# Bird’s eye view of high pathogenicity avian influenza (HPAI) – the risks to Australia

Program overview transcript

(Duration 58mins 37secs)

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## Introduction

This is the transcript of a webinar, presented by the Department of Agriculture, Fisheries and Forestry. This webinar explores the current HPAI situation across the globe, the Australian context and the importance of biosecurity preparedness.

## Transcript

[Webinar begins]

Deanna Emms: Welcome to the Australian Biosecurity Series webinar. Birds Eye view of high pathogenicity avian influenza, HPAI the risks to Australia hosted by the Department of Agriculture, Fisheries and Forestry. I'm Deanna Emms and I'll be facilitating today's forum. Thank you for taking time out of your busy schedules to join us.

I'd like to begin by acknowledging the Traditional custodians of the land on which we meet and pay my respects to their Elders, past and present. I extend that respect to Aboriginal and Torres Strait Islander peoples attending today.

I would like to remind people we are recording this webinar and it will be available to view on our website later.

Today's webinar will focus on high pathogenicity avian influenza (HPAI) – a significant exotic animal disease – and briefly explore the global situation, what HPAI may mean for Australia and the importance of good, ongoing biosecurity practices. Avian influenza has been Australia's most frequently occurring emergency animal disease, with eight outbreaks in Australian poultry farm since 1976. We have entered the most high-risk season for HPAI.

To start today's session, we are going to hear from Dr Mark Schipp, Australia's Chief Veterinary Officer. Dr Schipp will give us an overview of HPAI from an Australian perspective. We will then hear from Dr Andrew Breed, who is a veterinary epidemiologist with the Australian Health Policy branch at the Department of Agriculture Fisheries and Forestry. He will outline the global perspective regarding the epidemiology of HPAI.

We will then hear from Dr Sally Salmon who is the Deputy Chief Veterinary Officer of Victoria. She will be discussing experiences and insights from the 2020 HPAI outbreak in Victoria.

Dr. Salmon was part of the team from Agriculture Victoria that won an Australian biosecurity award in 2021 for its response to the 2020 avian influenza (AI) outbreak. We’ll then follow with a short video from the World Organization for Animal Health about the importance of on-farm biosecurity when it comes to avian influenza.

We then look forward to answering your questions as part of the Q&A session. We have a special guest panellist joining us today, Dr Tiggy Grillo. Dr Grillo is the Chief Operating Officer at Wildlife Health Australia.

She will answer questions about the surveillance programs of migratory and wild birds and its role in avian influenza preparedness. To make the most of the expertise on hand, please ensure you enter your questions into the Q&A box at the bottom of your screen throughout the session. If possible, please direct your question to the desired panellist for answering. We will then be sharing a short poll at the end of today's session that we invite you to participate in. So, let's kick it off today. Dr Schipp, please, take it away.

Dr Mark Schipp: Thanks very much Deanna and thank you everyone for joining us today to discuss this very important topic and this disease which is having such a broad impact right across the world at the moment.

So, it's impacting not only our poultry and our wild bird populations, but also having impacts on farmers and livelihoods and what we're seeing in Europe and North America, we're hoping to avoid here in Australia. Let's move to the next slide.

The records are being broken overseas with very challenging, high pathogenicity avian influenza or HPAI outbreaks. Australia continues to remain free of this disease because the chances of wild birds bringing it into Australia continues to be low. However, we must continue to be alert to the changes being observed overseas and for that reason we monitor what occurs overseas very closely and we need to remain vigilant to ensure that we've got good biosecurity practices in place and have our plans ready to go. Next slide please.

As Deanna said, avian influenza or HPAI is the most frequently occurring emergency animal disease in Australia and we've had eight outbreaks over the period since 1976. It's a viral disease of birds which occurs worldwide and sometimes it spills over into other animal species and we've seen that recently in the overseas experience.

There are two categories to describe avian influenza: high and low pathogenicity. High pathogenicity refers to its ability to cause severe disease and mortalities in chickens, and it can give an indication as to its possible zoonotic or impacts on other species as well.

As I said, we've had eight outbreaks in Australia since 1976 and the map shows that they've occurred in the three eastern states. This is referring to the entirety of the state, not the actual locations of those outbreaks. The most recent outbreak was in Victoria in 2020 and Dr Salmon will speak about that shortly. For 18 years now, we've been monitoring wild birds for avian influenza and we’ve collected thousands of samples with no HPAI virus detected amongst those samples. Some of our migratory shore birds that pass through certain regions of Asia can be exposed to the lineage of virus that's of current concern in northern hemisphere.

However, there's no evidence currently that those migratory birds are still carrying those infectious HPAI viruses when they arrive in Australia and this accords with our previous experience of the previous outbreaks that we've had in Australia, which have been caused by low pathogenicity virus that has mutated after it has entered poultry flocks and become high pathogenicity avian influenza.

We must reiterate that we continue to find every year we find multiple low pathogenicity avian influenza viruses when we conduct surveillance in wild birds, and for that reason, exposure between wild birds and domestic poultry should be prevented because that is the way that we believe that these previous outbreaks that we've had in Australia arose. Moving on to the next slide, this shows the global landscape and Dr Breed will be providing a global perspective, but the above map shows disease events that have been officially reported by countries to the World Organization for Animal Health and you can see that it has been quite exceptional. These are the reports just for this year and it's been an exceptionally challenging year for counterparts in North America and Europe. Next slide, please.

In the previous year in 2020 and 2021 over 60 countries were affected by HPAI with losses of close to 60 million poultry these are the reports that have been received by the World Organization for Animal Health and since then in Europe, it's reported its largest ever recorded epidemic season this year. It's reported over 2400 outbreaks in poultry and so far they've culled about 48 million birds.

In addition, they've also reported 3500 HPAI events in wild birds and this is a feature of what we're currently experiencing it is the high impact on wild birds where they've been significant victims of this virus which is unusual in our experience. Infection has also been reported in a range of other species, so we've seen spill over into foxes, dolphins and seals, presumably because they've been feeding on dead or sick or other poultry or wild birds.

In addition to the devastating impacts on poultry and captive birds and wild birds, there's also obviously a significant social and economic implication in and it's worth remembering that avian influenza was responsible for the United States largest animal health emergency in 2014/2015 where they had more than 50 million birds dying or being destroyed, and the cost to the federal government was in excess of 880 million U.S. dollars and another $200 million for indemnities. So, in excess of a billion dollars there in the US experience in 2014/2015.

In addition, there's obviously impacts on the community and economic stress. Flock mortalities mean that there will be loss of protein and chickens provide a significant and very affordable source of protein, both chicken meat and eggs here in Australia and overseas. And then there's the disruptions to producers and to the industry as a whole, which can be quite severe and sustained. On top of this, there are the international trade and market export opportunities that are lost when we have a disease outbreak and regaining those markets can take a considerable period of time. In addition, there is a public health consideration. A number of these viruses have the potential to spill over into humans and cause zoonotic disease. Fortunately, that has not been a feature of the H5N1 virus that’s been circulating in Europe and North America over the last two years. Indeed, there's only been two reports of human infection there over the past two years, despite the millions and millions of birds that have been affected and those two humans both had considerable and very close exposure to affected poultry.

Next slide please, And as mentioned earlier, the overall risk of high pathogenicity avian influenza being introduced to Australia through the natural pathways, that is through wild birds and migratory birds, has been considered to be low historically. However, the situation abroad means that we are increasing our level of interest and concern and it also means that the probability is likely increased compared to previous years given that price of disease is moving further and we're seeing it, for example, in Indonesia and near neighbours.

The period of concern for Australia commences now and runs through to the end of November. So, this is when migratory birds return to Australia in the spring and summer period and particularly now in Australia we've got a lot of surface water, surface water close to poultry establishments and this is going to provide a lot of opportunity for water birds and migratory birds to have closer association with poultry than in previous years.

For this reason, we believe that this is a climate sensitive disease and the mapping that has been done in recent years showed that when you've had years of drought followed by significant periods of high rainfall then you're more likely to have an outbreak and that's very similar to the conditions that we've faced this year and last year where we had significant trails in 2019/2020 and now significant water events in 2021 and 2022. And you’ll be aware that emergency services are gearing up for a significant storm season at the moment, and their advice is to get ready. My advice to the poultry industries and the livestock industries is that we should also be getting ready and that biosecurity and animal biosecurity should be a core component of our emergency preparedness and our storm arrangements.

Moving to the final slide. Thank you. So, a few key messages. Firstly, to remember the biosecurity matters. They matter to our communities, they matter to the health and welfare and the lives of the birds in your care. They matter to your business, and they obviously matter to wildlife and to our broader ecosystems. I hope that this webinar serves as a reminder to consider biosecurity as part of your routine activities and preparedness and to regularly review these.

I want to encourage you to reach out with any suspicions, so if you believe that you've seen a disease event, unusual mortality, or illness in wild birds or in domestic birds, please call that number that's on the screen there. That's the emergency animal disease watch hotline, and we'll pick up that report and investigate it further.

Also, I want to point to a number of resources that are available online and we'll have a screen of these and some links that will be provided but particularly to talk about Wildlife Health Australia, you'll hear from Dr Tiggy Grillo later in this webinar, which includes advice for people that encounter sick or dead wild birds, and how to report that and advice to vets and animal health professionals in responding to those calls.

There's advice available from Animal Health Australia, including our OzVet plan suite, farm biosecurity have got a large collection of resources for poultry holders to enhance the biosecurity on their properties and then resources that are available from industry and from state and territory partners. We are very fortunate in Australia. We have some exceptional expertise, including my fellow panel members and particularly Dr Andrew Breed, who you'll hear from shortly. So, to reiterate, Australia remains free from high pathogenicity avian influenza, but we need to remain alert and we need to remember that biscuity matters, to review our biosecurity arrangements, to reach out and report any suspicions of disease and to make good use of the resources that are available. Thank you very much.

Deanna Emms: Thank you, Dr Mark Schipp. That was some fantastic advice and takeaways there and we will be definitely sharing those links and further information in our follow up email. Now we will hear from Dr Breed. Thank you.

Dr Andrew Breed: Thanks, Deanna. Yes, so I am going to be giving very much a bird's eye view and perhaps a rapid fly-past on aspects of avian influenza, high pathogenicity avian influenza epidemiology and surveillance.

Just move to the first slide please. And so, you can see here the title for my next few slides on the left and on the right is a diagram indicating the circulation patterns of influenza A viruses. The solid circle around the duck silhouette, the wild ducks and their relatives of the ancestral hosts of all flu A viruses and the dotted circles indicate the circulation of avian influenza viruses in wild birds and poultry, and then the dotted circles around the other dotted circles are indicating that we have independent, established circulation of other flu A viruses in different species and populations, including pigs, humans, dogs, horses and some bats.

Next slide, please. So specifically, on avian influenza these viruses are classified into subtypes according to variation in a couple of surface proteins. The hemagglutinin and neuraminidase and they are numbered according to the variations of those two proteins, so they have H and numbers that you've probably heard before and there's also the pathotype classification that Mark spoke about. So, for avian influenza, there are two pathotypes low and high pathogenicity, and this refers to the disease severity in chickens and doesn't necessarily indicate the severity of disease that the same virus would cause in other species, such as humans. On the right-hand side of this slide we see a filogenetic or family tree showing the genetic relatedness of the hemagglutinin proteins of the different types, subtypes of avian influenza. So, all of these exist as low pathogenicity viruses circulating in wild bird populations globally and so far it's only two subtypes the H5 and H7 that have been observed to be able to mutate to a high pathogenicity form, and so they're showing indicated by the red oval shapes here. So, you see they're not particularly closely related.

Next slide please. And so, the way that high pathogenicity avian influenza causes more severe disease is through systemic infection in the birds that it can infect. In the images on the right here we have that phenomenon is being shown through the way that low pathogenicity avian influenza viruses can infect different body organs and the image on top. So, the purple colorations indicating that these LPAI viruses are restricted to the respiratory and gastro intestinal tracts. But when the mutation to high pathogenicity occurs, which globally has been recorded to occur probably about 45 to 50 times. Only it's been seen to occur in poultry, usually in chickens, but a couple of times in other poultry species. Once this mutation occurs, the image below is showing that this then allows the virus to access a whole variety of different body organ systems and can then cause much more severe disease. So globally, the first reports of disease due to HPAI were recorded in the 19th century, in the 1800s in Europe. But the first time the virus was actually isolated through traditional methods was in 1959 in chickens in Scotland.

So, from then from the time period from 1959 to 1995 there were 15 outbreaks of HPAI recorded globally all of which were fairly small with pretty minimal impact. And as we saw from Mark’s slide four of those 15, so over a quarter occurred in Australia. And then in the late 90s, things really changed regarding HPAI globally particularly with the emergence of an H5 Eurasian lineage. And this lineage has persisted until the present day and repeatedly spread intercontinentally and emerged in East Asia and spread on various occasions to Europe and Africa and remains endemic in poultry populations in some countries in Asia and Africa. And also since 1996 we've seen a number of really large outbreaks due to H7 HPAI, so in 1999 there was a large outbreak in Italy of H7N1 and in 2003 H7N7 in the Netherlands and also in 2004 an H7N3 in poultry in Canada, all of which arose due to independent mutation events.

Next slide please. Moving to epidemiology. So in this context epidemiology is the scientific study of the patterns and risk factors for disease in a group or population and this is useful to be able to understand the behaviour of the virus sufficiently to be able to manage and control disease. And so the factors influencing the epidemiology of HPAI can be classified or described in different ways, but I think one way that's useful is to look at their association at the level of agent, host and environment. So, at the agent level, which means the virus, as with all influenza viruses, HPAI shows rapid viral evolution and this allows the virus to over time escape immune responses and vaccines. At the host level, a key factor influencing the epidemiology is the species. So, host level meaning within individual birds. So as I said earlier wild ducks and their relatives are the ancestral hosts of all flu A viruses. So these birds have coexisted with flu viruses for thousands of years and this we see this being evident in the severity of disease in some wild duck species and in domestic waterfowl, ducks and geese often being considerably less the same virus, of course, considerably less disease and spread differently to that of other bird species, particularly in chickens and turkeys, which are much more susceptible to severe disease.

And then there's a range of environmental factors that influence the epidemiology particularly spatial patterns of host arrangement, meaning the aggregation or density at which birds occur. So, for poultry, this is stocking density and for wild birds, this is variation in seasonal variation in aggregations that when they're in very close quarters allows much more rapid transmission of the disease. Other environmental factors such as temperature and water availability effect the survival of the virus in the environment and impact its epidemiology.

Next slide, please. So, moving on to surveillance. Animal health surveillance is the ongoing and organised collection and analysis of data and dissemination of information so that action can be taken. So, in the context of HPAI surveillance can have various purposes or objectives, and these can include determining the presence or distribution of HPAI in an area, monitoring for trends and changes in the virus over time. It can also be early detection of virus if it may first appear in a geographic area or population and also where the virus is absent, surveillance can be used to generate evidence for to show freedom from infection again in particular geographic areas or populations. So, the method of surveillance, that's really the front line for HPAI is the observation of birds for signs of disease and investigation of unusual mortality events. And increasingly, we see surveillance being useful not just for detection of the presence and subtype of HPAI, but also there's value in generation and analysis of the genetic sequence data of these viruses. And this helps determine much finer resolution transmission patterns and there's a phylogenetic tree pattern on the image on the right side of this slide showing that.

Next slide, please. My final slide, just some recent events regarding the epidemiology of HPAI that Mark has alluded to already to some degree of particular significance. So, this Eurasian H5 clade that first emerged in the late 90s has a variant or strain designated 2.3.4.4 that emerged in East Asia in 2014 and has shown repeated intercontinental spread through wild bird populations, including into North America for the first time ever in 2014 and then a couple more times in 20221. This same strain or lineage is showing an apparent expansion in the host range. The different species that are appearing infected, and particularly migratory pelagic seabirds, wild mammals, as Mark mentioned, particularly foxes and marine mammals, is an event of concern and something different. And finally, in parts of Europe there's evidence that this virus is perhaps adapting sufficiently to wild birds to cause persistent or endemic infection in wild bird populations, which would be a real change in how this virus could be behaving.

Next slide, please. That's all the slides I have. Thanks for your attention.

Deanna Emms: Thank you, Dr Breed, that was very interesting and I loved the images on that last slide there. Over to our final presentation by Dr Salmon.

Dr Sally Salmon: Thanks Dee. Today I'm really pleased to be able to share with you some of the details of the avian influenza outbreak in Victoria in 2020. I'll only be speaking about the H7N7 outbreak, but many of you will be aware that simultaneously we had two, low path avian influenza outbreaks and we managed all three essentially as one outbreak. As Deanna noted, I was one of two deputy CVOs in place during the response and I led the epidemiology team throughout the event.

Next slide please. So, to start at the beginning, late on the 29th of July 2020 we were advised by an attendee veterinarian that they strongly suspected highly pathogenic avian influenza in a commercial free range egg producing farm at Lethbridge, which is near Geelong in southwest Victoria.

Clinical signs were observed, including lethargy, diarrhea and egg production drop in almost 100% of the birds in one shed. They undertook some necropsies and they contained a range of samples and they submitted them on the very same day to our state veterinary laboratory which is AgriBio at Bundoora initial testing there on the same day was strongly positive for influenza A and H7 subtypes, so then the samples went on to the Australian Centre for Disease Preparedness in Geelong, which is our national reference lab for these sorts of diseases. On the next day, the 30th an Ag Victoria, thank you, Ag Victoria Field team visited the property and additional diagnostic samples were collected and submitted to ACDP, the property was placed under quarantine on that day as well under section 110 of the *Livestock Disease Control Act*, relevant tracing information was collected, particularly on shipments of eggs that had left the property and by that time highly pathogenic H7N7 avian influenza had been confirmed by the reference laboratory ACDP in Geelong.

Prior to the onset of clinical disease, the farm had approximately 44,000 52 week old layer birds. They were housed in two separate sheds, so there were approximately 22,000 birds in each shed. Between the 24h and 29h of July in one of the sheds, the egg production had decreased to 61%. That's the little control chart on the left, feed consumption had decreased by 50% and on the right you can see a clear and significant increase in deaths in that group of birds. The second shed interestingly at that time was unaffected.

Next slide, please. This is a stylized diagram of the Lethbridge outbreak as it unfolded. 1IP at the top left there is the index case I've mentioned earlier, the arrows show the order in which we discovered infection. 2IP is a very large enterprise, effectively running as two production units. The west farms are 100% free range and the east farms are mixture of caged, barn and free range birds. 3IP had three sheds of birds and all these properties were within 8 kilometres of each other probably three or four between 2 and 3 and about four or five between 1 and 2.

By the end of the outbreak, we actually had four properties that were affected by the H7N7 virus that included a compost site that we detected by following the movement of manure and litter from 2IP to the compost site next door.

Next slide, please. Once the disease was detected, the aim on the on-farm activity was to contain and eradicate it. So, that started with the quarantine that was commenced on the 30 July, then followed by the tracing and surveillance, which commits very early as well. Then the on-site work commenced and that's focusing largely on what we call the 3D's, the destruction, the disposal and the decontamination of the site. Property resolution process was also a key component of the response and for each property a plan was developed that allowed successful reestablishment of a healthy flock on the infected property and it also helped provide more information supporting our claims for disease freedom.

Next slide, please. Thank you. This slide provides some more detail on the response activity at Lethbridge. The yellow shaded area is the limit of what we call the control area. On this occasion, we selected the whole Golden Plains Shire to be the control area and each of these areas I'll talk about are areas where legal orders are put in place to control movements of birds, products, sometimes people but not on this occasion, so that we can control the disease. So, the yellow shaded area was the limit of the control area. It's kind of the buffer between the red area in the middle, which is the restricted area and the side of the infected properties and the outside area which was the rest of Victoria which is the grey area there.

Intensive surveillance was undertaken and it involved production and mortality monitoring, like those control charts I showed you earlier on all the commercial poultry properties and I'm very grateful for their owners being prepared to share that information with us. It's quite unusual. We had twice weekly dead bird pickups from all of the commercial properties and we had text communication with owners of small flocks and there's a lot of those asking them to let us know if they see any unusual signs in their flocks. After the detection of the second affected property, 2IP we imposed a housing order for domestic poultry. That's something we've never done before in Australia and we put that in place because we were concerned about the potential for the amount of circulating virus in the environment and the spread, probably mechanically more than anything from the two infected properties we knew we had. And so 2IP is a big property to other properties. So, by asking people to confine their domestic poultry with good limit their interaction with wild birds that was really the aim. The other thing that we did that was a little unusual is we did a quite a lot of wild bird testing. So, we asked people to let us know if they found dead wild birds anywhere in the state, but particularly in Lethbridge and we also collected environmental samples. Some of them were part of the surveillance activities that Tiggy will tell you about, but some of them were quite specific for this event.

Next slide, please. After the event and Andrew’s mentioned this, we used genomic analysis of the virus and we've tracked what we saw unfolding in real life and we've all lived through COVID, it's very much like the COVID story.

Essentially the virus on all the properties was the same, but as it moves through birds, there's slight subtle changes in the virus genome that we can track. The original source of the virus is probably unknown, but it was it was – sorry - it was unknown, but it was probably wild birds. And as Mark has indicated over time and in 22,000 birds, it was able to mutate to highly pathogenic strain. At 1IP, there was initially only the one affected shed but during the flock depopulation process, clinical signs became apparent and the second shed of course also became infected and was depopulated.

At 2IP, the virus was detected in dead birds are one shared from each of the west and east sides and from interestingly enough, from a collection one day before clinical signs became evident in the west side.

Next click, please. Thank you. And the last one, perfect. Genomic analysis suggests that separate introductions of virus from 1IP to each of the west and east sides of the farms took place and could see it looks like there might have been five separate introductions of virus to the different sides of the farm.

We've been unable to establish exactly how the virus moved between 1IP and 2IP, but some work we've done with CSIRO suggests that the virus may possibly have moved by dust spread on the wind.

The story of 3IP is interesting too. It's part of the same business entity as 2IP. A single shed was due for depopulation because the birds had reached the end of their productive lives. We'd taken a pre movement test of the birds on Monday the 17th of August. They were all negative but clinical disease was evident on the 23rd virus was confirmed on the 25th. Anecdotal evidence at the time suggests that contractors already busy depopulating and cleaning up 2IP may have visited 3IP a little earlier than we'd expected. We've been unable to establish who or when or what or how the disease spread from 2IP to 3IP, but genomic analysis confirms that's what happened.

Next slide, please. So, the final part of the response was collecting sufficient evidence to support a claim that Australia had regained freedom from HPAI. You can see from this slide there are a number of steps in the process and the announcement of regained freedom was made on the 26th of February. So, in summary, this was a massive and very costly event, $22 million roughly, 212 days, 427 people deployed and 460,000 birds destroyed. Thank you for your attention.

Deanna Emms: Thank you, Sally. And you already answered one of the questions in your presentation, so well done. Just a reminder to please put your questions in the Q&A box and directed them to who you would like them to be answered. We will now play a short video from the World Organization for Animal Health.

[Video begins]

Farmers have a vital role in the prevention and limiting the spread of bird flu outbreak. The best way to prevent build flu is by consistently using appropriate biosecurity measures. Farmers must implement strict biosecurity measures in farms in commerce and in live bird markets. They should also ensure that farm workers are trained in employing such measures. Regular cleaning and disinfection of poultry premises is highly recommended, including materials and equipment such as drinkers and feeders used on the farm. Ensure that all clothing and footwear are washed thoroughly before contact with birds. Feeds should be stored in proper and secure storage places. Water should be pure and treated to eliminate any contamination.

Ensure appropriate disposal of manure, litter and dead birds. Quickly report sick or dead birds to responsible authorities. Use personal protective measures and avoid direct or close contact with sick or dead birds or contaminated environments. Visitors, vehicles and materials entering the farms must be strictly controlled and disinfected while entering and leaving the farm. Prevent direct or indirect contact between poultry and wild birds near farms, and prevent wildlife access into the farms.

[Video ends]

Deanna Emms: Thank you everybody. What a great line up of speakers we had today and a big thank you to Mark, Andrew and Sally. Now, it's time for our Q&A. Joining us to answer some of your questions is Dr Grillo, welcome Dr Grillo.

Dr Grillo, noting your work in the wild bird sector can you tell us more about your role?

Dr Tiggy Grillo: Thank you, Dee. Thank you very much for having.me along as one of the panellists to answer questions today, much appreciated. So as part of my role in the team at Wildlife Health Australia, we coordinate Australia's national avian influenza wild bird surveillance program. The program includes participants from a range of different organizations such as government, non-government, researchers as well as industry. So, we have poultry industry on our wild bird group to have their perspectives. And the group includes not only influenza experts but also experts in wild bird ecology, such as understandings around their migration, which we've heard about as being important.

As part of that program, the low pathogenic avian influenza viruses that Andrew and Mark noted have been detected in Australian while birds, they form part of the natural virus community for Australian wild birds and we monitor those. The national program collects samples from these healthy, apparently healthy birds, often by sampling poo samples that they've recently deposited by poking a little swab in them and then we screen those samples for influenza viruses.

Once we get a detection of a positive sample then we then screen those samples to determine if they are strains that we know exist in Australia like the ones that can periodically spill over into poultry and mutate, or they're novel viruses that might be concerning, such as the high pathogenic avian influenza viruses that we've heard about from overseas.

And this program is particularly important because while birds are the predominant source for detecting influenza viruses and the main source of viruses we can use to monitor what's here and what we want to try and be alert to. As part of the activities of Wildlife Health Australia, we also coordinate national disease investigation information that occur through investigations of sick and dead wildlife including wild birds. So, for example, if a member of the public reported a number of or a mass mortality, a number of wild birds being dead, then they would be reported to the authorities through the emergency animal disease hotline.

As Mark alluded to in his presentation and the authorities would request samples to be submitted, and they would most likely be tested for avian influenza to ensure that wasn't the cause of that event. And we call that our general surveillance program. So as Mark said through the programs that we've coordinated for over that are concerning and it's really just important to report mortalities and sickness in wild birds because that's part of a key element of Australia’s biosecurity system. So thanks, Dee, that's a quick summary of what we do.

Deanna Emms: Thanks to Tiggy and that definitely answered one of the questions we already had coming through, which was how do we take samples, what do we need to do? So that was really helpful. Thank you very much.

I can say there are a fair few questions coming in already. If we don't get to your questions, there will be information on the final slide about some further references and an email sent out when the recording is published. So please do use those resources.

So let's jump into some of the questions we have here.

Today, first for yourself, Doctor Schipp. As free range layers have doubled the risk of exposure to AI in normal times what is the advice regarding biosecurity when birds are outside with lots of service surface water?

Dr Mark Schipp: Yep. Thank you for that. Yes, free range birds do have a higher risk of exposure, but our experience is that they have a lower incidence of high pathogenicity avian influenza and it may be because that mutation issue which seems to occur mostly within a shared environment. But to answer the question, what we want to do is reduce the opportunity for interaction between wild birds and poultry.

So, that may mean in present circumstances closing the sheds. We heard about the shedding order in Victoria that was used during the outbreak. UK are taking a similar approach also, but it may be simply mean identifying areas that are flooded and keeping poultry away from those.

Deanna Emms: Thanks, Dr Schipp. So, Dr Andrew Breed. How do recent HPAI events overseas affect the risk to Australia?

Dr Andrew Breed: Thanks, Deanna. Yeah, I guess as we heard from Mark, the risk of entry of that Eurasian H5 lineage to Australia that's circulating so much overseas to Australia is considered low, but it's possible that that risk is increasing with some of the changes we're seeing overseas. We do know that there are large numbers of migratory shore-birds that move between Australia and northern neighbour countries every year in a seasonal pattern and those birds are moving into Australia basically at the moment through the spring and into summer.

We've seen evidence that some of those birds can be exposed to HPAI overseas but so far we haven't seen evidence that those birds are infected with those types of viruses when they arrive in Australia.

So, I guess in summary we know that there is some connectivity of the bird populations and the low pathogenicity flea populations between Australia and those overseas. We think there's potential for HPAI viruses to follow the same pathways, but we haven't seen that occur to Australia ever before and the risk would be perceived as being low from our understanding of the science currently, but it's certainly an area to for ongoing observation and monitoring. Thanks.

Deanna Emms: Thank you. And Doctor, Sally Salmon, what nesting was used in the sheds depopulated? What was the most efficient depopulation process? I'm guessing this is in response to the Victorian outbreak.

Dr Sally Salmon: Thanks Dee. I am sorry I can't comment on the nesting material due to COVID we had very limited ability for staff to actually attend these sites and we really limited it to the operational staff that we're needed on the site. The most efficient depopulation process, we physically depopulated the first IP and we also physically depopulated one of the low path sites by different processes.

By the time the second infected property came hot on the heels of the first one and it was a huge property, it became apparent to us that the most efficient way to do this was to ask the contractors who are normally part of that business enterprise, to take on the role of depopulation so they normally do that role anyway at the end of the productive lives of those birds. So, they took on that role under contract to us to the response effectively and that was a much more efficient way to manage the very large numbers of birds involved on that property. And because as I said, 3IP was associated with 3IP they're all part of the same business unit that flowed onto that group as well and that is one of the lessons to us from this.

I think we're going to have to more and more rely on commercial contractors who are good at this stuff, who do it all the time. Bearing in mind that we have very specific safety issues that we need to address and make sure that our staff are safe and we also need to address animal welfare issues in the process as well. So, it's not an easy process, but that's where we're working at the moment.

Deanna Emms: Thanks, Sally. It does sound very complicated. I will go to Dr Tilly Grillo – Tiggy Grillo – sorry about that. I have a few questions that I think might be able to be combined into to one big answer for you.

What about the potential role of wild birds and can we introduce measures to reduce the risk of incursion due to wild birds. Someone has suggested how far should dams to limit exposure? And the question of Ibis as well. So, hopefully that gives you a little bit of free rein to answer that one.

Dr Tiggy Grillo: Thanks, Deanna. Look there, I guess the one thing I was just say really up front is that globally and all the experts sort of all agree that destruction of wild birds and destruction of habitat is not a way to control avian influenza and it's not a method that's beneficial in any way. So just want to put that up front. In terms of where dams are on properties, they should certainly be far away or there are other methods that property owners have to deter wild birds.

Good biosecurity is all part of that as well. So, for example, farmers can ensure that there is not feed left on the ground outside the property that might attract wild birds their property or into areas where the poultry are already visiting outside. So, there are lots of methods that can be undertaken as part of the biosecurity plan to ensure that wild birds don't interact with poultry on the property. You mentioned Ibis. Ibis, certainly some studies have been done and in Ibis in relation to avian influenza. But we know the predominant wild birds in Australia that harbour low pathogen avian influenza viruses, our water birds, so ducks, plumed whistling ducks, magpie geese and the next category of birds that tend to harbor low path avian influenzas in Australia are the shore birds. So, terns, red knots, for example, and ruddy turnstones are another bird for example.

There have been very limited cases of low path avian influenza is detected in Ibis. But Ibis might be a front of mind in relation to other diseases that we monitor as well within the Australian context. So hopefully I've answered some of those questions. There are quite a few there. So, I think I covered most of them but I might have missed a few. So, apologies if I did that.

Deanna Emms: Thank you, Tiggy. And that's probably on me for asking too many in one go. They all just sounded very interesting.

Dr Mark Schipp in reference to AI being a climate sensitive disease did you say that HPAI is moving south as climate shift or was that a reference to a broader subset of diseases?

Dr Mark Schipp: Thank you. And my apologies for not being clear there. So in terms of it being a climate sensitive disease in the Australian context where largely talking about flooding and surface water which is attracting water birds away from river systems and onto farms and into closer proximity to poultry. More broadly, we're also looking at issues such as storms and Andrew spoke about the northern migratory species come quite close to Australia but don't usually enter Australia. But there have been occasions where they've got lost or they’ve got blown off course and with increased cyclonic and storm activity we might expect to see more of in future.

To make the point that HPAI is not confined to Europe and North America. It has been reported in Indonesia, we suspected it's present in other near neighbours but has not been reported and for that reason, we need to remain very vigilant and look out for the signs of it turning up or appearing in Australia.

Deanna Emms: Thanks, Dr Schipp Dr Breed, one for you.

What are some of the lessons or experiences from foreign countries which have dealt with an HPAI outbreak? Which can be applied to Australia?

Dr Andrew Breed: Thanks, Deanna. Yeah, I guess there's lots of information and lessons from outbreaks overseas and then part of, I guess the process is about sharing that information through various networks and conferences do people have that opportunity to find out about the particular outbreak response experiences. And also sharing analysis of data and experiences and applying science in a rigorous way to try to understand with clarity the factors that have made a difference in outbreak responses. And in a more general setting, I guess, developing and maintaining good and strong animal health surveillance and reporting systems has clearly been really useful overseas. Conducting research to understand the interface between wild birds and poultry that can relate to the direct and indirect transmission of virus across that interface and also carrying out research to look at the biosecurity measures that can make the most difference in different types of settings. Thank you.

Deanna Emms: Thank you very much. Now I will throw this one open to anyone who would like to answer or everybody who would like to answer. How can human and animal health experts work better together to address these types of outbreaks and prevent them from occurring in the future?

Dr Mark Schipp: I think the outbreaks will continue to occur in wild birds, so the measures that we can take to protect poultry and one of the key measures that we're looking at globally is use of vaccines. And whether we can prevent this enormous loss of protein and of poultry through mass destruction and slaughter through widespread vaccination. And then in terms of the zoonotic potential to ensure that we're sharing information to the fullest extent possible. So the sequencing work, the clade work that Dr Breed spoke about and feeds into development of human, human influenza vaccines and our awareness of influenza in human and other mammalian populations. So, providing forums to gather and share that information I think is very important.

Deanna Emms: Thanks, Mark. Would anyone else like to have a go as well?

Dr Tiggy Grillo: Just like to add that at least in Australia, we're very fortunate to have a large number of experts who understand avian influenza, who contribute to global discussions on avian influenza as well. That also cover the three sort of sectors of what we refer to as one health environment, agriculture and human health. And we're very fortunate that the wild bird group that we manage here at Wildlife Health Australia has those three items or three areas and sectors represented, as well as the poultry industry has a voice within the wild bird program and we're very fortunate to have human health experts who sit on that group as well. So I guess I'll just leave it at that to flag that we're very, very fortunate that there's already that collaboration within Australia through the wild bird program.

Deanna Emms: Thank you, everybody. And I think we are getting very close to the end. I would like to say thank you for joining us today. Your feedback is greatly appreciated by participating in a short poll by scanning the QR code on the screen with your phone or by going to menti.com and inserting the code on the screen, the information will also be shared in the chat very shortly on the screen.

We have other channels to connect to our work and details if you'd like to be added to the invitation list for this webinar series.

A reminder that today's session has been recorded and will be emailed to registrants and available on our website shortly, that email will also include links and information for further resources if you're interested.

Thank you for everyone who has attended, for your time and engagement and your wonderful questions. We apologise if we didn't get to them today. Thank you very much.

[Webinar ends]

**Acknowledgement of Country**

We acknowledge the Traditional Custodians of Australia and their continuing connection to land and sea, waters, environment and community. We pay our respects to the Traditional Custodians of the lands we live and work on, their culture, and their Elders past and present.

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