The Role of the Northern Australia Quarantine Strategy

By Jonathan Lee

Background

The Northern Australia Quarantine Strategy (NAQS) is a program conducted by the Australian Quarantine and Inspection Service (AQIS), and was established in 1989 to assume responsibility for quarantine surveillance in northern Australia. This was due to the recognition of the clear and present dangers of incursions of exotic human, animal and plant diseases and pests into northern Australia from countries to our north.

NAQS has three arms: NAQS Operations, NAQS Scientific and NAQS Public Awareness.

* NAQS Operations provides border security in the Torres Strait and northern Cape York Peninsula region, and uses Indigenous personnel to address the specific problems posed by the close proximity to Papua New Guinea and the traditional movement of Indigenous people between the two countries, which is allowed under the Torres Strait Treaty.

* NAQS Scientific is the investigative arm and provides the epidemiological information on exotic diseases and pests.

* NAQS Public Awareness provides support to the other two arms by producing public awareness materials and resources.

NAQS Scientific

The mission of NAQS Scientific is to identify and evaluate quarantine risks to northern Australia, and to provide early warning of quarantine pests and diseases through a program of monitoring, surveillance and public awareness across northern Australia and in neighbouring areas of Papua New Guinea, East Timor and Indonesia.

NAQS has most recently been reviewed in 1995 and again as part of the AQIS review in 1996. As a result of these reviews, NAQS’s role and importance in the surveillance and early warning of exotic diseases has been recognised, and this has resulted in increased funding and an expansion of capabilities.

Strategies

The NAQS Scientific Strategic Plan outlines the strategies designed to address the mission outlined above. These are:

* Identification and assessment of risk
* Surveillance activities

1. Risk assessment is a formal process involving scientific working parties evaluating the risk of entry and resulting impact of a range of exotic animal diseases and pests. This process results in the production of a NAQS animal disease target list. The provision of a target list enables available resources to be focused on the most significant threats to enhance the likelihood of providing early detection and early warning of potential incursions.

2. Using the resulting risk assessments and NAQS exotic disease target lists as a reference, NAQS veterinarians and scientists develop operational plans to provide comprehensive surveillance for these target list diseases both onshore and offshore. Although specifically aimed at target list
diseases, these surveillance activities are also designed to detect emergent or aberrant exotic diseases or strains. The NAQS veterinarians and scientists use their findings and experience to fine tune these surveillance activities to optimise the results obtained.

Surveillance activities covered by the animal program are structured around two main concepts. These are (a) the use of sentinel animal herds and strategically sited insect traps both onshore and offshore and (b) a series of targeted surveys (survey frequency is correlated to risk levels for the geographic areas covered).

The sentinel animal herds utilise serologically naive pigs or cattle, from which blood samples are regularly analysed for evidence of exposure to subclinical exotic diseases. These sentinel herds are also regularly checked for evidence of clinical disease due to other exotic pathogens or myiasis due to screw worm fly.

Targeted surveys are conducted along the northern Australian coastline from Cairns to Broome and are coordinated by the NAQS staff in each of the States and the Territory. Surveys are also regularly conducted in Papua New Guinea, East Timor and Indonesia with joint participation by scientific staff from those countries.

NAQS Scientific also funds scientific research aimed at developing new techniques to improve risk assessment and enhanced surveillance.

**Exotic Canine Diseases of Importance to Australia**

Rabies
Screw worm fly (*Chrysomya bezziana*)
Leptospirosis (*Leptospira interrogans var. canicola & var. icterohaemorrhagiae*)
*Babesia canis*
*Brucella canis*
Tropical canine pancytopaenia (*Erllichia canis*)
Surra (*Trypanosoma evansi*)
*Leishmania donovani*

+++Additional comments by Jonathan Lee

The NAQS is designed to look at the threats of exotic animal, human and plant diseases to northern Australia. Our role is to provide disease risk assessment and then to put in place surveillance strategies to detect these diseases. The aim is to find which diseases pose the highest threat and work out what they are doing, so we can provide early warning for response actions.

The area we are responsible for extends from Cairns in the east to Broome in the west and encompasses most of northern Australia, including Arnhem Land and the Kimberleys. We also cover our neighbours to the north, Papua New Guinea, Timor and Indonesia.

**Disease entry**

How are these diseases likely to get in?

1. *Traditional movement.* The Torres Strait Treaty allows traditional movement of people backwards and forwards between Papua New Guinea and Australia. This is a obviously a hot zone for quarantine. There is the risk that diseased animals could come into Australia through the Torres Straits.
2. *International sea traffic.* One possible scenario would be for an international yacht with a dog or cat on board to stop for some time in Indonesia, where there is a current rabies outbreak. The dog or cat becomes infected by being bitten by a local animal, but the yacht sails on to Australia while the disease is still in the incubation stage and the animal is showing no clinical signs. The animal enters Australia as a rabies transmission vector.

3. *The movement of illegal immigrants.* Some of these are coming from short distances and potentially could bring animals with them. We try to intercept these vessels and check them as soon as they come into Australian territorial waters, but there is still the chance that they could slip past us.

**Diseases of major concern**

*Rabies*

Rabies is one of the major diseases on our target list. This is because of the massive social impact it would have if the disease ever managed to get into Australia. Rabies is a virus transmitted primarily by biting, and the animals of most importance to human rabies infection are dogs. We know that in India dog rabies causes 50,000 human deaths a year. If rabies got into Australia and into the camp dog, dingo or fox population, you’d have to see a major change in lifestyle for everyone living in Australia.

Rabies is present through most of the world and is a particularly insidious disease because it often gets into the wildlife populations and can be very difficult to control. The control of fox rabies in Europe through the use of oral baits was a very effective technique, and we would certainly have to look at similar programs if it got established in Australia.

Rabies is very hard to diagnose even in the clinical stages. A whole range of diseases can look very similar. The signs include things like incoordination, changes in behaviour, aggressiveness and difficulty in eating, or swallowing foreign objects. But this can all look like other diseases we get in Australia. So particularly in the camp dog situation, it could be some time before people realised something different was going on here—and in that time people could have been exposed to the disease.

*Screw worm fly*

Screw worm fly is an obligate parasite of warm blooded animals (mammals). There are two types in the world: the new world fly, *Cochliomyia hominivorax*, which occurs in the Americas, and the old world fly, *Chrysomya bezziana*, which occurs in Africa, south-east Asia and Papua New Guinea.

This fly is a blowfly, but unlike our other blowflies in Australia, the females lay their eggs in the wounds of living animals. The eggs hatch and the maggots crawl from the edge of the wound into the wound and burrow deeper and deeper, producing a range of toxins, loss of serum and secondary bacterial infection. The smell attracts other flies and they continue to lay maggots, so you often have several generations of maggots in one wound. The wounds get bigger and bigger, the animal becomes very debilitated from loss of serum and toxaemia, and in a lot of cases dies.

Screw worm fly will affect any warm blooded animal—dogs, cats, cattle, humans.

*Surra*

Surra is caused by a protozoal blood parasite, *Trypanosoma evansi*. Surra primarily affects cattle, camels, sheep and goats, but also dogs and cats. The disease is spread from host to host by the action of blood-feeding biting flies such as *Tabanus sp.* (horse flies) and *Stomoxys sp.* (stable flies).
The big problem is that surra is a chronic wasting disease. In countries where it occurs you have mortality in a lot of animals. Surra is related to sleeping sickness of humans and trypanosomiasis of domestic animals in Africa, which is caused by *Trypanosoma brucei* and spread by the tsetse fly. If surra got into Australia it would probably make cattle production in northern Australia untenable.

Surra is endemic in Indonesia and Timor, and one of the potential routes to Australia is through an infected dog.

**Strategies**

Apart from doing the disease assessment, the NAQS also looks at the countryside and prioritises the areas in Australia in terms of risk priority. We produce lists and develop operational plans to conduct our surveillance operations.

There are two ways we do surveillance: multilevel biased surveys and structured statistical surveys. The first method is used when we don’t know how many animals are out there; we decide which communities have the highest risk and try to sample those directly. The second method applies when we know the total number of animals in the area and can statistically base our sampling techniques on that.

When we deal with community-based animals, we talk to people to get a history before we start clinical examination of the animals. In the case of sick or recently dead animals, we’ll often purchase them and do post mortems to try to determine if they have been being exposed to the diseases. Any samples we take go the Animal Health Laboratories in Geelong to be tested for exotic disease agents.

In addition to our surveillance work, we have established a series of sentinel herds throughout northern Australia. These animals are brought in from clean populations and bled on a fortnightly basis to look for diseases.

There are also the feral animal populations, which consist primarily of feral pigs, cattle, buffalo and donkeys. We sample feral pigs, for example, by shooting them and then doing post mortems to see if they show any evidence of exposure to exotic diseases.

We do annual surveys overseas in Indonesia, Timor and Papua New Guinea. Depending on which country we are looking at, the team will visit villages, talk to people to see if they have had any problems with their animals, then do clinical examinations and take blood from every animal we visit. We then put together a report on the outcomes of the investigation.

**Reporting**

There’s not much point doing this work if we don’t tell anybody. Firstly we produce a report from the survey, which is incorporated in our annual report and circulated to all interested parties. We try to send it back to the parties we work with overseas. When we visit communities here in Australia, we send a report back to them. We also have a database where we record all the information, and some information is recorded in the National Animal Health Information System (NAHIS) database.

NAQS Scientific is a very small program, with only three vets—myself in Queensland, Andrew Moss in Darwin and John Curran in Broome. We are responsible for the whole area, including the surveys of neighbouring countries. We can’t do it on our own, so we try to establish links with other organisations and with communities.
To that end we have made some recent initiatives. First of all, we have had an Aboriginal consultancy looking at how we can better communicate and interact with Aboriginal communities. In addition, we have put on an Aboriginal liaison officer in Darwin. His job will be to liaise with Aboriginal communities, to see what they want and how best we can interact with them.

And I also want to stress that all of you people who already working in communities are also very important. If you see things or have ideas on how we can interact and work together, then we need to stay in contact.

**Quarantine from a Torres Strait Perspective**

*By Jackson Sailor*

First, the general background of our responsibilities. In the Top End of Australia I work in an area where we have five communities—two island communities that originated from the Torres Strait and three Aboriginal communities. Because we have all these people together from both races, plus those of European descent, I find my work difficult due to cultural differences, especially dealing with animals. Our main responsibilities are inspection and prevention, especially with quarantine.

We have four different geographical and cultural sections in the Torres Strait: Upper Western (Saibai, Boigu and Dauan Islands), Lower Western (Thursday, Hammond and Prince of Wales Islands), Central (Badu, Moa and Mabuiag Islands) and Eastern (Warraber, Poruma, Masig, Yam, Darnley, Steven and Mer Islands).

The main language spoken in our area is Creole, which breaks down the communication barrier. English is last on the list. It may be hard for people like yourselves coming into the community; you need translators and stuff like that to communicate on the local level.

Some of the coastal area people on the mainland (Australia) say that some of the Torres Strait island people do have dog clans similar to Aboriginal people and that is like a tribal totem. This is mainly on the Lower and Upper western groups of the Torres Strait.

When I first started with quarantine, it was animal quarantine (before everything got amalgamated with plants). Working with all the veterinary staff has been an education, even though some of them have gotten their hands bitten by pigs etc. showing us how it’s done! I think some of your city vet people have that totally hygienic, clean situation compared to what’s in the bush—vet work at the back of your truck!

It’s a bit of a shame the community dog health program was phased out, because the local people still see us as the major people in the community to come and query all these things about dogs. I have stitched up dogs in the past that have been cut up by pigs. I’m not qualified like you guys [vets], but I did it. And horses that have been rammed against stumps, flesh hanging out. I like to save the dogs and horses that are wandering around. I’ve vaccinated dogs for distemper, parvovirus. Euthanasia with dog using Lethabarb—I’ve done it.

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8 This paper is an edited transcript of the author’s presentation.

9 At this time quarantine was a responsibility of the Queensland Department of Primary Industries, which instigated a community dog health and control program. This included basic veterinary care, desexing and disease surveillance. This program was later dropped due to changing political agendas and financial concerns. The responsibility now rests with the local island/community councils. (Ed.)
In all Torres Strait islands and the Cape York Peninsula, dealing with dogs is very important.

**Animal census.** In the communities this is very important, not only for the vet work but also for quarantine, to find out how many animals we have in the communities. It is important information in the event of an exotic disease incursion into the area.

**By-laws.** With by-laws we talk about responsibilities—who’s going to take the ball and run with it. Council by-laws in Torres Strait say two dogs to a house, but I think people are not willing to take responsibility and stand up and say, ‘You’re only allowed to have two dogs’. In Torres Strait the female dog is supposed to be spayed, but that’s not so.

Recently we did an animal census and discovered some of the community people are travelling from Cairns or Townsville down south, then bringing back new breeds of dogs into the communities such as bull mastiff, bull terror, all the bigger type dogs. How do we deal with these types of dogs? You bring all these expensive breeds into the community when they’re pups and when they grow up they eat everybody!

**Vet services.** Torres Strait has only been visited once by private vet services, at the people’s request. That was by a vet from Cairns who visited with an invitation from Torres Shire Council. She came, did her thing and left again—only temporary. I think she went to the peninsula once and didn’t want to go again because of the dust problem. We need to solve this problem of genuine delivery of vet services in the Torres Strait area.

But there’s a danger of duplication of services. We have that many government agencies going in and out of the communities it make us fellow dizzy! If you vets go into the community, make sure you’re not duplicating somebody else. We get inundated with that many government agencies it’s not funny. We get Queensland Department of Primary Industries doing programs with weeds, plants and animals; the same with quarantine for the Commonwealth government; and then you have the Queensland National Heritage Trust, which comes in for feral animals and weed control as well.\(^{10}\) It is very important for you to address this problem of duplication of services in all the communities or you’re not going to get anywhere.

**Vaccinations.** We vaccinate for diseases in dogs, pigs, horses etc. We are living in an area where disease is spread from animals and insects to human beings. We have already lost two Indigenous people from there due to Japanese encephalitis; it is very important that we sort out these things before we lose other people’s lives. Vaccination raises issues of occupational health and safety for the Indigenous worker. We’ve been vaccinated against all sorts of diseases, and if you are going to put Indigenous people into positions you need to make sure they are above all compliant with occupational health and safety standards.

**Education and training.** Again, very important if one of you comes to the Torres Strait. The Torres Strait has about 60 inhabited islands, and we don’t use motor cars. We use helicopters! You have to do underwater escape training—I’d like to see your faces when you come out of the water! That’s part of life out in the Torres Strait; we use boats, helicopters, planes. Delivery of service is very important.

**Exotic diseases.** Just a word about the responsibility for finding new diseases in animals (commonly called exotic animal diseases). This responsibility rests with all of us here, not just with vets. I urge you all: if you have suspicions about a sick animal—not just dogs, anything whatever—get onto your vet, private or state. There is a mechanism to enable the free and willing

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\(^{10}\) The Cape York Weed and Feral Animals project, a Cook Shire initiative funded by the Queensland National Heritage Trust. (Ed.)
submission of samples from that sick animal to our national lab to rule out the possibility of a new disease. It’s very important. It’s a no-blame, no-fault system and it’s free.

Illegal boat people are always examined. Whenever a boat comes ashore it is intercepted by a whole range of agencies. But quarantine are the first people that get on that boat, and we check out everything: the people, the animals (if any), the food stuffs and any other item that may be a risk to Australia. As part of that program, the people are taken away by people such as the Department of Immigration and examined by doctors before being put into containment facilities.