

# **Rabies: a Forceful Argument for Urban Animal Management**

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## **ABSTRACT**

Urban animal management would be a key factor in the success or failure of an eradication program for urban rabies if an outbreak were to occur in Australia. The greatest threat of introducing the disease is through the entry of infected animals and a number of measures are in place to counter this. All imported animals that represent a risk are placed under quarantine control on arrival, so that any outbreak would be contained within a quarantine station. Surveillance is maintained at our ports and along the coastline to detect the illegal importation of animals, and surveys of animal diseases in neighbouring countries provide advance warning of the proximity of rabies to our borders. However, due to the long incubation period of this disease, these preventative measures can only reduce the probability of an outbreak, and plans to eliminate the disease if it entered the country have been drawn up and are constantly being refined. The essential elements of an urban control program would include movement control, compulsory mass vaccination, stray control and eliciting the cooperation of the public through media campaigns. The critical role of urban animal management in the success of such a program is emphasised throughout.

## **INTRODUCTION**

Any disease which can kill is frightening. But not many involve such an unpleasant sequence of events as rabies and Australians are justifiably afraid of it. Most of the world's human population learns to live with it from birth, and to adapt their behaviour to prevent infection; no doubt Australians would do the same if it became necessary. It would certainly change the present perspective on urban animal control. But why should we have to change our way of life for something which is preventable? The intention of this paper is not to go into any depth about rabies as a disease - anyone involved with dog control should already know all about it - but more to look at the measures that are taken to prevent its entry and the contingency plans for use in the event of those measures failing. The last part is particularly important in this context because it is you, the people our community has entrusted with the task of regulating urban animal populations, who would play the most significant role in any control program involving domestic dogs and cats. You would also be at greatest risk.

## **EPIDEMIOLOGY**

The prevention and control of rabies rely on a few basic epidemiological features and these should be briefly touched on before proceeding.

### **Susceptible species**

All warm blooded animals are vulnerable to infection with rabies but there are variations in their relative susceptibilities. Several potential reservoirs for rabies are believed to exist in Australia (Newsome and Catling 1992) with dingoes, dogs and their hybrids being the most important in northern Australia, and red foxes in the south of the continent. Native mammals, cats, bats and rodents also represent potential reservoir populations, depending on their local densities. In an urban environment, dogs and urban foxes are the most likely reservoirs but cats, and even brush-tailed possums, could be significant hosts.

Little is known of the susceptibility of Australian native animals, but three New Guinea marsupials were found to be susceptible to experimental infection (Morahan 1967).

## **Biotypes**

Apart from urban rabies maintained in dogs (and, to a much lesser extent, cats), there are a number of comparatively independent cycles in various species of wildlife where the virus has adapted to the host species such that there is little spill-over into other susceptible animals (Geering 1992). Examples of this include biotypes adapted to skunks, red and Arctic foxes, racoons, insectivorous and vampire bats, jackals, meerkats and mongooses; differences between these biotypes can be detected using monoclonal antibody techniques. It is considered that biotypes which have adapted to overseas wildlife species are less likely to be introduced into Australia than the urban form. If urban rabies became established in Australia however, there is potential for the virus to adapt to native or introduced feral species, creating a reservoir of infection which would be very difficult to eradicate.

## **Transmission**

Although infection by inhalation of aerosols, either in bat caves or in the laboratory, has been recorded, the commonest mode of transmission is either through the bite of a rabid animal or by infected saliva entering wounds or mucous membranes.

## **Incubation period**

Despite the widespread distribution of rabies, there is surprisingly little reliable quantitative data on the incubation period because of the difficulty in establishing the exact time of exposure. Incubation periods for naturally induced rabies appear to be very variable and depend on the amount of virus injected and the site of the bite wound as well as the strain of the virus involved. One commonly quoted study is the analysis of 28 cases of rabies that have occurred in the UK (Anon 1971). Although the exact time of exposure was not known, as the animals had been held in isolation at a quarantine station, it was assumed to be before the entry into quarantine (although at least one case may have been contracted while still in quarantine). The results indicated that 50% of cases occurred within the first month of importation, 75% within four months, 89% within six months and 100% by 7.75 months. The theoretical period required to detect rabies during quarantine with a 95% degree of confidence has been estimated as 9.5 months (Gooch et al. 1971).

## **Survival of virus**

The virus will survive in saliva outside the host for up to 24 hours in a temperate climate. Therefore kennels which have been occupied by rabid animals should be disinfected (sodium hypochlorite is probably best) but would in any event be safe to enter after about one day. Infected animals may excrete virus in their saliva for up to 14 days before the onset of clinical signs (Fekadu 1988).

## **QUARANTINE CONTROL**

Rabies could occur in Australia through the entry of infected animals by either legal, illegal or natural means.

### **Legal entry through an Animal Quarantine Station**

All dogs and cats (except from New Zealand, Norfolk Island and Cocos Islands) entering Australia must undergo a period of quarantine in an animal quarantine station. Although there are a number of diseases and pests that are present overseas and are not found in Australia, the main reason for the period in a quarantine station is for the detection of rabies. At present, Australia only imports dogs and cats direct from countries or territories which are free from the disease.

Dogs and cats may be imported from the following countries and territories, for which the respective quarantine periods in Australia apply:

No quarantine period in Australia required:

Cocos Islands  
New Zealand  
Norfolk Island

60 days quarantine in Australia required:

Norway  
Republic of Ireland  
Sweden  
United Kingdom

120 days quarantine in Australia required:

Hawaii  
Japan (dogs only, cats not permitted direct entry)

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Japan (dogs only, cats not permitted direct entry)

270 days quarantine in Australia required:

Christmas Island  
Fiji  
Nauru  
New Caledonia  
Papua New Guinea  
Solomon Islands  
Tahiti  
Vanuatu  
Western Samoa

Dogs and cats may be imported from countries other than those listed only after they have been resident in one of the above countries for a minimum of one month. Residency is achieved only after the animal has been unconditionally released from any quarantine restrictions. In all cases, the animal would have spent a minimum of nine months in a situation where the transmission of rabies was unlikely.

As an example, a dog originating from a country which does not appear on the list above would have to be imported into, for example, the United Kingdom (UK), and undergo the current six-month quarantine period which applies in that country. One month after release from quarantine in the UK, the dog would be eligible for entry into Australia. On arrival, the dog would undergo a further two months quarantine in an Australian quarantine station, so that the minimum time between leaving its original country and being released into the Australian community would total nine months (6 + 1 + 2). Conditions for the exact requirements for the importation of dogs and cats from other countries can be obtained from Australian Quarantine and Inspection Service (AQIS) on request.

The Commonwealth currently owns, staffs and operates animal quarantine stations at Eastern Creek (Sydney), Spotswood (Melbourne), Torrens Island (Adelaide), Byford (Perth) and Cocos Islands (in the Indian Ocean). The stations are used for the quarantine isolation and testing of imported animals from various countries of differing disease status. Their basic function is to protect against the entry of animal diseases present in the country of origin which may not have been detected at the time of departure (eg rabies). Dogs and cats can be accommodated at any of the four mainland stations and, although numbers have decreased recently due to the current recession and higher fees, over 1 000 dogs and 500 cats are placed in quarantine annually.

All stations are fully equipped for accommodating, feeding, cleaning, grooming, bathing and generally caring for the welfare of dogs and cats. Each has a veterinary clinic and small hospital for use by private practitioners so that if medical treatment or surgery is required, the animal need not leave the station.

In the 125-year history of the Australian animal quarantine stations, there has never been an outbreak of rabies in dogs or cats. This is as it should be, because the stations act as a safety net to catch any disease that has circumvented the controls implemented in the country of origin. We would prefer that all diseases stayed overseas, rather than appear in our quarantine stations. However, if an outbreak of a serious exotic animal disease did occur in a quarantine station, it is certain that extra quarantine precautions would be imposed. This could include a prolonged period of quarantine until all risk of the disease escaping the station had been eliminated.

The possibility that the incubation period of rabies in dogs might exceed nine months on very rare occasions is of great concern to those of us involved in animal quarantine. It is also known that animals occasionally recover from rabies but nevertheless intermittently shed the virus (Fekadu 1988). Our present quarantine policy is not designed to cover these admittedly rare occurrences. The only foolproof way to prevent the entry of rabies in infected dogs and cats is to place a total ban on their importation. It is known from past experience however, that if no legal, controlled method of entry exists there will always be those in the community who will turn to smuggling, thereby greatly increasing the risk. In addition, there are certain human rights issues here with regard to domestic pets and their role in family life. A compromise situation exists therefore where the present quarantine requirements permit the legal entry of small animals and minimise, rather than totally eliminate, the risk of introducing rabies.

### **Dangerous dogs**

Although not directly concerned with rabies or animal quarantine, there may be interest in some recent developments concerning the importation of dangerous dogs through our quarantine stations. Following a number of serious attacks on people by dogs in Australia and in other countries recently, the Commonwealth Government has imposed a ban on the importation of dogs that pose a risk to public health and safety, particularly those breeds which have been bred for fighting. The importation of dogs belonging to the Pit Bull Terrier, Fila Brasileiros, Dogo Argentina and Japanese Tosa breeds is now prohibited. Import permits are not issued for any dog until a declaration from the exporter has been provided to the effect that the dog is not one of the above breeds, has not been bred or trained for fighting and has not made unprovoked attacks on people. If on arrival at an Australian quarantine station, the dog is suspected to be a prohibited import, it may be subjected to an assessment by an expert panel. If the dog fails this assessment it would either be re-exported or destroyed.

This requirement is not designed to exclude pets which may occasionally snap at handlers when feeling threatened. The intention is to prevent the entry of dogs which could represent a danger to public health and safety when released into the Australian community. Owners are advised not to apply for an import permit if they believe that their dog falls into this category.

## **Illegal entry**

Occasionally, attempts are made to smuggle dogs, cats and smaller mammals into Australia either through our sea ports, airports or via our northern borders. If anyone in the audience has considered it - don't even think about it! Not only would you be risking lives, but the chances of entering Australia with an animal undetected are not good. AQIS has an intelligence system which is electronically linked not only to our counterparts in most major overseas countries, but also to a wide network of law enforcement and customs agencies. A number of interceptions are made each year from tip-offs received in this manner and offenders can expect to be apprehended, charged and either fined or imprisoned depending on the severity of the offence. Passengers, baggage and cargo at all our air and sea ports are likely to undergo either targeted or random quarantine checks, and where human powers of detection can not be relied upon, snuffer dogs (the AQIS Beagle Brigade) are now being used successfully to detect illegally imported animals and animal products at major terminals. And if all this fails, the chances are that your neighbour will "do the right thing" and report you anyway. We receive many tip-offs from the public each year, all of which are followed up by our compliance people.

Although vast and largely uninhabited, our northern coastline is also watched more closely than is often realised for the illegal entry of people, drugs and quarantinable items. The task is undertaken jointly by the Navy, Air Force, customs and quarantine, with ships, aircraft and land-based radar being used in conjunction with intelligence reports from a number of sources. It is a daunting task however and breaches such as the recent unexpected arrival of 56 Chinese boat-people demonstrate how vulnerable we still are.

In summary then, although the system is by no means perfect and illegal imports of animals do occasionally occur, the chances of it going undetected are low. If you are suspicious that Australian quarantine has been breached, please contact your nearest Quarantine Officer (Compliance) on the following numbers:

Brisbane (07)223 8755

Sydney (02)268 5222

Melbourne (03)611 0100

Hobart (002)33 3626

Adelaide (08)273 6999

Perth (09)425 5800

Darwin (089)81 8733

If you cannot get through, ring (06)272 5191 or 272 4842 in Canberra. Confidentiality is guaranteed, so there will be no embarrassment if it turns out to be a false alarm.

## **Surveillance**

Part of our ability to mount effective strategies to prevent the entry of rabies also relies heavily on the acquisition of scientific information regarding the distribution and movement of the disease. This is particularly relevant in the countries immediately to our north. Although Indonesian authorities maintain an internal quarantine system to prevent the spread of plant and animal diseases into Irian Jaya from the rest of Indonesia, there have been some notable breaches. Newcastle disease of poultry, *Cysticercus cellulosae* in pigs and humans and more recently, varroasis in bees have all been introduced within the last two decades. Although rabies is only found to the west of Bali, these examples of breakdowns in quarantine mean that this disease must still be included in surveillance programs carried out in Irian Jaya and Papua New Guinea. Regular surveys are carried out by joint teams of Indonesians and Australian scientists (in Irian Jaya) and Papua New Guinean/Australian teams (in PNG) looking for exotic diseases of plants and animals as well as for the presence of previously undetected insects and noxious weeds, all of which could be transmitted to Australia. In the case of rabies, this could either be with human assistance or, in the case of bats, by natural migration. These surveys, carried out under the AQIS Northern Australian Quarantine Strategy are, although rarely publicised, an essential part of Australia's early warning system for exotic pests and diseases that could damage our agricultural industries or our way of life.

I will not dwell on the control measures that would be put in place if rabies were to become established in a wildlife vector in Australia, other than to mention that non-dispersive population density reduction (to below threshold levels) as well as vector elimination and aerially applied vaccine baits could all be used depending on the prevailing situation. Contingency plans have been made for this eventuality.

## **CONTINGENCY PLANS**

Plans to control and eradicate a number of animal diseases are contained in a series of manuals under the common title of AUSVETPLAN (Australian Veterinary Emergency Plan). They contain all the necessary detail for an immediate response to an outbreak of most of the serious animal diseases and are continuously being updated so that they always contain the latest technology and information. They were used to good effect in the recent outbreak of avian influenza at Bendigo.

The following outline of how an outbreak of rabies would be tackled is taken from AUSVETPLAN (1990). The legislative powers given to state and local government authorities in the event of an outbreak would stem from the Stock Diseases Act or Exotic Animal Diseases Act already passed by most state governments. It should be emphasised that these control measures are in their first edition and it is recognised that they need tightening up and expanding to cover all eventualities. You are the group with the most experience in urban animal control in Australia. What follows is only a rough outline and you are recommended to read the plans, which are available from your state government Department of Agriculture (or equivalent) in full.

### **Movement control**

If rabies was confirmed in an animal and there was evidence that the disease may have spread from the initial case, a "Control Area" would be declared, the size of which would depend on the geographical distribution of all in-contact animals. All dogs would be required to be restrained on their owner's premises until 30 days after they had been vaccinated. During that time it would become an offence to permit animals from different premises to mix and they could only be taken outside the premises for exercise if held securely on a leash, kept muzzled and prevented from any contact with other animals. Although generally less important in the maintenance of rabies, these controls might also be applied to cats. Because of these restrictions, all dog and cat shows, sheep dog trials and any activity that might permit susceptible animals to congregate would be suspended.

Although assistance could be expected from state and Commonwealth governments, it is likely that the responsibility for the enforcement of these restrictions would fall on the local authorities.

### **Compulsory vaccination**

All dogs and cats within the Control Area would have to undergo compulsory vaccination. Initially, central vaccination centres would be established where the public could bring their pets. The advantages of setting up these centres would be that a large proportion of the dog and cat population could be rapidly and comparatively inexpensively taken out of the pool of susceptible animals. These outweigh the disadvantages of allowing animals to congregate at the vaccination centre. House-to-house coverage of the Control Area would follow mass vaccination so that a census of domestic pets could be made and any residual animals would be vaccinated to obtain as close to 100% immune population as possible. Evidence from overseas suggests that urban rabies does not become established in a population once more than 80% of susceptible animals have been immunised.

In order to differentiate between vaccinated and unvaccinated animals, some form of identification would be required. Dog tags, coloured collars, tattoos and electronic implants are all possibilities although no preferred method has been determined to date.

## **Stray control**

This is where the local government authorities would be heavily involved. Firstly, warnings would be spread via the media that a stray dog and cat elimination campaign was about to start and that all owners should ensure that their animal was vaccinated, registered and displaying a registration tag. Dog control officers would then move into the Control Area and attempt to secure all stray dogs. Humane traps would be used for cats.

Once captured, animals would be transferred to local government pounds and RSPCA establishments. Depending on the size of the Control Area, there may be a temporary shortage of pound accommodation, in which case it is likely that private kennels would be hired for the purpose.

If an impounded animal was displaying an identification tag (ie it had been licensed and vaccinated) then the owner would be given a fixed period to collect the animal (probably between three and seven days) before it was destroyed. All untagged animals would be humanely destroyed when captured and the owners would not be eligible for compensation.

Untagged animals that could not be captured would be destroyed by other methods.

## **Publicity campaigns**

A careful balance would be required in formulating the initial public announcement of an outbreak of rabies. The public would be fully entitled to know all aspects of the outbreak so that they could protect themselves and their pets. Nevertheless it would also be essential to minimise any panic response, particularly one which might lead to the abandonment of animals. If responsible ownership of pets is important now, it would become critical in the event of a rabies outbreak, and might well be the deciding factor in an eradication program.

Another function of the initial media announcement would be to alert local government officials, medical and veterinary practitioners so that they would be ready for more detailed briefings on their specific roles, such as the preparation of pounds, the reporting of animal bite cases in humans and suspicious symptoms in pet animals.

After the initial announcement, a media campaign would begin which would give details of the progress of the eradication campaign, and would be likely to target such areas as the legal obligations of animal owners and responsible pet ownership, the location of mass vaccination centres and pounds and details of any street-to-street programs.

Unfortunately, time and space prevent further discussion of the contingency plans, but if, after reading them, you have suggestions on how they might be improved, you are invited to contact The Executive Officer, Australian Exotic Animal Diseases Preparedness Program, Livestock and Pastoral Division, Department of Primary Industries and Energy, GPO Box 858, Canberra, ACT 2601 with your recommendations.

## **THE MESSAGE**

The issues of responsible pet ownership and urban animal management are complex and although it is hoped that this workshop will produce some of the answers, there is no easy fix. The present problems facing participants are many and varied - but the introduction of rabies would place a totally different perspective on what is already a vexed issue. Australia is the only continent free of rabies - we intend to keep it that way.

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David Banks was born in the UK and graduated from London University in 1974. After a period in mixed practice, he spent a year studying tropical diseases at Edinburgh University before taking up a position in the Highlands of Papua New Guinea. It was there that he gained his first experience with the social complexities of dog population control after a hydatids scare.

As a post-graduate student in Townsville, he teamed up with Dick Murray in an unsuccessful attempt to set up a dog control program for the Council of Palm Island, a small Islander community just off the North Queensland coast. Although the Council was keen to control the dog population, it soon became clear that the rest of the community was not.

He then spent several years as a research scientist with CSIRO, based in Fiji but involved in livestock research programs throughout the Pacific. In his spare time he frequently spayed bitches for various island councils in an attempt to control the dog populations that abound on even the smallest island. A spay cost the owner one can of beer and although the effect on the dog populations in the islands was of questionable value, consuming the proceeds by the lagoon made it all worthwhile.

During his time in the Pacific Islands he encountered one of the better animal control schemes in the region on some of the tiny atolls which make up the country of Tuvalu. One island kept only male dogs while a neighbouring island permitted only females. When more dogs were required, bitches on heat were taken to neutral territory - a small islet between the two larger islands - where they were united with suitable males from the other island. Most of the human population turned up to watch, and a joyous time was had by all. When the resultant pups were weaned they were distributed to new owners on each island according to their sex. They were some of the healthiest, and least troublesome dogs in the Pacific.

Now, as a Canberra bureaucrat trying to reconcile the unattainable promises of politicians with the impossible demands of the public, he is convinced that there are few animal problems that do not have a comparatively simple solution. Solving the problems of their owners is a different matter altogether.

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