

Avian influenza surveillance programme

New Zealand has never had a case of highly pathogenic notifiable avian influenza (HPNAI) or notifiable avian influenza (NAI)⁽¹⁾. In 2005, in response to the World Organisation for Animal Health's introduction of reporting requirements for the presence of low pathogenic avian influenza viruses of subtype H5 and H7 in poultry (LPNAI), in addition to reporting requirements for HPNAI⁽²⁾, and as part of New Zealand's commitment to a global early warning and response network for HPNAI, work commenced on reviewing and expanding New Zealand's avian influenza surveillance programme⁽³⁾.

New Zealand's avian influenza surveillance programme is multifaceted, incorporating active surveillance of poultry, active surveillance of resident and migratory wild birds and enhanced passive surveillance.

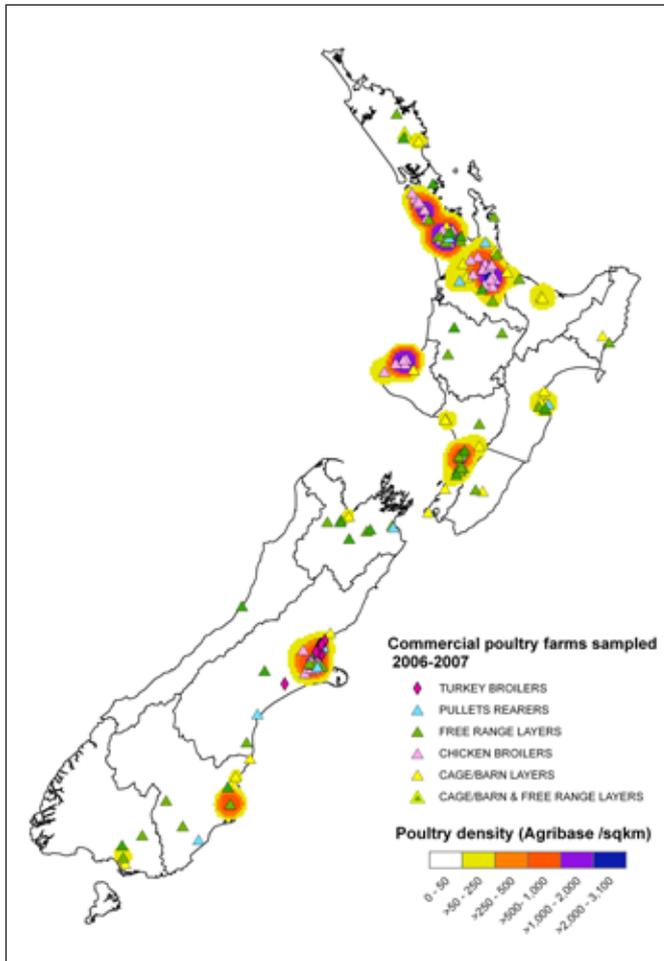
Poultry surveillance

In May 2006, MAF Biosecurity New Zealand, with the support of the Poultry Industry Association of New Zealand (PIANZ) and the Egg Producers Federation (EPF), implemented a comprehensive active surveillance programme for avian influenza virus H5 and H7 subtypes in commercial poultry. The programme has been developed to meet OIE guidelines for avian influenza surveillance⁽²⁾ and uses a cross-sectional two-staged stratified design to ensure representative sampling of all poultry production categories and proportional regional representation of poultry farms. Sampling specifications depend on the epidemiology of avian influenza within each poultry category under consideration. Results from active surveillance in chickens have been previously reported⁽⁴⁾.

Active surveillance in commercial turkey broilers was completed in 2007. Sampling was designed to detect a farm-level prevalence of avian influenza antibodies of 5% and a within epidemiological unit prevalence of 30%, with 95% confidence. All farms, including free range farms, were sampled (Table 1). Ten serum samples were collected from each epidemiological unit on a farm. Laboratory testing at the Investigation and Diagnostic Centre (IDC) Wallaceville involved a screening ELISA (FlockChek AI Antibody ELISA, IDEXX Laboratories, Maine, USA) and in-house haemagglutination-inhibition (HI) assays for H5 and H7 subtypes, interpreted in series.

Table 1: Commercial poultry avian influenza surveillance: serological results 2007					
Poultry category	Date sampled	Number of farms tested	Number of samples tested	Number of surveillance positive samples ¹	Number of NAI positive farms ¹
Turkey broilers (barn and free-range)	Feb – Oct 2007	10	170	0	0
¹ As previously defined ⁽⁴⁾					

The figure summarises the chicken surveillance previously reported⁽⁴⁾ and the 2007 surveillance in turkeys.



Commercial poultry farms tested 2006–2007 by category overlying a kernel-smoothed density presentation of New Zealand poultry numbers (Agribase™ 2007)

Surveys to date have found no evidence of NAI⁽¹⁾ in the poultry categories tested. Active surveillance in commercial ducks, geese, quail and game birds farmed for processing is planned for 2008/09.

A joint project testing for AI in small backyard poultry flocks (ducks and chickens), involving MAF Biosecurity New Zealand, AgResearch and Environmental Science and Research also commenced in 2007. No AI viruses have been isolated to date.

Wild bird surveillance

Waterfowl, and to a lesser extent waders and shore birds, are primary reservoir hosts for avian influenza and it is believed that migratory birds have the potential to play a role in the introduction and spread of avian influenza virus⁽⁵⁾. With the exception of occasional Australian vagrants, New Zealand’s waterfowl are non-migratory⁽⁶⁾. However, migratory birds do stop over and interact with our indigenous species and could provide a pathway for the introduction of new viruses. Their arrival in large numbers and their migration route through East Asia means testing of bar-tailed godwits (*Limosa lapponica*), and red (lesser) knots (*Calidris canutus*) is an important component of the surveillance programme.

A number of surveillance projects carried out since 1975 have been designed to provide information on the presence and ecology of

avian influenza viruses and paramyxoviruses in the New Zealand’s waterfowl and shorebird populations⁽⁴⁾⁽⁷⁾⁽⁸⁾⁽⁹⁾⁽¹⁰⁾⁽¹¹⁾⁽¹²⁾⁽¹³⁾⁽¹⁴⁾⁽¹⁵⁾.

Since 2004, MAF Biosecurity New Zealand, in conjunction with the Department of Conservation and other stakeholders, has carried out surveillance for avian influenza on targeted migratory birds, in particular the bar-tailed godwit and red knot, on their arrival from late September through to November, at Miranda, their main North Island arrival site. Waterfowl, predominantly mallard ducks (*Anas platyrhynchos*), are also sampled in the summer months throughout New Zealand, with a particular focus on coastal areas.

Cloacal swabs are used for influenza A real time RT-PCR TaqMan⁽¹⁶⁾ and virus isolation⁽¹⁴⁾. In 2007, 48 migratory shorebirds (19 red knots, 29 bar-tailed godwits) were tested, and no viruses were isolated. From a total of 1,190 samples collected from resident waterfowl in 2007, 34 avian influenza viruses were isolated (Table 2). Subtyping of the viruses indicated two viruses of H5 subtype and no viruses of H7 subtype. All H5 detections are further tested to exclude neuraminidase subtype N1 by specific RT/PCR for this gene. H5 and H7 subtypes are also analysed using molecular methods to determine pathogenicity – all detections to date have been low pathogenicity.

Table 2: Resident waterfowl avian influenza surveillance: virological results 2007		
Location	No samples/species	Influenza A viruses isolated
North Island		
Miranda	29 bar-tailed godwits (<i>Limosa lapponica</i>), 19 red (lesser) knots (<i>Calidris canutus</i>)	No viruses isolated
Paeroa (Piako River)	209 mallard ducks (<i>Anas platyrhynchos</i>)	14 viruses
Turua (Waihou River)	91 mallard ducks	9 viruses, including 1 H5 (not H5N1) ¹
Kaituna River mouth	218 mallard ducks	1 virus
Lake Aniwhenua	167 mallard ducks	2 viruses, including 1 H5 (not H5N1) ¹
Napier	81 grey teal (<i>Anas gracilis</i>), 224 mallard ducks	8 viruses
South Island		
Invercargill	200 mallard ducks	No viruses isolated
Total	1,238	34 viruses

¹ All H5 detections are further tested to exclude neuraminidase subtype N1 by specific RT/PCR for this gene. H5 and H7 subtypes are also analysed using molecular methods to determine pathogenicity – all detections to date have been low pathogenicity.

Enhanced passive surveillance

New Zealand has a long history of comprehensive passive surveillance. MAF operates a toll free exotic disease and pest emergency hotline, on a 24-hour seven-day a week basis, and receives calls relating to sick and dead, wild and domestic birds from members of the public, veterinarians, regional laboratory pathologists and others.

An ongoing public communication programme for avian influenza has increased public awareness of the clinical signs of avian influenza, the presence of the hotline, and the importance of reporting unexplained bird deaths.

A rapid field service for sample collection and submission using MAF approved suppliers, and a standardised investigation protocol carried out at IDC Wallaceville, is in place. The investigation protocol includes necropsy and sample collection for histology, bacteriology and virology. The presence of avian influenza is assessed using a generic influenza A real-time RT-PCR TaqMan, with follow-up using conventional RT-PCR assays to exclude H5 and H7 subtypes. Virus isolation is performed on samples that are positive in PCR assays.

In addition to investigating individual calls when required, epidemiologists at IDC Wallaceville monitor the bird reports received through the hotline and analyse the data to detect unusual events and any changes or trends in the reporting that may indicate an emerging disease event requiring further investigation⁽¹⁷⁾⁽¹⁸⁾. Reports on avian disease and mortality investigation are published quarterly in Surveillance magazine as part of the IDC report of suspect exotic disease investigations.

Future surveillance

The results of the current programme of active surveillance of commercial poultry, complemented by ongoing active surveillance in resident and migratory wild birds and enhanced passive surveillance initiatives, will establish the avian influenza status of New Zealand's avian populations. Surveys to date have found no evidence of NAI⁽¹⁾.

These activities are part of the ongoing process of demonstrating freedom from HPNAI in New Zealand and NAI freedom in commercial galliforms. The focus of further active surveillance plans will depend on the results of these surveys, risk analysis of biosecurity practices⁽¹⁹⁾ and the likelihood of introduction of avian influenza to the different poultry categories.

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