention of rabies. Travellers going to areas where rabies exists should avoid unnecessary contact with animals.
- 2.8 If they are bitten or scratched by an animal while abroad, immediate attention to the wound is essential and the actions in the table below should be taken.

## **Action if bitten or scratched by an animal: information for patients and those providing initial medical care**

### **Immediate first aid**

- Wash the wound at once under a running tap for 5 minutes with soap or a detergent such as those quaternary ammonium compounds which have a proven lethal effect on rabies virus, e.g. Cetrimide solution 0.1% BPC. Primary suture and scrubbing should be avoided if possible.
- Apply 40-70% alcohol or iodine and cover with a simple dressing.
- Do not apply substances of unknown potential to wounds that could, for example, destroy immune response.
- Antibiotics and specific tetanus prophylaxis should be given if necessary.
- The full post exposure immunisation schedules can be found in **Appendix 3**.

### **Medical Assistance**

- If post-exposure treatment is advised it should be started immediately; if the animal is wild or a stray and observation is impossible, the doctor will know if rabies occurs in the locality and if immunisation is advised.
- In the case of difficulty contact the nearest British Consular official.
- Report the incident to the local police, particularly if the animal is a stray.
- On return to the UK, if travelling through Heathrow or Gatwick Airports consult the Duty Port Medical Officer at the Health Control Unit; otherwise seek medical advice as soon as possible. This will normally be through your general practitioner.

### **Contact Details**

- Where possible, exchange names, addresses and telephone numbers with the owner or person in charge of the animal. For cats and dogs, arrange to be told if the animal sickens within 10 days. Ask whether the animal has been vaccinated against rabies and if possible find out when and where.

## **Post-exposure treatment**

2.9 When exposure to rabies has occurred, human cases and deaths can usually be prevented by prompt and appropriate post-exposure treatment. This will be required even when pre-exposure immunisation has been given. Post –exposure treatment includes treatment of the wound and specific treatment with rabies vaccine and sometimes also human rabies-specific immunoglobulin (at site of wound and by intramuscular injection). Where post-exposure treatment is indicated, this should be started at once.

### *Specific treatment*

2.10 Specific treatment aims to achieve protective levels of local and circulating antibodies as soon as possible, to prevent the development of clinical disease. Treatment depends on the immune status of the individual, the risk of the animal being rabid and the site and severity of the bite. In general, people who are already fully immunised require two booster doses of vaccine, while those who have not been fully immunised before require five doses of vaccine. They may also need human rabies-specific immunoglobulin to give immediate (passive) protection while (active) immunity from the vaccine develops. The full schedules can be found in **Appendix 3**.

2.11 Detailed advice on measures to be taken and on the use of rabies vaccine and immunoglobulin may be obtained from the Virus Reference Division of the Central Public Health Laboratory\* (Tel: 020 8200 4400; email [infections@hpa.org.uk](mailto:infections@hpa.org.uk)) where stocks of these agents are held for post-exposure use (see **Appendix 4**). In Northern Ireland, advice can be obtained from the Northern Ireland Public Health Laboratory (Tel: 028 90263588) where stocks of these agents are held for post-exposure use.

\*Now the Health Protection Agency (HPA) Centre for Infections

2.12 Answers to the following questions are needed to determine the correct schedule of rabies prophylaxis for a patient who has suffered an animal bite or other potential exposure.

**Ten questions to ask the patient**

1. Was the person bitten or licked on an open wound or mucous membranes by an animal?
2. Where on the body was the bite / lick?
3. Where did the incident take place and on what date?
4. What species was the animal?
5. Is rabies known or suspected to be present:
  - (a) in the species?
  - (b) in the area?
6. Is there an owner known and contactable?
7.
  - (i) Was the animal behaving normally at the time?
  - (ii) Had it been vaccinated?
  - (iii) Is the animal being held under observation?
8. If the animal was a dog or cat did it become ill while under observation for the following 15 days?
9. If the animal has died, does laboratory examination of the animal's brain confirm rabies?
10. Has the bitten person previously received rabies vaccine? How much does the person weigh? (relevant HRIG dosage)

2.13 Where rabies is enzootic or where an epizootic of rabies occurs, post-exposure treatment is usually begun as soon as a person reports a bite by an animal suspected of having rabies. Even where the animal appears healthy and is kept under observation it will usually be prudent to start post-exposure treatment, and to continue it until the state of health of the animal is assured at least 10 days after the bite. (The terms enzootic and epizootic are applied to disease in the animal population in the same way that the terms endemic and epidemic are applied to disease in man).

2.14 When travellers returning to this country report an exposure to an animal abroad, it will usually be advisable to start treatment and, where possible, ascertain the health of the biting animal. Treatment can be stopped if the animal is confirmed as remaining well. If necessary, the Medical and Allied Services of DHSSPS (Tel: 028 90520658 or out of hours, 028 90520500), may be able to assist in making enquiries of foreign health authorities regarding the health of the animal involved in an incident. Relevant particulars, such as the date of the incident, the location where the incident occurred, the species and description of the animal involved and the name, address and telephone number of the owner of the animal are needed to enable the animal concerned to be identified and traced.

2.15 The possibility of contracting rabies from an animal bite in the UK is extremely remote. There have been no such cases for almost 100 years. Those treating animal bites in this country should enquire about possible exposures to rabies. However, a definite possibility of exposure to rabies must be established before specific prophylaxis is recommended. An important consideration would be knowledge that the biting animal was in, or had recently been released from quarantine or had been imported illegally.

2.16 Where suspicion exists, the medical practitioner should contact the local Consultant in Communicable Disease Control (CCDC) who can obtain further information on the extent of the risk in the particular instance from the Divisional Veterinary Officer. Contact details can be obtained from Department of Agriculture and Rural Development (DARD). More details on public health measures can be found in Chapter 4.

## CHAPTER 3

### Management of a patient with rabies

#### Treatment and care

3.1 If started early, the post-exposure treatment described in chapter 2 and **Appendix 3** can be expected to prevent rabies. Once clinical symptoms and signs of rabies appear, treatment is ineffective. Although human rabies is almost invariably fatal, a few instances of recovery have been recorded. In spite of the poor prognosis, patients should be given full supportive care.

3.2 When treating a patient with rabies it should be borne in mind that patients remain conscious, often aware of their illness, and are usually extremely agitated, particularly when excitation is predominant. They should be sedated with an appropriate tranquilliser.

#### Protection of health care professionals

3.3 Rabies virus is a biological agent to which the Control of Substances Hazardous to Health (COSHH) Regulations (Northern Ireland) 2000 apply<sup>(8)</sup>. It is classified as a hazard group 3 biological agent<sup>(9)</sup>. Detailed guidance on the application of the COSHH Regulations in respect to agents is given in the Control of Biological Agents Approved Code of Practice (ACOP) 2000 and the General COSHH ACOP 2000, schedule 3 of which is particularly relevant<sup>(8)</sup>. The COSHH Regulations require assessments to be done on the risks to health from work activities and prevention of exposure to risks, or adequate control measures if prevention is not possible. All health care workers should be provided with information, instruction and training about the risks of rabies exposure and the precautions to be taken if they are likely to be exposed to the rabies virus.

3.4 Rabies transmission from person to person has never been documented, other than by corneal graft. As secretions do contain the virus (rabies virus may be present in the patient's saliva, tears, urine, CSF and tracheal aspirates for at least two weeks after onset of symptoms), transmission is theoretically possible.

3.5 The number of persons attending the patient should be kept to a minimum. Nursing and medical staff should be informed of the potential risks (especially during intensive care) and must be offered pre-exposure immunisation. Four intradermal injections of 0.1 ml of human diploid cell vaccine, each given into a different limb on the same day (i.e. 0.4 ml in all) has been suggested for this purpose<sup>(6)</sup>. Intradermal immunisation is reliable only if the whole of the 0.1 ml dose is properly given into the dermis and should only be performed by those experienced in the technique. (The use of the intradermal route is also on the doctor's own responsibility as it is not covered by the manufacturer's product licence.)

3.6 Nursing and medical staff should also be provided with suitable personal protective equipment, including gloves, gowns and face visors. Surgical masks do not provide the required level of protection against micro-organisms and are inappropriate in these circumstances.

3.7 If contamination does occur through skin or mucous membranes, the staff should receive post-exposure prophylaxis. Staff with cuts or abrasions on their hands should not be allowed in contact with the patient.

### **Diagnostic methods**

3.8 Each case should be discussed with staff in the laboratory first so that appropriate specimens are obtained and transported correctly. Specimens should be transported to the Virus Reference Division, HPA Centre for Infections, Colindale (Telephone 020 8200 4400; email [infections@hpa.org.uk](mailto:infections@hpa.org.uk)) who should be notified prior to despatch, and who will advise on the most appropriate method of transport. See **Appendix 5**.

3.9 Animal samples should be submitted to the Veterinary Laboratory Agency, Weybridge, following consultation with the Veterinary Service, DARD, (Tel: 028 90524580)

3.10 Diagnosis before death is difficult and negative results do not exclude rabies infection. Current diagnostic methods for both human and animal cases are shown in the boxes over the page.

**Diagnostic methods: *Ante-mortem***

- There are currently no reliable *ante-mortem* diagnostic methods. Diagnosis before death is often based on case history and clinical findings rather than test results as virus detection is difficult and negative results do not exclude rabies infection.
- Viral antigen may be detected by FAT (Fluorescent Antibody Testing) in corneal smears or skin biopsies. However, FAT positive specimens are more common during the final stages of the disease. Skin biopsies are usually taken from the nuchal area of the neck with hair follicles containing peripheral nerves. Corneal impressions (never scrapings) are taken from patients with encephalitis by lightly touching the central part of the cornea with a microscope slide. Corneal impressions and skin biopsies should be refrigerated immediately after collection.
- The sensitivity of FAT for *ante-mortem* diagnosis is nevertheless limited, although the overall sensitivity of FAT is higher with skin biopsies than with corneal impressions.
- Rabies virus may be isolated from saliva, cerebrospinal and other fluids. However, the virus may be absent from biopsies, saliva or CSF (cerebrospinal fluid) during the late stages of the disease, presumably due to the presence of neutralising antibodies.
- RT-PCR (Reverse-transcriptase Polymerase Chain Reaction) is the most sensitive test and is increasingly being used by expert laboratories to detect the rabies viral genome in animal and human samples. Indeed it has successfully demonstrated the presence of rabies viral RNA in the saliva of infected humans. Preliminary results are normally available within two days of receipt of samples. Further investigation by DNA sequencing may be used to confirm RT-PCR diagnosis and genotype the virus.
- The CSF and/or blood should be tested for rabies antibodies as their presence in an unvaccinated patient suggests a positive diagnosis.

**Diagnostic methods: *Post-mortem***

- FAT on impression smears from the cerebellum, medulla and hippocampus is the most widely used test (but may give false-negative results on degraded samples) and the result should be available within 24 hours of the receipt of the specimens.
- The RTCIT (Rabies Tissue Culture Inhibition Test) is also a routine test using highly susceptible neuroblastoma cell culture which produces results within 4 days.
- Although histological diagnosis is not routinely used, material may be reserved for archives.
- With human samples, RT-PCR would normally be applied to and the MIT (Mouse Inoculation Test) may be used in addition to the RTCIT, with results after 21 days of incubation.

## Laboratory practice

3.11 All work involving the handling of rabies virus has to be carried out under licence by the UK Agriculture Departments in MAFF Containment Level 4 facilities. Diagnostic tests and clinical laboratory investigations on suspect or confirmed patients should be carried out at COSHH Containment Level 2 or 3; the level will be dependant on the strength of suspicion of rabies (see paragraphs 8(4)d and e of Schedule 3 of General COSHH ACOP 2000).

3.12 Diagnostic specimens from patients suspected or confirmed to have rabies should be handled with the appropriate precautions. Specimens should be correctly labelled, packed and stored. It should be noted that specimens from animals must only be submitted according to MAFF veterinary investigation procedures.

3.13 Centrifugation should be carried out in sealed buckets. Safe disposal of specimens and decontamination of any equipment used or areas potentially contaminated should be in accordance with the General COSHH ACOP 2000, and the guidance on clinical waste disposal in **Appendix 6**.

3.14 Movement of rabies virus, other than in material for diagnostic purposes only, requires prior notification to the Health and Safety Executive (HSE). Specimens for virological and antibody testing must not be sent by post, as rabies is a biological agent to which the COSHH Regulations (Northern Ireland) 2000<sup>(8)</sup>, the Carriage of Dangerous Goods (Classification, Packaging and Labelling) and the Use of Transportable Pressure Receptacles Regulations (Northern Ireland) 1997 apply. See **Appendix 5**.

3.15 Pre-exposure immunisation is indicated for those who work with the virus. Details can be found in Chapter 2.

## Disinfection

3.16 The rabies virus is not particularly resistant and is readily inactivated by sunlight, heat and desiccation. Objects that are soiled by infective or potentially infective secretions or excretions may be disinfected by boiling or autoclaving. Where heat cannot be used, detergents or chemical disinfectants may be used. Substances for possible use in environmental disinfection include 3% caustic soda and commercial preparations of organic phenols, iodine, and a mixture of trisodium phosphate and sodium hypochlorite.

3.17 Normal disinfection procedures can be applied for spillages of potentially infective material, e.g. disinfectants containing 10,000 ppm of available chlorine are recommended for spillages. The use of sodium

dichloroisocyanurate (NaDCC) granules is also generally recommended for clinical waste spillages because made up solutions lose activity with time and require regular replacement<sup>(10)</sup>.

3.18 Spilled waste and any absorbent material used must be placed in a clinical waste container for disposal.

### **Clinical waste**

3.19 For clinical waste procedures please see **Appendix 6**.

### **Post mortem examination**

3.20 Exposure to biological agents should be prevented where reasonably practicable. Therefore post mortems should only be performed when absolutely necessary and when diagnosis cannot be made by any other means. A sequential approach is essential in making a diagnosis whereby less hazardous procedures are carried out first to avoid unnecessary risk of exposure.

3.21 When a post mortem is necessary, reference should be made to the precautions outlined in paragraphs 3.3 – 3.7, and staff performing a post mortem are strongly advised to be immunised before exposure. If required, a booster dose should be given at the appropriate time to ensure the staff member is fully protected.

3.22 Post-mortem examinations should only be performed in mortuaries with appropriate physical containment features, following HSAC (Health Services Advisory Committee) guidance on safe working in the post mortem room<sup>(11)</sup>. It will be necessary to have procedures in place for appropriate disinfection of the facilities used and the sterilisation of contaminated equipment.

### **Disposal of corpses**

3.23 The risk of infection from the body of a person who has died from rabies is considered to be low. Even so, the bodies of those known or suspected to be infected with rabies should not be embalmed. Embalming carries significant risk to the operator as sharp instruments need to be used and a substantial amount of blood is drawn. Training and adherence to agreed protocols for safe procedure are essential. Where ritual washing of the body has to be undertaken, a quaternary ammonium compound, e.g. Cetrimide solution 0.1% BPC, should be used.

## CHAPTER 4

### Public Health Action

#### Responsibility

4.1 Consultants in Communicable Disease Control (CCDCs), are responsible for leading the local public health response to known or suspected cases of human or animal rabies.

#### Planning

4.2 CCDCs and district councils should work together to prepare joint contingency plans for the control of rabies and work out details of local liaison with those concerned. This should include involvement with local veterinary services.

4.3 Rabies is a notifiable disease under the Public Health Notifiable Diseases Order (Northern Ireland) 1990. The CCDC should ensure that all local doctors are aware that they must inform their CCDC immediately by telephone if one of their patients is suspected to be suffering from rabies.

#### Incident control team

##### *When to form a team*

4.4 The CCDC should form an incident control team when there is a suspected or confirmed case of human or animal rabies.

##### *Who to include on the team*

4.5 The incident control team should seek support from the Regional Epidemiologist and Communicable Disease Surveillance Centre Northern Ireland (CDSC (NI)).

4.6 The incident control team should include expert representatives from veterinary and human health agencies. When there is a suspected or confirmed case of rabies in an animal in Northern Ireland, the Veterinary Service DARD should be represented on the incident control team.

##### *Actions for the incident control team*

4.7 The incident control team, with the CCDC in the lead, should implement an action plan as follows, adapted in accordance with local needs.

### **To provide appropriate care of the patient**

- Ensure that the patient is admitted, if necessary, to an appropriate infectious disease unit.
- Ensure that the clinician responsible is familiar with the contents of **Appendix 3** of this Memorandum.

### **To protect contacts of human or animal cases of rabies**

- Assess the risk of rabies in people who have been exposed a suspected or confirmed case of human or animal rabies.
- Co-ordinate rabies post-exposure treatment for those at risk of infection, and to ensure that appropriate prophylactic immunisation is given to contacts of a suspected or confirmed case of human or animal rabies.
- Where there is a suspected or confirmed case of human rabies, offer prophylactic immunisation to the patient's intimate home contacts. Other contacts only need be offered prophylaxis if they have been in direct contact with the patient's body fluids since the onset of symptoms.
- When there is a suspected or confirmed human case of rabies, arrange for the disinfection of soiled articles contaminated in the domestic setting by the patient before they were admitted to hospital. Boiling, autoclaving or thorough washing with soap solution or detergent will inactivate the virus. Soft furnishings that may be contaminated and which cannot be heat-treated may be washed or dry-cleaned.
- Where premises have been declared an infected place under the Rabies Control Order, arrange for disinfection of the premises to be carried out to the satisfaction of the VSD staff DARD by the owner of the premises or in their default, by the district council.

### ***To communicate with others***

- Consult the Northern Ireland Public Health Laboratory (Tel: 028 90 263588) and Virus Reference Division of the HPA Centre for Infections (Tel: 020 8200 4400; email [infections@hpa.org.uk](mailto:infections@hpa.org.uk)), to make arrangements to secure supplies of rabies vaccine and immunoglobulin.
- Liaise with appropriate local health and veterinary services.
- Inform all general medical practitioners, medical directors of all Trusts and the Accident and Emergency Departments in their area for appropriate cascade according to local plans.
- Inform the DHSSPS (Tel: 028 90520658) so that the CMO or DCMO can be immediately notified.
- Liaise with CDSC (NI) (Tel 028 90263765) who will liaise with the DHSSPS in ensuring appropriate communications in the UK and internationally.
- Co-ordinate a response to media and public enquiries.

### ***When there is a suspected or confirmed animal case of rabies***

- Ensure that the appropriate Divisional Veterinary Officer and the DHSSPS are informed of the circumstances of the case as a matter of urgency.
- Liaise as necessary with DARD, in the event of an infected area being declared.

## **Veterinary action when there is a suspect case of animal rabies in this country**

4.8 The control of an outbreak of rabies involving animal cases and human contacts requires the concerted efforts of animal and human health services working in close liaison. Further details can be found in **Appendix 7**.

4.9 Rabies in animals is a notifiable disease under of the Rabies (Control) Order (Northern Ireland) 1977. Known or suspected cases of animal rabies must be notified to a Divisional Veterinary Officer (DVO) or to the police. The DVO should inform the CCDC of any case of suspected or confirmed rabies in animals in the district, even where there has been no known human exposure.

## **Diagnosis of animal suspected of having rabies**

4.10 Where there is a reasonable suspicion of rabies, i.e. the presence of clinical symptoms, in an animal that has bitten or scratched a person, via the Veterinary Service (DARD) may arrange for the destruction of the animal and submission to the Veterinary Laboratories Agency at Weybridge for diagnostic examination of the brain.

4.11 Where there is no human exposure the animal concerned is normally isolated for observation in secure accommodation. A dog or cat may be detained for up to 15 days following the onset of clinical symptoms during which time it is inspected regularly by a veterinary surgeon. If it survives this period in reasonable health, then rabies is eliminated as a diagnosis. If it dies, the head and neck are submitted for diagnostic examination of the brain (see paragraph 3.9).

### **Rabies on farms**

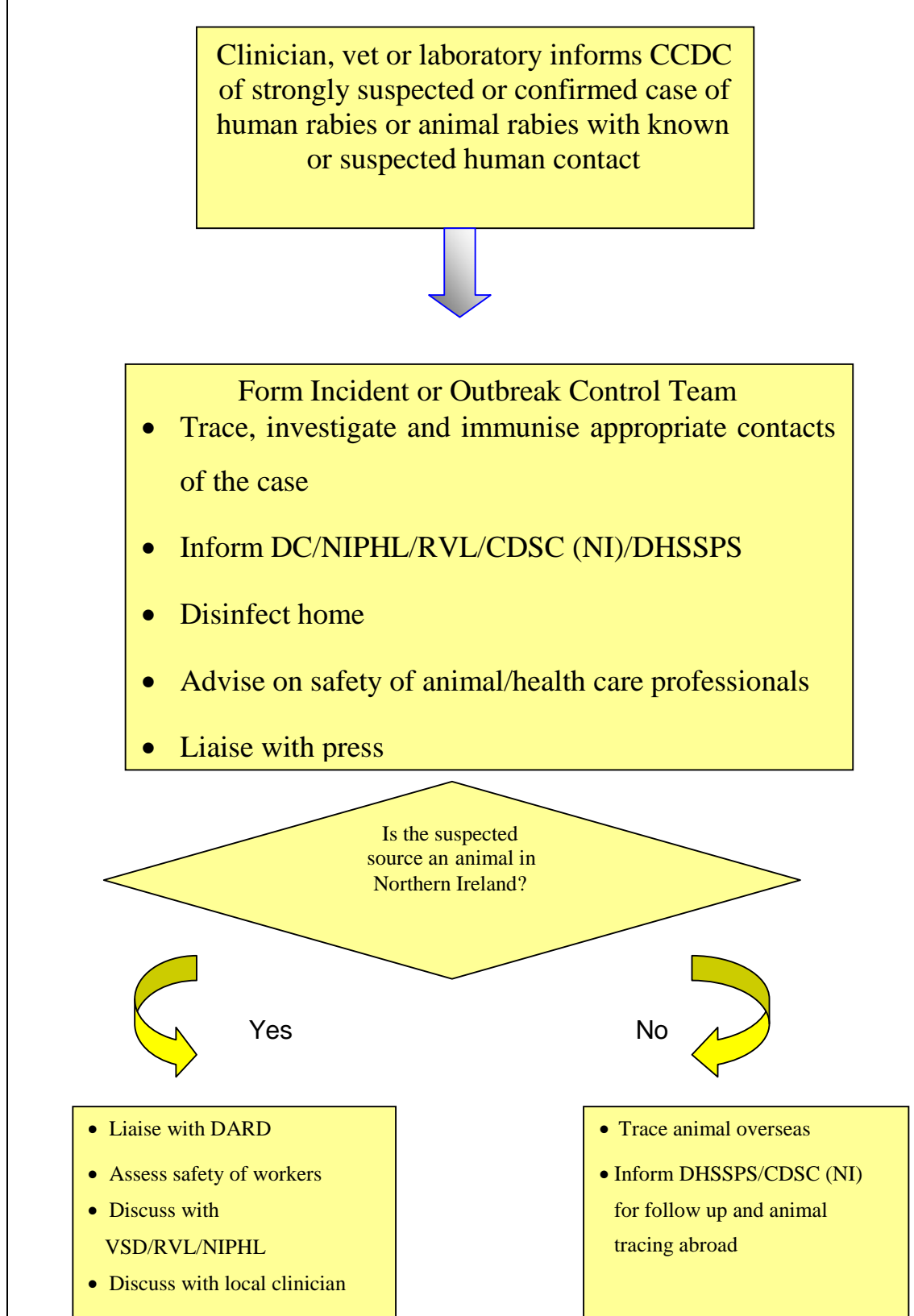
4.12 Where a suspected or known rabid animal is found on a farm, attention will have to be given to the disposal of farm products from both suspect and contact animals. Primary responsibility rests with the Veterinary Service (DARD). Disposal of milk from suspected or affected animals must be in accordance with the terms of the licence issued by a Veterinary Inspector.

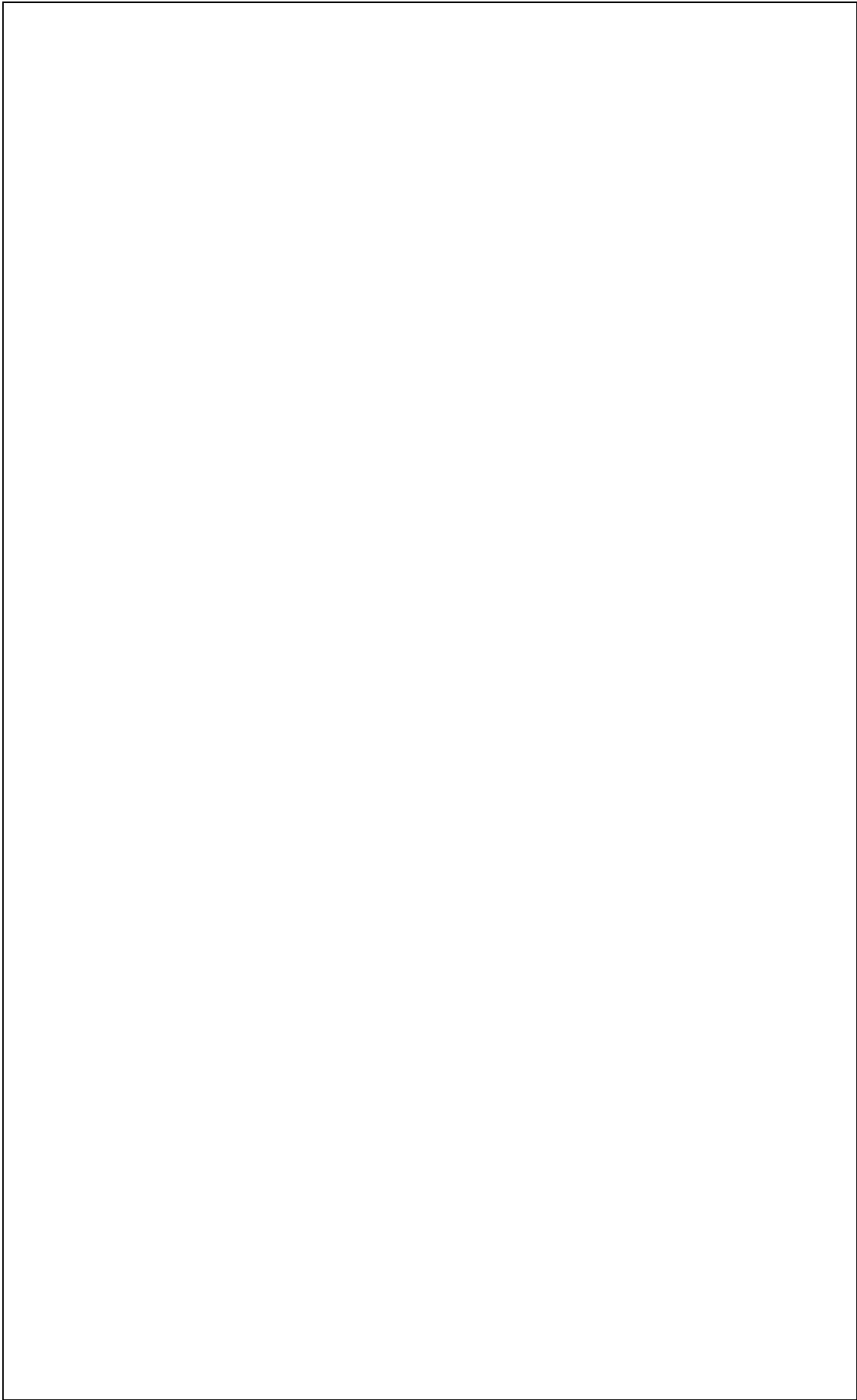
4.13 The CCDC may also be called upon, particularly where farm animals are involved, to advise the Veterinary Service (DARD) on the extent of human risk in allowing contact animals to remain in detention and isolation on farm premises. Persons who are likely to come into contact with such animals should be made aware of the potential hazards and should be offered pre-exposure prophylactic vaccination.

### **Flowchart**

4.14 Figure 1 outlines the steps to be taken by the CCDC in the event of a suspected or confirmed case of animal or human rabies. [CCDC – Consultant in Communicable Disease Control, DC – district council, RVL – Regional Virus Laboratory, NIPHL – Northern Ireland Public Health Laboratory, DARD – Department of Agriculture and Rural Development, VSD – Veterinary Sciences Division, CDSC (NI) – Communicable Disease Surveillance Centre (Northern Ireland), DHSSPS - Department of Health, Social Services and Public Safety.]

**Figure 1: Local public health control of rabies incident**





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## APPENDIX 1

### GOVERNMENT POLICY, LEGISLATION & PETS

#### Government Policy

1. To counter the threat of rabies the Government has the following policy:
  - (a) *The primary aim:* to keep rabies out of Great Britain by means of stringent import controls, with strict penalties for offenders. Controls involve compulsory quarantine for six months, unless an exemption is made under the 'Balai arrangements' or the Pet Travel Scheme.
  1. *b) The contingency aim:* should an outbreak nevertheless occur, to prevent it becoming established in wildlife by containing it, and eradicating it swiftly and effectively.
2. Until recently the Government policy required, as a general rule, all rabies susceptible mammals (excluding farm stock and some herbivores not considered significant vectors of the disease) entering Great Britain to have a licence and be subject to six months quarantine. Animals coming from Northern Ireland, the Republic of Ireland, the Channel Islands and the Isle of Man were exempt.
3. Since the Waterhouse review of rabies policy in 1970 there have been a number of scientific advances. These have included developments in our understanding of vaccination and the rabies virus, in our ability to blood test for immunity and advances in microchip technology and the electronic identification of animals.
4. These prompted a reconsideration of the quarantine system. The independent Advisory Group on Quarantine, chaired by Professor Kennedy, concluded in its report (MAFF, 1998) that there would be no significant increase in the risk of importing rabies if the quarantining of certain animals from certain qualifying countries (including western Europe) was replaced by a system based on microchip identification, vaccination with blood testing, and certification. This was provided that there was a high level of compliance with these equivalent safeguards.

5. The Pet Travel Scheme (PETS) commenced on 28 February 2000, initially as a pilot. PETS allows exemption from quarantine for those animals that satisfy its conditions. Under the pilot scheme only pet cats and dogs from Western Europe are eligible, but in the future consideration will be given to extending the scheme to additional species, and further qualifying countries. The pilot will allow the requirements of the Scheme to be tested and evaluated.
6. Commercially traded cats and dogs can be exempted from quarantine if they comply with the EC's 'Balai arrangements' (in Council Directive 92/65/EC), transposed into law in the United Kingdom.
7. Rabies susceptible mammals that do not qualify under either of the latter two arrangements, or which fail to meet their conditions, are still subject to the licence and quarantine requirements.
8. Pet animals travelling within the British Islands and the Republic of Ireland will continue to be able to do so without restriction.

## **Legislation**

9. The current rabies legislation is as follows:
  - The Diseases of Animals (Northern Ireland) Order 1981
  - The Rabies (Importation of Dogs, Cats and Other Mammals) (Northern Ireland) Order 1977, amended in 2000.
  - The Rabies (Control) Order (Northern Ireland) 1977 - measures to be brought into operation should an outbreak occur.
10. Further legislation will be brought forward in due course to provide for implementation of the full Pets Travel Scheme in Northern Ireland.

## **Quarantine**

11. The requirements for animals to be quarantined are principally laid out in the Rabies (Importation of Dogs, Cats and Other Mammals) Order (Northern Ireland) 1977. All mammals are covered, except farm stock and some herbivores which are not considered significant vectors of the disease. These exceptions can be subject to controls if they have been in contact with species subject to quarantine regulations. However, they are themselves subject to other animal health import controls which provide safeguards against rabies.

12. The main provisions are as follows:

- a) Bringing in an animal from countries other than Great Britain, the Channel Islands, the Isle of Man or the Republic of Ireland (including ones exported and brought back) is prohibited except in accordance with the terms of a licence issued in advance (except for those animals entering under the Pet Travel Scheme or the Balai arrangements - see below).
- b) This prohibition does not apply to animals brought from Great Britain, the Channel Island, the Isle of Man or the Republic of Ireland, unless the animal had been brought to those countries from elsewhere and had not undergone at least six months' quarantine, if it was required, before entering these countries.
- c) Licensed landings are permitted only at authorised ports and airports, other than in exceptional circumstances. Licensed animals must be moved to quarantine premises by an authorised carrying agent.
- d) Animals imported under licence must be detained in quarantine for six months (life in the case of vampire bats), at the owner's expense. Quarantine may be extended in the case of a rabies outbreak at the quarantine premises.
- e) Vaccination against rabies of dogs and cats in quarantine is compulsory, unless the animal has been imported for research purposes with which the vaccination might interfere.
- f) There are equivalent provisions in respect of animals transshipping Northern Ireland, or animals on vessels which dock here.
- g) Animals which contravene or fail to comply with these provisions may be seized.

13. Quarantine premises and their veterinary supervisors are subject to statutory standards and procedures relating to disease security. These are inspected by government veterinary officers to ensure that the requirements are met.

### **The Balai Arrangements**

14. Under Council Directive 92/65/EC (the so-called 'Balai Arrangements') implemented into law in the United Kingdom in 1994, commercially traded cats and dogs from the EU can enter the United Kingdom without quarantine where they meet certain requirements. These include that the animals:

- a) are the subject of a commercial transaction,
- b) are individually identified with an implanted microchip,
- c) have been vaccinated against rabies with an inactivated vaccine (of at least one international antigenic unit) when at least three months of age and at least six months before export,
- d) have been blood tested after vaccination to show a satisfactory level of protection,

- e) are accompanied by a veterinary health certificate, and vaccination record, and show no signs of contagious disease,
  - f) have been born and remained on a registered holding of origin since birth with no contact with wild animals susceptible to rabies,
  - g) must be transported in a means of transport approved in the member state of origin.
15. Agriculture departments must be notified of the details of animal movement at least 24 hours in advance.

### **The Pet Travel Scheme (PETS)**

16. The Pet Travel Scheme enables certain pet animals to enter or re-enter the United Kingdom without quarantine, if they come from qualifying countries via designated routes, are carried by authorised transport companies, and meet the conditions of the scheme.

17. The pilot scheme commences on 28 February 2000 and is restricted to pet cats and dogs from western European countries (plus assistance dogs from Australasia). A pet must not have been to a non-qualifying country in the six months before entry to the UK. The person bringing in an animal will be asked to sign a declaration that the pet complies with this requirement. In the following order these animals must:

- a) be fitted with a microchip,
- b) be vaccinated against rabies using an inactivated vaccine authorised for use in the qualifying country in which the animal is resident,
- c) be blood tested, and the test performed at a laboratory recognised by MAFF. The blood test result must show that the vaccine has given a satisfactory level of protection against rabies. An animal will not be able to enter the UK until six months from the date that the blood sample, which gave a successful test result, was taken.
- d) be accompanied by an official certificate certifying that the above requirements have been met. A government-authorised veterinarian of the country concerned must issue the certificate.
- e) be treated before embarkation for the UK to prevent the spread of certain tapeworms and ticks, carried by cats and dogs, that are vectors for diseases that pose a threat to public health. The administering vet will issue a certificate to certify that this has been done.

18. The transport company bringing a pet animal to the UK will be required to check the microchip number of the pet and that its corresponding certification is in order before it is allowed to enter the British Isles. Before being authorised to carry pets to the UK, each company will have to enter into a

binding agreement with MAFF. This will specify, among other things, the facilities and procedures to be followed in checking pets and the number and level of training of staff.

19. Under the Pet Travel Scheme any animal that does not qualify may be brought to the UK only under the 1977 Order. A transport company can incur penalties for failure to check animals to the standard required in their authorisation to carry pets to the UK. These include the revocation of the authorisation.

## **Enforcement**

### *Enforcement Procedures*

20. The Department of Agriculture and Rural Development is the principal enforcement authority in Northern Ireland.

### *Penalties and Prosecutions*

21. Offences under the Rabies (Importation of Dogs, Cats and Other Mammals)(Northern Ireland) Order 1977 can be dealt with under summary proceedings, where the maximum penalty is a fine of £5,000. Where there is evidence of deliberate intent to evade the provisions indictment can result, in which case the maximum penalty is an unlimited fine and/or up to one year's imprisonment. In addition, the animal may be re-exported, licensed to quarantine, or destroyed at the discretion of the enforcing authority, though the latter is not intended to be a punitive measure.

### *Commercial Transport Companies*

22. No transport company is permitted to accept animals for landing in the United Kingdom except under the Pet Travel Scheme or the Balai arrangements, or (if destined for quarantine) through authorised ports of entry and on production of a boarding pass, which shows that a licence has been issued. Carriers of animals imported under the Pet Travel Scheme must be specifically authorised to do so; this authorisation will specify the routes on which animals may travel.

### *Small Boats and Yachts*

23. The owner or captain of a small boat or yacht is required to sign a customs declaration form on arrival, and is informed of their obligations concerning the proper confinement of animals onboard while in port. There is publicity emphasising the danger from illegally imported animals, and to remind boat-owners about the quarantine restrictions. Animals landed from small boats and yachts are not eligible for the Pet Travel Scheme.

24. Customs and harbour masters are involved in surveillance, as are the police and local authorities, as well as the public.

### *Oil Rigs*

25. Rabies susceptible animals landing on oil rigs are subject to the normal six months' quarantine requirement, whether or not they have come from outside territorial waters or have had contact with 'foreign' animals. They are not eligible for the Pet Travel Scheme.

### *Information and Publicity*

26. The Ministry of Agriculture, Fisheries and Food can be contacted for further information on quarantine procedures, including the Balai arrangements, and the Pet Travel Scheme:

Ministry of Agriculture, Fisheries and Food  
Animal Health (Disease Control) Division, Branch A  
1A Page Street,  
London  
SW1P 4PQ  
Tel: 020 7904 6000

27. In addition MAFF offers a telephone helpline service for enquiries about the Pet Travel Scheme, on **0870 241 1710**. There is also further information on MAFF's website, at <http://www.maff.gov.uk/animalh/quarantine/>

28. The Department of Agriculture and Rural Development can also be contacted for advice:

Department of Agriculture and Rural Development  
Dundonald House  
Upper Newtownards Road  
Belfast  
BT4 3SB  
Tel: 028 90524580

## APPENDIX 2

### NOTES ON HUMAN DIPLOID CELL VACCINE AND ITS USE FOR PRE-EXPOSURE PROPHYLAXIS

Rabies human diploid cell vaccine (HDCV) is a freeze-dried suspension of Wistar rabies virus strain PM/WI 38 1503-3M cultured in human diploid cells and inactivated by beta-propiolactone. It should be stored at 2 - 8<sup>0</sup>C and not frozen.

#### *Reconstitution of the vaccine*

The vaccine is issued by the manufacturer in single-dose vials accompanied by a disposable syringe containing 1.0 ml of diluent (distilled water). The vaccine should be reconstituted immediately before use. The entire amount of diluent is used and the resultant 1.0 ml of fluid represents one dose (except where administered intradermally). The potency of the reconstituted vaccine is not less than 2.5 International Units per 1 ml dose. Any unused vaccine must be discarded after one hour.

#### *Dosage schedule*

The recommended schedule for primary pre-exposure immunisation with HDCV is three doses of 1.0 ml given by deep subcutaneous or intramuscular injection in the deltoid region on days 0, 7 and 28. (The antibody response may be reduced if the gluteal region is used).

For travellers who are not animal handlers, two doses of 1.0 ml by deep subcutaneous or intramuscular injection four weeks apart can be expected to give immunity in 98% of recipients, and may be acceptable if post exposure treatment is likely to be readily available. For those at continued exposure a further dose should be given 6 - 12 months later.

### *Reinforcing doses*

Where post-exposure treatment is readily available, as in the UK, reinforcing doses are not required for individuals who have received three doses of vaccine unless exposure occurs (but see below). Otherwise, single reinforcing doses of vaccine should be given at two to three year intervals to those at continued risk, the interval to be reviewed after 2 - 3 reinforcing doses.

The three dose primary pre-exposure course produces protective antibody in virtually 100% of recipients and makes routine post-immunisation serological testing unnecessary. Serological testing is advised for those who work with live virus. They should have antibodies tested every six months and be given reinforcing doses of vaccine as necessary to maintain protective levels. Serological testing is otherwise only advised for those who have had a severe reaction to a previous dose of vaccine to confirm the necessity for a reinforcing dose.

### *Supplies*

HDCV for pre-exposure immunisation for those at occupational risk and is available from the NIPHL (Tel: 028 90263588). For others, it can be obtained through local pharmacies by private prescription.

## APPENDIX 3

### GUIDE TO POST-EXPOSURE TREATMENT

The recommendations given here cover most situations. It is recognised that in special situations modifications of the procedures laid down may be warranted. Such special situations include exposure of young children and other circumstances where a reliable history cannot be obtained, particularly in areas where rabies is known to be endemic, even though the animal is considered to be healthy at the time of exposure. In areas where rabies is endemic, adequate laboratory and field experience indicating that there is no infection in the species involved may justify local health authorities in recommending no specific anti-rabies treatment.

Treatment should be started as early as possible after exposure, but in no case should it be denied to exposed persons whatever time interval has elapsed.

#### **Treatment of wounds involving possible exposure to rabies**

##### *First-aid treatment*

Elimination of rabies virus from the site of infection is aided by immediate washing with soap or detergent, or if they are not available, water alone, under a running tap for at least 5 minutes. Then either 40-70% alcohol, tincture or aqueous solutions of iodine or quaternary ammonium compounds which have a proven lethal effect on rabies virus, e.g. Cetrimide solution 0.1% BPC, should be applied. In addition, a simple dressing should be applied.

##### *Please note:*

*Primary suture and scrubbing should be avoided if possible. This will cause further damage to the wound and possibly increases the risk of introduction of the virus to the nerves.*

*Where soap has been used to clean wounds, all traces of it should be removed before application of quaternary ammonium compounds because soap neutralizes the activity of such compounds.*

*Substances of unknown potential that may, for example, destroy the immune response should be avoided.*

*Treatment by or under the direction of a physician*

1. treat as above;
2. postpone suturing the wound;
3. where indicated, institute anti-tetanus procedures and administer antibiotics and drugs to control infections other than rabies.

### **Specific Treatment according to geographical location**

Subsequent treatment will depend on the risk of rabies in the country concerned and the immune status of the individual, but each incident has to be judged on its merit. Points to consider include whether the animal is indigenous (native) or not, its behaviour, the site and severity of the bite and whether the bite was provoked.

*Risk according to geographical location:*

1. **No Risk:** generally no rabies post-exposure prophylaxis needed.

The following countries are considered 'no risk' for terrestrial rabies (however for bat exposures, specialist advice should be sought):

**Europe:** *Cyprus, Faroe Is, Finland, Gibraltar, Greece, Iceland, Ireland, Italy (except the Northern & Eastern borders) Malta, Norway (mainland), Portugal, Mainland Spain (exc. N. African Coast), Sweden and the United Kingdom.*

**Americas:** *Anguilla, Antigua & Barbuda, Bahamas, Barbados, Bermuda, Cayman Is, Dominica, Guadeloupe, Jamaica, Martinique, Montserrat, Netherlands Antilles, St Christopher & Nevis, St Lucia, St Martins, St Pierre & Miquelon, St Vincent & The Grenadines, Turks & Caicos Is, and the Virgin Is.*

**Asia:** *Japan, Singapore, Taiwan.*

**Oceania:** *American Samoa, Australia, Belau, Cook Is, Federated states of Micronesia, Fiji, French Polynesia, Guam, Kiribati, New Caledonia, New Zealand, Niue, Northern Mariana Is, Papua New Guinea, Samoa, Solomon Is, Tonga, Vanuatu and Western Samoa.*

## 2. Low Risk: vaccine only required:

**Previously unimmunised or incompletely immunised individuals** should be given 5 doses of 1.0 ml HDCV on days 0, 3, 7, 14, and 30.

**Previously fully immunised individuals** (i.e. those who have had a three dose primary course of HDCV) should be given two doses of 1.0 ml HDCV, one on day 0 and one between days 3-7.

Vaccine must be given by deep subcutaneous or intramuscular injection into the deltoid region (not gluteal) or, in a child, the anterolateral aspect of the thigh.

The following countries are considered low risk:

*Belgium, Canada, Denmark, France, Germany, Luxembourg, Netherlands, Switzerland, USA.* (For bites within the USA, the Centre for Disease Control in Atlanta may be able to provide more information on the risk of rabies in different parts of the USA).

## 3. High Risk

**Previously unimmunised individuals should be given immunoglobulin (as well as vaccine) as follows:-**

(i) Immunoglobulin: human rabies-specific immunoglobulin 20iu/kg body weight, up to half the dose infiltrated in and around the wound after cleansing and the rest given by intramuscular injection. Human rabies immunoglobulin may cause local pain and low-grade fever but no serious adverse reactions have been reported.

(ii) Vaccine: 5 doses of 1.0ml HDCV by deep subcutaneous or intramuscular injection into the deltoid muscle (not the buttocks) or, in children, anterolateral thigh, one each on days 0, 3, 7, 14, and 30.

**Previously fully immunised individuals:**

Two doses of 1.0 ml HDCV given as above, the first on day 0 and the second between days 3-7. Immunoglobulin treatment is not usually needed.

Countries considered high risk are:

*Colombia, Ecuador, El Salvador, Guatemala, India, Parts of Mexico, Nepal, Pakistan, Peru, Philippines, Sri Lanka, Thailand, Turkey, Vietnam. Also most other countries in Asia, Africa and South America.*

**Up to date advice should be obtained from the CDSC (NI) or the Virus Reference Division, HPA Centre for Infections, Colindale, London, NW9 5HT, as the country by country risk groups may change (Tel: 0208 200 4400; [infections@hpa.org.uk](mailto:infections@hpa.org.uk)).**

## Specific treatment according to nature of exposure

### (a) Terrestrial animals

Nature of exposure	Status of biting animal (irrespective of previous vaccination)		Recommended treatment
	At time of exposure	During 15 days <sup>1</sup>	
I. Contact, including licks to intact skin (but with no lesions); indirect contact; no contact*.	Rabid	-	None.
II. Licks of the skin if there are scratches or abrasions; minor bites (covered areas of arms, trunk, and legs).	(a) Suspected as rabid	Healthy	Start vaccine**. Stop treatment if animal remains healthy for 15 days <sup>1</sup> .
	(b) Rabid; wild animal, or animal unavailable for observation.	Rabid	Start vaccine; administer rabies immunoglobulin if appropriate upon positive diagnosis and complete the course of vaccine.  Vaccine + rabies immunoglobulin - according to country-by-country risk and previous immunisation history.
III. Licks of mucosa; major bites (multiple or on face, head, finger or neck).	Suspect <sup>2</sup> or rabid domestic or wild animal, or animal unavailable for observation.		Vaccine + rabies immunoglobulin - according to country-by-country risk and immunisation status***. Stop treatment if animal remains healthy for 15 days <sup>1</sup> .

<sup>1</sup> Observation period in this chart applies **only** to dogs and cats.

<sup>2</sup> All unprovoked bites in endemic areas or animals from endemic areas should be considered suspect.

\* Exposure to rodents, rabbits and hares seldom, if ever, requires specific anti-rabies treatment. Small rodents (e.g. squirrels, hamsters, guinea pigs, gerbils, chipmunks, rats, and mice) and lagomorphs (including rabbits and hares) are almost never found to be infected with rabies in the USA and have not been known to transmit rabies to humans. Post-exposure prophylaxis is not generally indicated for exposure to rodents. The only exception to this in the USA is exposure to woodchucks (also known as groundhogs). These have accounted for 70% of rabies cases among rodents reported to CDC between 1971 and 1988.

\*\* 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.

\*\*\* 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.

## **(b) Assessment of bat exposures**

In rabies-endemic countries, bat exposures are high risk for classical rabies and should be managed as such.

Several rabies-free countries including UK have rabies-like virus in their bat populations. This includes Australian Bat Lyssavirus in Australia, and European Bat Lyssavirus 1 and 2 in Europe and in the UK. The risk from these viruses is likely to be low because the incidence of acute infection and excretion of virus is rare in bats and because humans are rarely exposed to the most affected bat species (in the UK this is the Daubenton's bat). Nevertheless, because the assessment of exposures is difficult to make and the number of exposures in unvaccinated individuals is relatively limited, previous guidance for unvaccinated individuals has now been simplified to ensure consistency of advice. For all unequivocal exposures to bats such as bites which are of a nature to be a possible rabies risk, post exposure prophylaxis should be with HRIG and 5 doses of vaccine. If the exposure is uncertain (can't confirm a bite), then vaccination alone may be considered.

This replaces the previous treatment guidance and flowchart in the April 2001 version of this memorandum. See also HPA protocol:

[http://www.hpa.org.uk/infections/topics\\_az/rabies/HPA\\_Rabies\\_protocol\\_April2006.pdf](http://www.hpa.org.uk/infections/topics_az/rabies/HPA_Rabies_protocol_April2006.pdf)

## APPENDIX 4

### STOCKHOLDERS OF RABIES VACCINE AND IMMUNOGLOBULIN

Human diploid cell vaccine (HDCV) is available from Aventis Pasteur Merieux MSD Ltd (Tel: 01628 773 200).

Human rabies immunoglobulin (HRIG) is manufactured by Bio Products Laboratory (BPL) and supplied through the NI Public Health Laboratory.

HDCV for pre-exposure immunisation of those at occupational risk is available from the NIPHL (tel. 028 90263588). For others, it can be obtained through community pharmacies by private prescription. Information may also be obtained from the CDSC (NI).

**For post-exposure use, vaccine is supplied by:**

**1. NIPHL, Belfast City Hospital, Lisburn Road Belfast (Tel: 028 90263588)**

**2. Virus Reference Division**

HPA Centre for Infections, 61 Colindale Avenue, London NW9 5HT.

(Tel: 020 8200 4400. Fax: 020 8200 1569; email [infections@hpa.org.uk](mailto:infections@hpa.org.uk)).

**3. Port Health Unit, Gatwick Airport\***

London Gatwick, West Sussex. RH6 0NP.

(Tel: 01293 533229/502358, Fax: 01293 502 503)

**4. Port Health-Unit, Heathrow Airport\***

Terminal 3 Arrivals, Heathrow Airport, Hounslow, Middlesex. TW6 1NB.

(Tel: 020 8745 7419, Fax: 020 8745 6181)

\* Vaccination is only available to arriving passengers or those in transit before they have gone through customs. To ensure that post-exposure vaccination is available, if possible, ring the port health units' at airports in advance

## APPENDIX 5

### THE CARRIAGE OF DANGEROUS GOODS

Infectious substances are defined as “dangerous for transport” under the Carriage of Dangerous Goods (Classification, Packaging and Labelling) and Use of Transportable Pressure Receptacles Regulations (Northern Ireland) 1997.

The Regulations (which apply to road and rail carriage) require that before substances are transported, the consignor has to:

- (i) identify substance (classification).
- (ii) suitably package substance.
- (iii) properly label package.
- (iv) provide information to the vehicle operator/carrier.

Infectious substances are those known or reasonably expected to contain pathogens. Pathogens are defined as micro-organisms (including bacteria, viruses, rickettsia, parasites, fungi) or recombinant micro-organisms (mutant or hybrid) that are known or reasonably expected to cause infectious disease in animals or humans. Infectious substances include biological products, diagnostic specimens, genetically modified micro-organisms (GMMs) /genetically modified organisms (GMOs) and wastes.

#### **Classification**

WHO criteria are used to classify pathogens into four risk groups. The probability of the presence of pathogens in certain risk groups determines whether the goods (i) are dangerous for carriage (e.g. goods containing only pathogens in risk group 1 are not dangerous for carriage) and (ii) in some circumstances, allows a reduction in the packaging requirements.

#### **Packaging**

The packaging must comply with the standard consistent with the classification. For infectious substances this includes:

- (i) inner packaging made up of a watertight primary receptacle.
- (ii) watertight secondary packaging and enough absorbent material between the two to absorb the contents of the primary receptacle.
- (iii) outer packaging of adequate strength, mass and capacity.

There is some flexibility for diagnostic specimens where there is only a low probability of pathogens in risk groups 2 and 3<sup>1</sup> being present. This includes specimens being transported for either initial diagnosis or routine screening for other than the presence of pathogens. Such samples are exempt from the full packaging requirements as long as the volumes of individual samples are limited and they are packaged to a specific standard. If the volume or packaging do not meet these standards then you need ensure that all the relevant recommendations have been met.

## **Labelling**

Packages must be labelled with the following:

- (i) the proper shipping name of the goods.
- (ii) the UN number.
- (iii) the specified main danger sign.

## Information for the carrier

The consignor must provide the following information to the carrier:

- (i) What is being carried, i.e. name, UN number and classification.
- (ii) Where it came from (name & address).
- (iii) Where it is going (name & address).
- (iv) How much is being carried.
- (v) Extra information to determine the transport category of the items and actions necessary in the event of an emergency.

There are exemptions from the main vehicle related aspects of the regulations for smaller amounts of substances in risk groups 2 & 3<sup>1</sup>, but no exemptions for any amounts of substances in risk group 4<sup>1</sup>, which are also subject to additional controls under Control of Substances Hazardous to Health<sup>2</sup>.

<sup>1</sup> Advisory Committee on Dangerous Pathogens *Categorisation of biological agents according to hazard and categories of containment* (1995) 4th Edition. HSE Books. (ISBN 0717610381)

<sup>2</sup> *Control of Substances Hazardous to Health. Regulations* (2000). SR 2000/120 Stationery Office. (ISBN 0337938342)

## APPENDIX 6

### CLINICAL WASTE

Detailed guidance on the handling and safe disposal of clinical waste is given in the document 'Safe Disposal of Clinical Waste' issued by the Health Services Advisory Committee<sup>1</sup>.

Clinical Waste is defined in the Waste Collection and Disposal Regulations (Northern Ireland) 1992<sup>2</sup> as being:

**1. Any waste which consists wholly or partly of:**

- human or animal tissue;
- blood or other body fluids;
- excretions;
- drugs or other pharmaceutical products;
- swabs or dressings;
- syringes, needles or other sharp instruments;

which unless rendered safe may prove hazardous to any person coming into contact with it.

AND:

**2. Any other waste arising from medical, nursing, dental, veterinary, pharmaceutical or similar practice, investigation, treatment, care teaching or research, or the collection of blood for transfusion, being waste which may cause infection to any person coming into contact with it.**

<sup>1</sup>*Safe Disposal of Clinical Waste* HSAC 1999. HSE books. (ISBN 0717624927)

<sup>2</sup>*The Waste Collection and Disposal Regulations (Northern Ireland) 1992. SR 1992/254. HMSO. (ISBN 0337 108544)*

Clinical Waste is categorised according to its risk as follows:

- GROUP A Includes identifiable human tissue, blood, animal carcasses and tissue from veterinary centres, hospitals or laboratories.  
Soiled surgical dressings, swabs and other similar soiled waste  
Other waste materials, for example from infectious disease cases, excluding any in Groups B-E.
- Group B Discarded syringe needles cartridges broken glass and any other contaminated disposable sharp instruments or items.
- Group C Microbiological cultures and potentially infected waste from pathology departments and other clinical or research laboratories.
- Group D Drugs or other pharmaceutical products.
- Group E Items used to dispose of urine, faeces and other bodily secretions or excretions which do not fall within Group A. This includes used disposable bed pans or bed pan liners, incontinence pads, stoma bags, and urine containers.

Clinical Waste from rabies-infected patients or animals is not subject to controls under The Special Waste Regulations (Northern Ireland) 1998<sup>1</sup>.

All identifiable human tissue, whether infected or not, may only be disposed of by incineration.

<sup>1</sup>*The Special Waste Regulations (Northern Ireland) 1998. SR 1998/289. HMSO. (ISBN 0337 932239*

### *Clinical waste disposal*

**Clinical waste primary packaging must be capable of holding the waste without spillage and waste bags and shall conform to the appropriate UN, European or British Standard.**

Clinical waste should be disposed of by the means recommended in the Health Services Advisory Committee document "Safe Disposal of Clinical Waste".

If clinical waste is to be transported off site for disposal:-

The Carriage of Dangerous Goods (Classification, Packaging and Labelling) and Use of Transportable Pressure Receptacles Regulations (Northern Ireland) 1997 require the proper classification of clinical waste. The following are considered as **dangerous** for carriage:

- any infectious biological waste;
- any related swabs and dressings from hospitals, clinics, surgeries or laboratories;
- pharmaceuticals which are toxic or have flammable or hazardous properties;
- any infectious waste known or likely to be contaminated with pathogens in risk groups 2, 3, or 4, and
- sharps.

The Controlled Waste (Registration Carriers and Seizure of Vehicles) Regulations (Northern Ireland) 1999

## APPENDIX 7

### THE MANAGEMENT OF A CASE OF RABIES IN AN ANIMAL

#### Contingency Plans

1. Detailed procedures have been developed to respond to an outbreak of rabies in Northern Ireland. The empowering legislation is currently the Rabies (Control) Order (Northern Ireland) 1977 and also the Diseases of Animals (Northern Ireland) Order 1981.

2. The majority of powers granted to the Department of Agriculture and Rural Development are optional and can be put into effect if needed. The powers used would depend on the circumstances, including the nature and location of the outbreak. At one extreme there could be a situation where an infected domestic pet had had no contact with other animals, and limited measures might easily contain the disease. At the other extreme there could be an area containing infected wildlife, farm stock and domestic pets, where the problem of containment could be complex.

#### Notification of rabies

3. Rabies is a "notifiable disease" under the Rabies (Control) Order (Northern Ireland) 1977. Therefore anyone who knows or suspects that an animal may have rabies has a legal duty to report this to the police, or the local Divisional Veterinary Officer. A veterinary enquiry will then ensue.

#### Veterinary investigation

4. As soon as there are reasonable grounds to suspect that an animal is infected with rabies, the premises on which it is kept will be declared an infected place. The suspect animals and any contacts will be secured within the premises or, in case of a high-risk suspect, removed for detention and observation to secure accommodation maintained by DARD for this purpose. If the suspect is rabid it will die within a few days, otherwise it will be released after 15 days. If the circumstances point to the desirability of immediate slaughter and a rabies test, there is the power to do this. The brain of a dead suspect will be examined for evidence of rabies at the Veterinary Laboratories Agency.

### **Procedures following a confirmed case of rabies**

6. The action will depend on the circumstances, the critical factor would be whether or not the infected animal had been at large with the opportunity of infecting other animals, including wildlife. If this were the case then an infected area would be declared, the size depending on the specific details of the case. This would enable any or all of the following measures to be put into effect:

- a) restriction of movement of animals into and out of the area;
- b) control and confinement of animals in the area (e.g. muzzling and leashing of dogs and leashing of cats);
- c) seizure, detention and disposal of animals not under proper control in the area;
- d) compulsory vaccination of animals;
- e) prohibition of gatherings of animals and sporting and recreational activities, including hunting, the racing or coursing of hounds or dogs, point-to-point meetings and the shooting of game or other wildlife;
- f) the eradication of the disease in wildlife.

7. In the event of a rabies outbreak in wildlife, control actions would be put into place to eradicate the outbreak and thus prevent rabies becoming endemic. These measures would focus primarily on foxes in the infected area but also other species, including feral cats and badgers, if necessary. The methods employed, such as vaccination and/or culling, would be those deemed to be most effective to suit the local circumstances while presenting the minimum hazard to other species of wildlife and to farm and domestic animals.

### **The Northern Ireland Arrangements**

8. The Veterinary Service – Epizootics is currently based in Dundonald House. It is responsible for maintaining rabies awareness and preparedness, directing the local centres, and directing the strategy in the event of an outbreak of disease e.g. determination of the infected area, deployment of staff and resources to the area, and the provision of information.

9. The divisional offices of the Veterinary Service throughout Northern Ireland act as the Local Disease Control Centres (LEDCC). They are responsible for local rabies awareness and preparedness. In the event of an outbreak they arrange preliminary investigations (including diagnostic tests) in liaison with the CEDCC, ensure that the infected area is placed under restriction with the help of the police and local authorities, are responsible for controlling the disease and eliminating it from the area, and arranging the payment of compensation in the event of the compulsory slaughter of animals.

10. Each District Council is also responsible for preparing its own rabies contingency plan. The plans clarify responsibilities and local resources and how these will be co-ordinated. In response to an outbreak measures might include co-ordinating the service of notices for confinement of pet animals, collecting stray animals and their care in detention or their destruction, public relations work, and maintaining records of animals, premises and areas involved in the outbreak.

## **Vaccination of Animals**

### *Domestic Animals*

11. Rabies vaccination is required for domestic cats and dogs that participate in the Pet Travel Scheme and for those that are exported to countries where regulations require it. Animals entering quarantine premises are vaccinated on arrival to provide an additional safeguard against the unlikely possibility of accidental cross-infection. So long as the country remains free of rabies the Government does not regard it necessary for animals resident in the UK to undergo routine vaccination.

12. In the event of an outbreak, compulsory vaccination of dogs and cats or other specified species may become necessary as a control measure in an infected area. Contingency plans exist for carrying out such a programme quickly and comprehensively.

### *Wildlife*

13. In the event of a rabies outbreak in Northern Ireland that affects the wildlife population DARD is considering the possibility of using vaccines as part of the control measures. The application of a ring of vaccine around an area in which an outbreak has occurred would immunise foxes which may migrate into the infected area from outside. Vaccination procedures will take some time to develop.