

BIOSECURITY FAILURES IN AUSTRALIA: 12 CASE STUDIES

8. PIGEON PARAMYXOVIRUS

A case study of a failure to prevent, eradicate or contain a new bird disease

Species: Pigeon paramyxovirus (an avian paramyxovirus serotype, closely related to Newcastle disease; both are serotype 1).

Origin: Probably the Middle East. The strain is genetically identical to a European strain, genotype 6.

Australian occurrence: First detected in August 2011 in Victoria in loft pigeons and in October in a wild bird (feral pigeon). Detected in loft pigeons in NSW in May 2012 (as a result of illegal movements of pigeons from Victoria), and in feral pigeons in November 2012.¹³⁸ Detected in northwest Tasmania in June 2013 in loft pigeons.¹³⁹ Now considered endemic in Australia.¹⁴⁰

Potential ecological impacts:¹⁴¹ The pigeon paramyxovirus (PPMV1) causes an often fatal disease in many bird species worldwide, not just pigeons. Overseas it has infected raptors, pheasants, swans, cockatoos and budgerigars (the latter Australian species in captivity overseas). So far in Australia the virus has infected racing, show and feral pigeons (rock pigeons and one spotted turtle dove). The one native species so far diagnosed with the disease was a collared sparrowhawk in a Melbourne park, which presumably ate a diseased pigeon.



Photo: Michael Porter

Overseas, it has caused sporadic large die-offs in wild doves and pigeons, and in Australia several hundred (600 estimated) feral pigeons died at a grain storage facility in Geelong. With feral pigeons so widely distributed, we have cause to be concerned about their potential to spread it to native birds. The Australian region has by far the world's most diverse pigeon and dove fauna, with 22 native species in Australia and more than 50 in Papua New Guinea (in combination a quarter of the world's total).

New diseases can have catastrophic consequences. A very high rate of mortality (up to 100%) has been recorded in pigeon lofts. Schuler et al. (2012) warn that 'transmission events may be rare, but single spillover occurrences could have dire consequences for native species.'

The virus is readily transmitted by direct contact between birds and by contact with faeces and other discharges. The virus can last several weeks in the environment. Where pigeons feed and drink with other species – bird feeders for example – could be high risk sites. Signs of PPMV1 include:¹⁴²

- high morbidity and mortality (up to 100% in some flocks)
- loss of appetite, lethargy
- gastrointestinal signs including regurgitation and diarrhoea
- neurological signs such as head shaking, torticollis
- respiratory signs.

Death can occur within three days of infection. However, in NSW the incubation period (from exposure to the virus to appearance of clinical signs) was observed to be as long as 4 weeks.¹⁴³

¹³⁸ NSW Department of Primary Industries (2013)

¹³⁹ Biosecurity Tasmania (2014)

¹⁴⁰ Cowan et al. (2014)

¹⁴¹ Aldous et al. (2004), Kim et al. (2008), Schuler et al. (2012), Ujvari et al. (2003), Australian Wildlife Health Network reports.

¹⁴² Department of Agriculture, Fisheries and Forestry (Qld) (2012).

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Potential economic impacts: Losses to keepers of hobby and racing pigeons and their costs of managing the disease (including by vaccination). Potential losses from trade restriction on racing pigeons. Potential impacts on the poultry industry if PPMV1 is diagnosed in meat pigeons.¹⁴⁴

Pathways: PPMV1 is thought to have derived from multiple events of chicken to pigeon transmission of Newcastle disease virus. Since the late 1970s, PPMV1 has spread from a likely Middle East origin into many other countries in Africa, Europe, Asia and America, probably largely through the export of infected pigeons for racing and ornamental purposes. How it got to Australia is unknown. But smuggling of infected pigeons is suspected. (Smuggling of infected pigeons and parrots has been identified as the main source of risk for Newcastle disease.¹⁴⁵) The disease readily spreads from infected birds through the air, and via drinking water and food contaminated with nasal secretions or faeces. (With Newcastle disease, some bird species can become carriers; some parrots have excreted virus for more than a year. The virus has been recovered from over 25% of introduced pet birds quarantined in the United States.¹⁴⁶)

Summary of biosecurity issues: Despite its known potential to cause disease with high rates of mortality in many Australian bird species, and its spread around the world, there was no contingency plan for the virus (whereas there is a plan for Newcastle virus). Despite its initial occurrence for several months just in loft pigeons, there was no attempt to eradicate the pathogen. We do not believe it was ever properly assessed as a potential national eradication target. There was no comprehensive risk assessment. If this disease had been of concern to industry (as Newcastle disease is) the response would undoubtedly have been much more rigorous (it is Australian policy to eradicate virulent Newcastle disease viruses in poultry¹⁴⁷). The response was flawed in several respects and failed to prevent spread of the disease between pigeon lofts. The importation of a vaccine from overseas was refused and trials of a chicken vaccine used for Newcastle disease were slow. Vaccination of kept pigeons is recommended by state biosecurity agencies but is not a requirement. The pathogen allegedly arrived with smuggled pigeons, highlighting the need for more focus on enforcement against wildlife smuggling.

Particular biosecurity issues

Contingency planning: Because this virus has been spreading around the world for the past few decades there was a realistic likelihood that it would eventually arrive in Australia. Despite it clearly posing a significant risk for Australian birds (because it has infected a wide range of Australian species or their relatives overseas), it was not on Australia's national list of notifiable diseases¹⁴⁸ and there was no contingency plan for it because Australia lacks the environmental equivalent of Animal Health Australia.¹⁴⁹ In contrast, the closely related Newcastle Disease is notifiable and does have a contingency plan.

There was an initial delay in diagnosis because the first vet to treat sick pigeons did not consider paramyxovirus as a possible cause because the 'virus did not occur in Australia'.¹⁵⁰ (Other pigeons were infected in the veterinary clinic during the period of investigation.) The lack of preparation for this disease was epitomised by the lack of any readily available vaccine in Australia known to be effective for pigeons despite effective vaccinations being used overseas (considered below).

Preventive measures/surveillance: One of the most important preventive measures (to limit the spread of an outbreak) would have been to ensure there was ready access to a vaccine (one had been used overseas for many years). But there had been no application for its use in Australia and authorities have refused to allow its

¹⁴³ NSW Department of Primary Industries (2013)

¹⁴⁴ George Arzey, personal communication.

¹⁴⁵ Animal Health Australia (2010)

¹⁴⁶ Animal Health Australia (2010)

¹⁴⁷ Animal Health Australia (2010)

¹⁴⁸ Department of Agriculture (2013). It was also not on notifiable disease lists for Victoria, Tasmania, Northern Territory and ACT.

¹⁴⁹ Animal Health Australia (2010)

¹⁵⁰ Walker (2011)

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importation without a time-consuming approval process (see below). Arzey (2013) considers the inability to quickly access a vaccine 'the most critical aspect in the PPMV1 saga'.

A more general failure of prevention is in poor biosecurity practices evident in some premises with pigeons. For example, when a large number of pigeons died (from the yet undiagnosed PPMV1) in a pet shop in Melbourne (from where pigeon fanciers sell excess pigeons on consignment), the shop owner invited his customers to collect their pigeons, thus spreading the disease to many lofts.

Emergency response: The disease was first detected in Victoria in August 2011. A decision was very quickly made (presumably by the Consultative Committee on Animal Exotic Diseases) to not attempt national eradication. There was no comprehensive risk assessment or feasibility assessment done. The decision of the Victorian government was only to try to limit its spread rather than eradicate it. This decision was made despite there being no reports of the disease in wild pigeons. There are no documents publicly available that analyse the feasibility of eradication or provide any justification for the limited approach. ISC is concerned that the decision lacked precaution, that the risks to native birds of this disease were not fully considered and that eradication was not properly assessed as an option.

The disease spread rapidly, mostly between lofts of fancy pigeons; a few racing pigeon lofts were also affected. At the time of diagnosis, 12 lofts were infected. A month later (end of September 2011) 36 lofts were infected. Seven months later (March 2012) 74 lofts were affected.¹⁵¹ The first report of infection in a wild bird, a feral pigeon, was October 2011. Up to December 2012 the disease was recorded in 16 locations in wild pigeons, mostly within 5 km of infected lofts. This included a collared sparrowhawk and a spotted dove. In Geelong in March or April 2012 about 600 infected feral pigeons died at a grain silo.

The measures used by the Victorian government to limit spread were to quarantine affected flocks, conduct tracing and surveillance. Initially, the Victorian DPI recommended to pigeon keepers that shows, racing and gathering be avoided. It was only a year later on 30 September 2012 that they were banned. These restrictions have since been lifted.

The movement of pigeons from Victoria into NSW was restricted in late 2011 (a movement permit was required). But nine months after initial detection, in May 2012, the disease spread to NSW, first recorded in a hobby pigeon flock in western Sydney.¹⁵² Infections have been recorded in 13 lofts (mostly racing pigeons). It has also been recorded in a few feral pigeons, the first detected in November 2012, 6 months after disease detection in NSW domestic pigeons. A Control Order was enacted on 28 June 2012 banning all pigeon shows, racing and gathering in NSW. (These restrictions were lifted in August 2012 following 'good uptake of vaccination by pigeon owners'.)¹⁵³ Other states also placed restrictions on movements of pigeons and equipment, and some are still in place (to Queensland, Western Australia and Tasmania) while others have been lifted.

In June 2013 PPMV1 was detected in a racing pigeon in the north west of Tasmania. This is the most recent recorded event.

It is clear from the different approaches taken in the different states and the slow response (eg. in assessing a vaccine and banning pigeon events at which the virus could spread) that the approach to the PPMV1 outbreak was weak and lacked national cohesion and clear protocols. Because it was not recognised as an emergency disease (triggering a national response and national cost sharing) and regulations and approaches in each jurisdiction was different, Arzey (2013) says the approach was 'partially fragmented and lacked clear vision'.

There is a lack of knowledge in Australia of the feral pigeon population – size, movements, habitat and ecological interactions – which compromised decision-makers' capacity to assess risks. This lack of knowledge may have contributed to a premature assumption that the disease was difficult to eradicate or could not be

¹⁵¹ Arzey (2013).

¹⁵² NSW Department of Primary Industries (2013)

¹⁵³ NSW Department of Primary Industries (2013)

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eradicated.¹⁵⁴ A more precautionary approach would have more actively considered eradication despite this lack of knowledge.

Vaccination:¹⁵⁵ As outlined by George Arzey who, as a senior veterinary officer with the NSW government,¹⁵⁶ was involved in monitoring and responding to the outbreak, a major flaw in the response was the failure to quickly make available to pigeon keepers an effective vaccine. There was no vaccine registered in Australia registered for use in pigeons. (This remains the case today.) Comprehensive vaccination of racing and fancy pigeons could presumably have prevented or minimised spread of the disease. There were two possibilities: (1) import an inactivated pigeon vaccine from overseas or (2) use the Newcastle disease vaccine registered for use in chickens if it was shown to be safe and effective for pigeons (it was thought likely they could offer some cross-protection¹⁵⁷).

Two inactivated pigeon-specific PPMV1 vaccines (manufactured by Merck and Pfizer) have been widely used in Europe and the US for many years.¹⁵⁸ However, AQIS refused an initial application to import the Pfizer vaccine.¹⁵⁹ Three years later, an application by Merck is still undergoing assessment by the APVMA. Arzey, who as chair of the Committee on Exotic diseases and Importation for the Australian Poultry Veterinary Association says he 'could not fathom the arguments against the importation of these 2 widely used inactivated vaccines when such vaccines were required urgently and when at stake was possible impact on native pigeons and other native birds in Australia, not to mention possible mutation to virulence in poultry.'¹⁶⁰ Decisions about importation of vaccines seem admirably precautionary but it can perversely mean that emergency responses to outbreaks are not precautionary. The risks of importing a widely used inactivated vaccine from the United States or Europe would seem minor.

There are chicken Newcastle disease vaccines available in Australia but their efficacy and safety in pigeons were unknown at the time of the outbreak, and advice by state governments and veterinarians was contradictory and included that there was no effective vaccine for pigeons.¹⁶¹

In 2012, the Victorian government recommended that vaccination using the Newcastle disease vaccine be considered (in consultation with a veterinarian) but Biosecurity Queensland would not endorse its use in the absence of safety and efficacy data.¹⁶² A trial six months into the outbreak by a Melbourne veterinarian (commissioned by the Consultative Committee on Exotic Animal Disease) found the vaccine was ineffective. The veterinarian had limited experience in testing vaccines, and a second trial commissioned by the Victorian Homing Association produced positive results, the researchers concluding it was safe 'and resulted in antibody levels considered protective for [Newcastle disease virus] in chickens.'¹⁶³ However, by this time 'valuable time and the confidence of the pigeon sector' had been lost. Many pigeon keepers initially refused to vaccinate their flocks because of concerns about vaccine safety.

An adverse reaction to one Newcastle disease vaccine was reported in 2014. The veterinarian reporting it warns that 'Until a product is registered for use, vaccination remains off-label and the risk of adverse reaction, including sterile granuloma, must be considered.' Until there is a vaccine registered for use in pigeons, there can be no requirement for pigeon keepers to vaccinate their flocks. Infected pigeons that are vaccinated still carry and shed the virus, although at lower levels than unvaccinated pigeons.

¹⁵⁴ Arzey (2013)

¹⁵⁵ Arzey (2013)

¹⁵⁶ Now retired, George Arzey was Senior Veterinary Officer, NSW DPI, Elizabeth Macarthur Agricultural Institute. He is the Australian Poultry Veterinary Association Chair of the Committee on Exotic diseases and Importation.

¹⁵⁷ Department of Agriculture, Fisheries and Forestry (Qld) (2012)

¹⁵⁸ Assessed as effective by Duchatel and Vindevogel (1986), Duchatel et al. (1992)

¹⁵⁹ The reason given was that it was unable to meet all the requirements of the Australian protocol for imported biological products.

¹⁶⁰ Arzey (2013)

¹⁶¹ Walker (2012)

¹⁶² Department of Agriculture, Fisheries and Forestry (Qld) (2012)

¹⁶³ Scott et al. (2013)

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Risk assessment: There has been no comprehensive risk assessment for PPMV1 in native Australian birds. There was a brief assessment by AWHN – acknowledged as rudimentary – which considered there were possible high risks for some native species. A comprehensive assessment would have taken into account the capacity of viruses to evolve to infect a wider range of hosts and the greater difficulty of detecting new strains of the virus once the disease became endemic and the risks of multiple strains exacerbating impacts of the disease. To engender confidence, any risk assessments should be publicly released and peer reviewed. Given the lack of information about the potential impacts on native birds (most of which haven't been tested), it would be appropriate to apply the precautionary principle in any significance assessment.

Learning from failure: As far as we know, there has been no review of the response to PPMV1 to assess its adequacy and what can be learned from it. As far as we are aware, there have been no changes to limit the risk of new strains entering the country.

Community engagement and communication: There were clear inadequacies in engaging different sectors and communicating about PPMV1. Arzey (2013) comments that the hobby pigeon sector was fragmented, there was little knowledge of the sector within government and it was difficult 'to establish effective communication with the industry in each jurisdiction and nationally'. In the limited publicity about this disease, most of the focus has been on racing and show pigeons and risks to poultry, with the potential for harm to native birds barely mentioned. There was also little communication with the bird watching or environmental communities. None of the sectors with a strong stake in the outcomes (pigeon hobbyists, bird watchers, conservationists, ecologists) was engaged in decision-making about the approach to the disease despite their clear stake in the outcomes.

Enforcement: There are allegations that the source of pigeon paramyxovirus was illegally smuggled pigeons, as aired in a report on ABC Radio National 'The parrot smugglers' (November 2012), which investigated deficiencies in enforcement against bird smuggling. Here are excerpts from that program:¹⁶⁴

Hagar Cohen (the reporter): Two sweeping wildlife investigations were launched in the past decade. They revealed sophisticated networks of criminals trading eggs of native parrots with eggs of exotic parrots from South Africa, Singapore and the Philippines. But as we'll hear, these two investigations were dropped at the last minute. None of the key players identified were prosecuted.

Australia has some of the toughest penalties for wildlife crime—up to ten years in jail and a \$100,000 fine—but these laws are rarely used. The previous National Manager of Investigations with Customs says smugglers operate with impunity. Here's Richard Janeczko:

Richard Janeczko: I believe with a bit more resources, effort, and equipment those people could be successfully prosecuted, so I'm concerned about that. No point in having all these great penalties without anybody who is actually going to find the crime, do the paperwork, take it to court, and prosecute people.

Hagar Cohen: So you're saying there's no one out there to police wildlife crime in Australia?

Richard Janeczko: What I'm saying is that it's not got the focus it deserves. I do think it's gone too far down the pecking order.

...

Hagar Cohen: A chilling example of the dangers involved in wildlife smuggling was documented last summer. Two diseased pigeons were smuggled into Australia. They carried the highly infectious and deadly paramyxovirus. ... A similar incident, involving exotic parrots, wasn't made public. Some of the infected parrots showed up at a vet clinic in Brisbane run by Dr Adrian Gallagher.

...

Hagar Cohen: Richard Janeczko says investigating wildlife crime is complex.

¹⁶⁴ Background Briefing (2012)

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Richard Janeczko: You make a detection at the airport, you've got two options. You either just record it, take the goods away, tell the guy he's a naughty boy or a naughty girl... to actually then pursue that to court takes a lot of effort and you know that it's going to take a lot of effort. And if you want to get the organisers, you've got to do more than that. If I get you at the airport with your birds in your vest—you've smashed them up—you've got to get DNA testing, you've got to identify the birds, you then have to work out where you were going to take the birds, because you might be only a mule, so we've got to work out who paid you, who the real organiser is. So the success rate in prosecutions, I think, or the lack of success—which is the better way to describe it—I think is down to the fact that there just isn't enough resources and priority to this sort of crime.

...

Hagar Cohen: Is it simply an issue of not enough resources?

Richard Janeczko: Well, I think firstly it's the recognition that it's a problem. And I think that's what's missing at the moment; there's not a recognition that the problem is as important as it is. So I think that's the key issue. If you accept that this is a danger to the future existence of Australia's vibrant ecology, you'd find the money.

...

Background Briefing has seen internal documents from the Department of Environment in Victoria about Operation Janitor. One document says:

(Via reader) There is ample evidence that there is a thriving illegal trade in wildlife, both into and out of Australia, and that Victoria is significant in that trade.

...

From a Department of Environment document about Operation Janitor

(Via reader) There is an ongoing criminal enterprise located in Central Victoria based on protected, notable and endangered wildlife. This enterprise is part of an established network of international traffickers in the eggs of high value wildlife. Couriers and safe houses are utilised in the operation. Profits in the order of A\$300,000 per courier per treatment are being derived. Money is being laundered and disguised through apparently legitimate businesses.

Current smuggling trends were listed as:

(Via reader) Couriers are carrying between 30 and 50 eggs on their body. There are 50 to 500 eggs entering Australia per month, a significant increase in smuggling activity over the last several years. Smuggling occurs on a weekly basis during the high season.

The intelligence was gathered between 2005 and 2009. Several properties were raided.

Issues for the inquiry

Planning and preparation

- Should pigeon paramyxovirus have been a notifiable national disease?
- Given its risks for native birds should there be a contingency plan for pigeon paramyxovirus?
- In anticipation of spread to Australia – given its spread in other countries – should there have been work to ensure a vaccine was available for pigeons?

Emergency response

- What was the decision-making process that led to the decision to not attempt eradication of pigeon paramyxovirus?
- How does the response compare to that which would have been activated if pigeon paramyxovirus had been a risk to chickens?
- Should there have been a comprehensive peer-reviewed risk assessment to inform decisions at a national level about whether there should be an eradication attempt of pigeon paramyxovirus?
- Should there be emergency provisions allowing for rapid assessment and importation of vaccines for an outbreak of an exotic disease? (Ideally this would all have been sorted out beforehand in contingency planning given the known risks of the disease entering Australia.)
- Was it justified to take several months before initiating an *efficacy and safety* trial of the Newcastle disease vaccine for use in pigeons? Should there be protocols about who undertakes such trials and methods used to ensure they engender confidence in the results?

Disease management

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- Should it be a legal requirement for pigeon keepers to vaccinate their flocks to limit the risks for their pigeons and wild birds that come into contact with them? (However, before this can be done a pigeon registered vaccine must be available.)
- What can be done to limit the risks of new strains of pigeon paramyxovirus entering Australia and potentially exacerbating the threat to native birds? Has there been any assessment of pathways?

Enforcement

- Is there sufficient focus on enforcing laws against bird smuggling in Australia?
- Is there sufficient priority in biosecurity accorded to environmentally relevant breaches?

Learning from failure

- Has there been any review of the response to PPMV1?

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