# Australian biosecurity webinar series

Lumpy skin disease

(Duration 1 hour 27 mins 27 secs)

11 April 2022

## Introduction

This is the transcript of the Australian Biosecurity Series – Lumpy skin disease webinar, presented by the Department of Agriculture, Water and the Environment.

## Transcript

[Session begins]

Steve Peios: Hello, everybody. Good afternoon. Welcome to our ninth webinar in the Australian Biosecurity Series. Today's topic, lumpy skin disease, what you need to know about this biosecurity threat hosted by the Department of Agriculture, Water and the Environment. My name is Steve Peios and I will be facilitating today's forum. Thank you very much to everybody for taking time out of your busy schedules to join us today.

I would 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 also like to remind people that we are recording this webinar and it will be available to view on our website later on. We have an extraordinary mix of listeners with us today, including animal health representatives, cattle, producers, live animal exporters, government biosecurity experts and the general public.

We have a lot of regional and rural attendees, so greetings to those folks tuning in today from West Woombye, Won Wron in Southeast Victoria, and Camooweal near Mount Isa in Queensland. We also have listeners tuning in from around the world, including Bangkok, Jakarta, Quezon City and New Delhi. There is also a good cross of federal and state government and private sector attendees. In fact, it's the largest audience for any biosecurity series webinar, to date. So thank you very much, everybody, for taking part.

Let's begin to discuss our topic today, lumpy skin disease, or LSD. LSD, predominantly, impacts cattle and Buffalo and is transferred by biting flies, mosquitoes and ticks. It causes serious skin lesions on infected animals, as well as fever, loss of appetite, decreased milk production and can sometimes lead to death. In 2019, LSD was reported for the first time in Bangladesh, China and India. In 2020, it hit Taiwan, Nepal, Vietnam, Bhutan, Hong Kong and Myanmar. In 2021, outbreak spread to Sri Lanka, Thailand, Malaysia and Pakistan. And in 2022, so far, the disease has spread to Singapore and Indonesia and was recently detected in 31 villages in Riau province on the island of Sumatra. Now, that's only 3,500 kilometres from Darwin.

Today's discussion is designed to provide information on LSD, what producers and exporters need to look for, how outbreaks have been handled overseas and what Australian biosecurity responses are in place. We will hear from three key speakers, all of whom are at the forefront of the response plans, policies and tools that are being developed to combat lumpy skin disease. We are also very fortunate to have an expert panel to answer your questions, once the presentations are completed.

To start today's session, we are going to show a short video explaining the ABC's of LSD. We will then have Australia's chief veterinary officer, Dr Mark Schipp, talk to us. Dr Schipp has just returned from Indonesia where the disease has badly impacted several rural regions. So we look forward to hearing his insights today.

We will then hear a prerecorded presentation from Dr Nadav Galon. Because he's located in Israel, Dr Galon will not be able to appear in the Q&A, unfortunately, in person, but has provided a number of answers to any anticipated follow up questions. Dr Galon is a former national chief veterinary officer of Israel and a delegate to the OIE. Dr Galon was on ground during several LSD outbreaks in Israel. His presentation is about what that looked like, how it impacted industry in that country and the challenges Israel has faced with recurring outbreaks over the past 33 years.

Then we will follow with James Watson. James is the group leader, Emergency Disease Investigation at the Australian Centre for Disease Preparedness at the CSIRO. As many of you may know, Australia has not approved the use of an LSD vaccine, as have other countries. James is here to walk us through where we are at in that process and how Australia is tracking, regarding vaccines and other LSD combat tools.

We then look forward to answering your questions as part of our extended Q&A session today. Now, we've extended this session, especially for this webinar, to give you a chance to ask our panel of experts any questions that you may have. Our panel today includes Andrew Tongue, Department Deputy Secretary and head of the Biosecurity and Compliance Group, Malcolm Letts, Chief Biosecurity Officer at the Department of Agriculture, Fisheries and Forestry, Queensland. Also, from Queensland, we have the state's Chief Veterinary Officer, Dr Allison Crook and phoning in from the Northern Territory is Dr Susanne Fitzpatrick, Chief Veterinary Officer with the State Department of Industry, Tourism and Trade, who can shed some light on what's happening with industry in the Northern Territory. Let's start today's session with a short video.

Dr Mark Schipp: Lumpy skin disease is a viral disease of cattle and water buffalo. It is not present in Australia, but we should all be aware of the risk of this disease broaching our borders. Lumpy skin disease only affects cattle and water buffalo and does not pose a risk to human health. The disease is spread primarily by insects, such as biting flies and mosquitoes and possibly ticks. These insect vectors can also spread through natural means, including wind currents. The disease has a low mortality rate. However, it can cause significant disease in the infected cattle, with economic losses resulting from loss of body condition, decreased milk production, abortions, infertility and damaged hides from the skin nodules that develop. Some animals can be infected but not show any signs of the disease. The disease poses a substantial risk for Australia, as an outbreak in a close neighbouring country could potentially spread to our shores. We must be vigilant to protect our cattle industries from lumpy skin disease.

If the disease were to occur in Australia, this would have significant consequences for our beef and dairy cattle industries. There would be substantial trade impacts, if Australia was no longer recognised as being free from lumpy skin disease. The eradication of lumpy skin disease is difficult and early detection is essential for successful control and eradication. This is why our best defence against lumpy skin disease entering Australia is by continuing our strong biosecurity and surveillance measures. Across Australia's north, it is important that veterinarians, cattle producers, associated livestock industry personnel, indigenous rangers and the wider community are vigilant and can identify lumpy skin disease. This will bolster our surveillance against this terrible disease. Lumpy skin disease is a nationally notifiable disease, which means if an animal is showing suspect signs, it must be reported to a veterinarian or the Emergency Animal Disease Watch Hotline on 1800 675 888.

Steve Peios: Dr Mark Schipp, thank you very much for that video. I can't wait to welcome you and hear your presentation today, to kick us off and sharing your insights about Australia's LSD response, how we can protect our Australian industries and also providing us an update on the Indonesian outbreak. Dr Schipp, thank you very much.

Dr Mark Schipp: Thank you very much. Thank you for the opportunity to join with you this afternoon. I had the good fortune to be able to travel to Indonesia and Singapore, last month. On the 2nd of March, Indonesia notified the World Organisation for Animal Health, the OIE, of an outbreak of lumpy skin disease. Shortly after this, on the 12th of March, Singapore also declared an outbreak of lumpy skin disease on one dairy farm. This development represents a further spread of lumpy skin disease across Asia and it's now closer to our doorstep.

At the end of March, I had the privilege to travel to Indonesia and Singapore, to meet with my counterparts there, very soon after they began responding to outbreaks of lumpy skin disease in their countries. The trip started in Jakarta, Indonesia's capital and the nearby towns. We then went on to Lampung province, which is a significant cattle production area on the Island of Sumatra. Then I travelled on to Riau province and finally, I finished my travels in Singapore.

In Indonesia, I met with government officials, industry groups and visited farms and feed lots. Likewise, I also met with government officials in Singapore and even visited the lumpy skin disease affected dairy farm. I'm very thankful to my hosts who were exceedingly gracious and welcoming at what was a very busy time for them and the valuable discussions that we had. Today, I'd like to take the opportunity to discuss the disease and pass on to you some of the observations and the lessons learned.

Why is it imperative that the global spread of lumpy skin disease is prevented? And what can we do to keep lumpy skin disease out of Australia? A lumpy skin disease incursion will have significant consequences. While the mortality of lumpy skin disease is generally low, animals may have symptoms from mild illness with very sparse lumps through to severe illness, where they're unable to walk or feed. Australia exports around 70% of the total value of agricultural production. In the event of a lumpy skin disease outbreak in Australia, trade implications are difficult to predict, but would depend on our trading partners responses. Nevertheless, the impacts on live cattle exports, as well as red meat, dairy products, animal products like skins and hides and genetic materials, may be expected. This is because some of the commodities are recognised as being able to transmit lumpy skin disease. Trading partners may also implement stricter measures than international standards. Australia, quite often, does this ourselves. The exact bans and suspensions that would be imposed, should Australia suffer a lumpy skin disease incursion, are difficult to predict, but are expected to be significant and severe.

What are the most likely pathways into Australia? Firstly, windborne ... The disease is carried and transmitted by insects. It's possible that insects will be carried in on the wind and insects don't respect borders. The movement of insects is thought to be the way that the disease has entered both Indonesia and Singapore. Australia's famous for our measures at the border, in biosecurity, but x-rays and detector dogs and inspection activities are going to be no match for insects that may get blown in. With changing climate conditions, the pathway only becomes more unpredictable.

The second pathway is returning livestock vessels or aircraft. Australia doesn't import the relevant commodities from lumpy skin disease affected countries, but we do have returning livestock vessels and it's not uncommon to find exotic mosquitoes when opening aircraft holds. Lumpy skin disease can also spread by the scabs which form on the skin lesion. So contaminated clothing, footwear, equipment returning to Australia, are also of concern. This is why operators must follow the relevant disinsection and disinfection protocols, upon return to Australia.

Then the third pathway is contaminated products. There's the risk that products containing lumpy skin disease virus may be imported into Australia, hence our strict biosecurity requirements. Dairy products, cattle reproductive products and other animal products can harbour the virus. We've seen from other countries that, as alarm for lumpy skin disease increases, so do the incidents of people illegally importing unregulated or poor quality vaccines. These vaccines are unsafe and have the potential to become transmissible, again. Any of these contaminated products, when fed to or used on cattle, could lead to a lumpy skin disease outbreak.

Australia's responded to the emerging threat of lumpy skin disease in a variety of ways. Firstly, we have provided support to Indonesia. We provided financial support for the vaccination program. We're also providing technical support and expertise around the rollout of vaccines and vaccination logistics. In the area of surveillance, Australia has ramped up surveillance for lumpy skin disease with our Northern Australian quarantine strategy, now performing additional surveillance on wild animals in the north of Australia. NABSnet is a network of private veterinarians equipped with support and funding for undertaking investigations on suspicious cases during their work. As they're the first responders for sick animals, this program ensures that the early detection of emergency animal diseases like lumpy skin disease. Numerous products are ongoing to model the potential risk pathways for lumpy in disease to enter Australia. There's a large amount of work going on in lumpy skin disease preparedness, too many to name today, but a couple include modelling of risk pathways for lumpy skin disease to enter Australia, assessing lumpy skin disease vaccines, reviewing our import conditions to prevent lumpy skin disease entering Australia through imported goods. And vector monitoring will aim to detect insects that may arrive from other countries into Australia and help to increase our knowledge about potential risk pathways.

If we were to have lumpy skin disease enter Australia, what would we do to enable trade to continue? Zoning is a practice where a country might identify a lumpy skin disease affected area and exclude it from export eligibility, so as to allow unaffected areas to retain export market access. An agreement is then made with trading partners for continued safe trade of product sourced from outside of the affected area. Zoning will always be complimented with strict measures to contain the disease within the affected zone and surveillance to demonstrate that the situation is stable and that disease won't spread outside of that zone. If zoning arrangements are being sought, Australia would implement these under international standards set out by the World Organisation for Animal Health. Unfortunately, zoning recognition is very difficult, if not impossible, to achieve for lumpy skin disease in Australia. Most countries don't recognise zoning arrangements and will only trade when lumpy skin disease isn't present at all in a country. Importantly, lumpy skin disease is carried on many flying insects. These insects can easily travel outside of the zones and infect adjacent zones. Zones with wide buffers and effective vector suppression would be needed, but even this doesn't promise the containment of these flying insects.

What about vaccinations? The temptation is to vaccinate in an area immediately surrounding a non infected area, but this approach has been shown to fail on a number of occasions, in other countries. The insect vectors move faster than the vaccinators and new infections are quickly found outside of the vaccinated zone. Indeed, this is the experience in Indonesia, at the moment. A better approach is to start to vaccinate in an area, well in advance of the vectors, so that when they move from the infected herds, they are only encountering vaccinated and hopefully immune cattle. This requires vaccines to be used preventatively in free areas, rather than just as an emergency response in infected areas. Having the vaccine, in itself, is insufficient. You must also be able to deliver it to the cattle in a comprehensive and efficient manner. If lumpy skin disease were to enter Northern Australia, we would have the challenge of large numbers of cattle on extensive holdings. In Indonesia, the delivery of the vaccine has been hampered by a range of factors, including lack of capacity in cold chains, inability to catch, corral and vaccinate cattle that are free ranging and lack of operational funds at the provincial and district levels.

When it comes to funding, Australia has pre-agreed mechanisms to cost share and release funds for emergency response. This is outlined under the Emergency Animal Disease Response Agreement. Livestock industries are part of that agreement and would play a large and important role in any response in ensuring cattle are rapidly vaccinated. Obviously, an enormous amount of coordination is required to deliver such comprehensive response. Australian biosecurity officers and livestock industry regularly participate in exercises, responding to a range of emergency animal diseases and such exercises also include the use of control centres and liaison with other agencies and bodies that would support such a response with logistics, accommodation, meals and the like. These elements were all missing from the Indonesian response, during my visit. The AUSVETPLAN is a nationally agreed response to emergency animal diseases like lumpy skin disease. The current chapter on lumpy skin disease is being reviewed. Should lumpy skin disease arrive in Australia, this document will form the basis of our response.

Biosecurity is everyone's business, so I encourage everyone ... and by that, I mean absolutely everyone ... to help keep Australia safe. I also call upon everyone here to help spread the word. Educate those who are not familiar with lumpy skin disease. This QR code contains a link to a lumpy skin disease fact sheet. You can also find it by googling, "Animal health Australia lumpy skin disease." The information sheet also provides useful information on LSD. We need everyone who interacts with cattle and buffalo to be aware of the signs of lumpy skin disease and who to tell if they suspect the disease and the urgency of doing so. There may be some false alarms, but that's okay. In fact, it's a good sign that the message is getting through and being taken up. If these signs add up, then don't hesitate. Contact your local government authority, veterinarian, or the Emergency Animal Disease Watch Hotline, immediately. Remember, a false alarm is the best case scenario. Agricultural producers should engage closely with their relevant industry bodies. This is an excellent avenue to receive news and advice. Thank you very much.

Steve Peios: Thank you very much, Dr Schipp. A great insight there into the LSD response and we look forward to hearing more from you in our Q&A. I can also see we have a question that's coming for you already, so a positive start to our webinar. Thank you very much, Dr Schipp.

Now, we would get everybody to keep paying attention. We're going to hear from Dr Nadav Galon, his pre-recorded session about his first-hand experience, seeing what works and what doesn't with LSD. Here we have Dr Nadav Galon.

Dr Nadav Galon: Hi, good morning. My name is Nadav Galon. I'm pleased to be with you and discuss the Israeli experience with lumpy skin disease, over the last three decades. Just to put you in the frame, this is Israel, this little yellow banana in the left, very small country. You can see on the right, our neighbours. We are actually between Africa, Asia and close to Europe, as well. Just to give you an idea about Israel, in comparisons to Australia, much, much smaller. The amount of people is 9 million, amount of small ruminants is about 1 million. And the amount of cattle, which is a susceptible animal for this disease, is about half a million. And our main market trend, in terms of cattle and small ruminants is, of course import while, I guess, Europe is export and it's important for this disease. Our main reason for not import is our economical situation with little grass, pasture, et cetera and of course, foot and mouth disease, which we regularly have.

Israel, being small, is a very diverse country, in terms of altitude, rainfall and temperature, from very low to very high, from semi desert or desert in the south, up to very green and rainy, even snowy, in the northern mountains. And temperature can be anywhere from zero, up to more than 40. For vector-borne disease, this is, of course, very important.

The susceptible population for lumpy skin disease, we have dairy farms. We have feed lots, which about 70% of them are imported. And we have a small population of pasture, cow calf operations. You can see the number of herds is not large, the number of heads is not high and the size of the herds vary a lot. Of course, this is very important in terms of disease management, because the dairy farms are mostly and the feed lots, are zero grazing. You can see the distribution map. While on the right, you can see kind of a cowboy land, mostly in the Galilee and Golan Heights, in the north and east north, which is typical, probably, for what you have in your country, in terms of management.

Lumpy skin disease was first introduced to Israel in 1989, then repeated in 2006, 2007. Later on, we had two outbreaks, coming up from the north. A little bit more details in the south, which is, again, this is the negative. This is desert. You're probably familiar with the city of Beersheba, which was conquered by Australian cavaliers in 1970s. The first surprising incursion was in 1989. Came out of Egypt and the Gaza strip. And it's infected several dairy herds in one moshav, like a village. What we did, at that time, is that we did total stamping out during that operation with no vaccination. Okay. This was about a 25 kilometre penetration into the border, with a lot of farms in between, but none of them infected. This is an easy, a very accessible land, zero grazing, limited spread. And the major vector was Stomoxys.

In 2006, we had a similar situation, but the management strategy was different. The veterinary services, at the time, did a semi culling, or at least partial stamping out, of the clinical cases. At the same time, they started vaccinated with sheeppox, made in Jordan at the sheep dose.

Then in 2007, there were several dairy farms infected. And the same, it was culling the clinical cases and living, and that led them to believe that the sheeppox vaccine was actually effective. Therefore, from 2008 to 2012, they continued to vaccinate the whole southern part of Israel with the sheeppox from JOVAC.

Surprisingly, in 2012, we had an outbreak coming up from the north, northeast. You can see it's on the map. It's high terrain, mountains, forest, very inaccessible. We didn't know, at the time, why it surprised us and came from the north, but later on, EFSA published this good work that showed reported live cattle movements between the Horn of Africa, Africa and the Middle East and Asia. A lot of those movements went to Lebanon, maybe to Syria, too. That's exactly where we had it, in the first time. Israel doesn't import any cattle from Africa.

The initial picture, in 2012, started always in summer. This is our summer June. Okay? We had a delayed detection because it was beef, because there was less presence of herders and vets in those mountain herds. It's mountains. It's forest, very limited accessibility, poor pasture in summer. And the total population involved was about 40 beef herds, with about 4,000 cows, communal grazing. Horn flies were the main vector, but there were plenty of others. Morbidity per heard was varied between 10 and 60%. At the time, that area, as explained, did not have any preventive or pre-emptive vaccination. But the final resolution was that there was very low mortality. In terms of insecticide, disinfection and such, not very practical in those areas. Stamping out was ruled out, because it was almost impractical.

What we did is we started vaccinating with the JOVAC vaccine, sheeppox, again, which we believed, since 2007, it works. You can see in the green, the beef herds. Later on in winter, it continued into dairy herds and spread in that whole north of Israel, in vaccinated herds. The main issue here that we were concerned, except for the spreading herd-by-herd, was the unauthorised movement. And this is a very high risk, the longer movements of infected cattle. So until March 12th, 2013, we actually vaccinated with the JOVAC vaccine, but we realised in the spring of 2013, we had a high rise in the accumulation of new herds getting infected. And it was a tough decision to make, because the only vaccine that we had, at the time, was [DEPARTMENT TO CONFIRM] biological product vaccine, which is a Neethling vaccine. We didn't know what's going to come out, if it's going to recombinant, et cetera.

But, practically, once we vaccinated with the [inaudible 00:27:41] vaccine, the disease, actually the outbreak, subsided fully. So we realised this was a successful vaccine. At the same time with the academia, the vet school, we ran a compared field trial for efficacy, the Neethling versus the Pox-10. The Pox-10 is a fortified sheeppox vaccine, the same one from JOVAC, just one log stronger. That was a massive trial with many herds involved, dairy herds, half of them vaccinated with one, half of them vaccinated with the other. Practically, we came to the conclusion that was, later on, a word to many other countries that the Neethling vaccines were better and were very effective.

From then onward, we actually used [DEPARTMENT TO CONFIRM] vaccine and later joined the MSD from South Africa and the Moroccan vaccine. Currently, they're all available to the choice of the vet. All prove to be very effective because, although this vaccine was developed in 1960, or something like that, the virus is very stable. We did a field safety trial before we started it, in 2013, because we didn't know what's going to happen. I should warn you that all these vaccines are non-GMP. Therefore, we test every batch before we start using it, the vet services. And we did find in the past, once, a strain of Bluetongue virus and, once, a microplasma and maybe others that I'm not aware of.

The Neethling response is not a big issue because it's rather limited. We don't see it much. It's easy to distinguish by sight. The farmers and the vets don't get excited. They know it'll go away in a few days. And if they are excited or concerned, we have a lab test that can differentiate the field in which is the vaccine stream. Since then, we started annual vaccination by private vets, because the government didn't have enough force. Actually, in our situation, the farmers, the herders have to pay for the vaccine, which has some effect on the compliance. But I think with the tragedy of the big outbreak in 2013, that was quite practical.

Once that outbreak of 2013 subsided, from 2014 to 2016, mandatory vaccination was imposed on the whole country and compliance was good, probably about 80% or more. Then after three years of no new outbreaks, we decided to make it voluntary, but still the dairy farms, at least the dairy herds, used to use the vaccine up to 50% coverage, more or less.

Then in 2019, we had another entry across the international border, more or less in the same area, from Syria and from Lebanon. But a lot of the herds were vaccinated or at least were protected. We don't know how long the protection lasting for, but we didn't see a lot of casualties. There was low morbidity, very few herds infected and mortality was very low. Stamping out, again, was not used at all, during that outbreak. What we did was we sort of responsive vaccination in those herds that were not properly vaccinated, all animals from three months old, up to any age. Again, from 2020 until 2022, it was mandatory vaccination. I think this summer it's going to be the last summer again and maybe it will become voluntary again. In a bracket, I put here that, due to the good vaccination, I think we have good control of lumpy skin disease, while ephemeral fever is a much bigger problem for us because we don't have a good vaccine and we have a lot of outbreaks, which cause a lot of damage.

This is a table just to summarise the strategies and the outbreaks. We actually moved from stamping out, all the way to no stamping out, into responsive or preemptive vaccination, which seems to be good. I leave it with you. You can look at it, due to the shortage of time, in a later stage.

Emphasis, very important to do good risk communication and for everybody. What I mean, everybody is that the outbreaks that we had in the north were actually involving a religious sect called Jews and also Muslims, which are more traditional than professional herders. They actually didn't like very much the idea of stamping out and to get their compliance, you have to explain in different ways what it's all about and why it's important for them, et cetera, et cetera.

This is, in a nutshell, our experience. I'll be happy to be at your service whenever you need. What I learned from those many years is that there are very few things that are simple black and white, the diversity and variability of nature and diseases leaves you humble and looking forward to help you. I wish you all the best. Thank you very much.

Steve Peios: Thank you very much indeed, Dr Nadav Galon. A fantastic presentation there and we really appreciate him being able to prerecord that session for us, detailing those first-hand experiences.

Our final presentation this afternoon is from James Watson. James, welcome. Are we prepared technology-wise to fight a battle against LSD? Can you please bring us up to speed on vaccines for the disease and where Australia is placed? Everybody, James Watson.

James Watson: I'm from the Australian Centre for Disease Preparedness in Geelong, which was previously known as the Australian Animal Health Lab, which may still be a more familiar name to some people. It's the national high containment laboratory. And we do a lot of work there with various pathogens that, obviously, we don't want to see out in the wider community, including such things as African swine fever and high path avian influenza. This is the background of the type of work we do there. We also do the lumpy skin diagnostic work, nationally, at the moment, to work up suspect cases and exclude that disease. It's probably worth noting that we've just commenced a project to roll some of that frontline capability out to the National Animal Health Lab network, along the lines it has been some other priority diseases.

I lead the Emergency Disease Investigation Group there. As part of that, I've been involved with the technical reference group for AUSVETPLAN, for 15 years. It's just some of the background to where this is all coming from.

Vaccination for lumpy skin disease, as we've heard, this is very important. No country has achieved sustained control or elimination or of lumpy skin disease without vaccination, which makes it the cornerstone of a response. But it's important to note that vaccination on its own is not enough. Control of cattle movement and control of vectors plays a really important part. As Dr Galon just noted, under some circumstances stamping out may still be required as part of an integrated response, very much depending on the nature of the outbreak you're dealing with. But nonetheless, the experience shows this can can be achieved. The outbreaks in Europe, in the Balkans, have shown that effective vaccination program and good control has enabled control and elimination of the disease. They're now in the process of withdrawing vaccination through that area. That is a hopeful note to keep in mind. But one of the key things here and it's important to remember, there are many challenges with the existing vaccines and we do not have a, perhaps, as ideal a situation or set of options as we would like.

Basically, it comes down to two forms of vaccines, broadly. There are the live attenuated vaccines. We've just heard a little bit about some of those. They are either based on strains of lumpy skin disease itself or on the related sheeppox or goatpox viruses. It's important to be aware that, at the level of the immune system, the different capripox strains, they are effectively indistinguishable, which is why these other viruses can make effective vaccines for lumpy skin disease. There are also some inactivated vaccine coming onto the market, which I'll come to in a moment.

Basically, the live vaccines break down into two groups, the homologous and the heterologous. Homologous strains are largely based on the Neethling strain, although there are others. These are highly attenuated versions of the lumpy skin disease virus itself, but it's important to be aware they are still live viruses and they do still cause some level of disease, although it is generally pretty minor. The heterologous vaccines are based on sheeppox or goatpox. The experience that we've heard in Israel and also elsewhere, in Russia and so forth, has been that these heterologous vaccines are less effective in gaining full control of lumpy skin disease outbreak. In the Australian context, they also present some different challenges, in that there would be an obvious reluctance to import a live capripox virus, other than the one that you were trying to control. There are also issues with the composition. It's well established and we heard in the previous presentation, these vaccines often contain viruses that you're not expecting to be present, including, in one case, at least one of these vaccines has been shown to contain wild type lumpy skin disease virus itself, which is not really what you're looking for in a vaccine.

Inactivated vaccines present an obvious ... it's an obvious opportunity. There is one that's just come to market, that has shown to be quite effective experimentally in providing protection. However, it requires two doses and six monthly boosters for effect. This presents some pretty obvious challenges in the Northern Australian context. It's also the duration of immunity of this vaccine is not well understood, but experience with other similar vaccines suggests it's not likely to be as long as the live vaccines, which although the manufacturers recommend annual dosing, the effective duration of immunity is probably more like two or three years.

So a number of problems around vaccination that are worth being aware of. First of all, is that if we use a live vaccine in the field, then we lose our OIE free status, because that is a version of the live lumpy skin virus. And it can take some time to regain that status. It also complicates regaining freedom, when you have both the wild type and the vaccine strains in circulation. There are, of course, the side effects of a live vaccine, which are important to be aware of, but in the context of an outbreak, are not going to be an obstacle to the use of these vaccines.

I mentioned horizontal vaccine transmission, just because this has occasionally been raised as a question. The vaccine virus is obviously live. It has been detected in secretions from vaccinated animals. So in theory, it's possible this can be transmitted in its own right. Field experience shows this is not a significant issue. And in the context of a situation where you need to use the vaccine, the vaccine itself choosing to spread to a few other animals is unlikely to be seen as a major problem. In a pre-emptive situation, that obviously could be quite different.

There is the whole vaccine quality issue, that we've also touched on. The issue, more recently, of recombinant strains is starting to get some attention and cause some concern. This is where the vaccine strain has recombined with the wild type virus to create a new variant of the virus. This particularly happens where vaccination occurs in diseased animals or perhaps animals that are incubating the disease and haven't shown clinical signs yet. This has recently been flagged as an issue in some Asian outbreaks and some of these recombinant strains, their properties are not well understood, but some of them appear to be quite transmissible. There is the risk that a new disease-causing strain could emerge and that is a considerable concern and one of the reasons why vaccinating potentially infected animals is something we really need to avoid.

A couple of specific points in the Australian context ... Another question which is often raised is whether or not we should be vaccinating to prevent an outbreak, before an outbreak occurs in the country. There are a number of reasons why we don't do this. The issue of OIE status in this case of this disease is obviously a very important one, but another issue there that is very important is that, in a vaccinated population, you don't get 100% protection and it is possible that the disease can be introduced under the cover of vaccination. It'd be very hard to detect. It is much easier to detect and respond early to an outbreak in a situation where it's going to be confused with vaccination. And that's a general approach that's taken for many diseases.

Nonetheless, it's really critical, if we are going to respond to an outbreak of a disease like this, that we have the capability for vaccination, lined up and ready to go and we're not trying to source and understand vaccines after an outbreak has already occurred. There's a lot of work going on, at the moment, to prepare the ground for potentially importing a vaccine. At present, with the vaccines being produced, there's about a dozen live vaccine candidates available on the market. They are produced in Africa, Middle East and Russia. None of the plants producing these vaccines would pass the normal requirements that Australia's biosecurity framework requires for importation of vaccines. So there is, obviously, some interesting problems that are going to have to be resolved there. And then, even when that hurdle is overcome, it's also then going to be necessary both to characterise the vaccine and to screen vaccines for adventitious agents, for other viruses that may be present, that we don't want to bring into the country. That ladder is something that we do at ACDP, quite routinely, for a number of vaccines. We're well placed to do that work, if we get to the point where we have a candidate vaccine that can be imported.

Just highlighting, briefly, some of the gaps in what's available and what we can do. DIVA testing, which is differentiating infected from vaccinated animals, is something that is often raised. DIVA testing is never easy. Just it's a very attractive option, but it's not easy to do. There are no DIVA options available for lumpy skin disease, at present, unless you want to count the technical case of we can differentiate, obviously, the vaccines and wild viruses in an infected animal, but at the level of testing the immune system, doing antibody tests, that's not currently possible. And given the antigen cross reactivity amongst the capripox group, it's going to be quite challenging to develop something in that space.

We do need better vaccines, partly to enable deeper options, to increase the safety profile and to increase our flexibility in responding to outbreaks as they occur. Another really important point ... and I won't go too far into this in the short time available, but it's important to be aware that the immune response to this disease is largely cell-mediated immunity, which is to say, it's not dependent on the antibody levels circulating in the animals. Many animals that are infected and some that are vaccinated, will not show a positive test for antibody, even though they are effectively protected. Tests that can detect that cell-mediated immunity would add considerably to our capability of understanding the disease.

Looking to the future, there's a real opportunity here to apply modern vaccine technologies to lumpy skin disease, things like recombinant subunit vaccines, mRNA vaccines, such as we've seen with COVID in recent times. Things that would allow a single dose application of vaccines that didn't include a live virus would obviously provide a huge improvement in capability and the DIVA testing.

There's also some important questions. This is obviously something that's been in the media recently, about whether or not we bring the live virus into the country for research purposes. That does enable considerable step-up in our sovereign capability for research and for development around preparation for this disease. It's important to note that bringing the virus into a containment laboratory for research purposes doesn't affect our OIE status.

Very briefly, in summary, the vaccine capability is critical for managing this disease. Trying to set that up, after an outbreak occurs, is far too late. Live vaccines can be effective, but there are a number of problems with them, and inactivated vaccines have not yet managed to fill that gap. And there are a number of gaps in the available vaccines and technology around them, that we think there is a real opportunity to address. Thank you.

Steve Peios: James, thank you so much for that presentation. What a great lineup of speakers we've just had in our webinar, so far. I say a very big thank you to Mark, Nadav and James for all of those great presentations. It's now time for us to move on to our Q&A.

Now, in our Q&A doc, we have lots of questions already. That's fantastic. That's exactly what we wanted, was to have a huge amount of those for us to talk through. I'd like to welcome our expert panel once again, a very warm welcome. Joining me today, Deputy Secretary Andrew Tongue. Also joining me, Malcolm Letts, Dr Allison Crook, and also Dr Sue Fitzpatrick. Thank you so much for joining us, and Dr Mark Schipp also remains with us here to go through some of those questions. James, I understand you're also here, as well, potentially to answer a few questions, as well.

Okay. Without any further ado, thank you again to our panel. Let's get underway with our questions. There are many that are provided here, so I'll do my best to get through those and any supplementary issues that may present themselves after we answer those. I'll begin. The first question I have here is for you, Mark, please. The question is regarding recent outbreaks, and it talks here about it's seemingly being confined to the Asian region. What is the likelihood that this will continue to spread globally to other countries? The example that's been provide here is Europe. I note that we've talked about areas such as Europe and the Balkans, which have had those successful programs in the past, but I'm assuming, here, they mean the recent outbreak and the likelihood of a spread there. Please, Mark.

Dr Mark Schipp: Thank you. Lumpy skin disease is traditionally a disease associated with Africa. It spread in the late '80s, early '90s, through the Middle East, then up into Eastern Europe. We heard from Nadav the impacts on Israel from the movement of infected animals out of Africa, into the Middle East. Then in 2019, it came into China, India and then spread south in Asia. At this stage, no part of the Americas are infected, but they are very concerned because they recognise that they have all of the vectors, all of the susceptible cattle and are exposed to exactly the same challenges that we are in this region. It's certainly not off the cards, spreading to other regions.

Steve Peios: Absolutely. I think that's something we need to be vigilant of, is that this can get anywhere. It's like a lot of diseases and those sort of things. We want to prevent that, as best as we can.

Malcolm, thanks very much, again, for joining us. We appreciate you being with us. Next question I have here is for you. It looks to be a five-pronged question. I might just ask it in two parts if that's okay, Malcolm, so I don't overwhelm you with questions. It talks here about, how are the 50% industry cost sharing contributions collected from industry? Is it levy money from producers via MLA? Now, I understand this would also come down to the category of the disease and the reason that's categorised in that format. I'll just get you, if you don't mind, to respond to those first two and then I'll ask the supplementaries after that. Malcolm Letts.

Malcolm Letts: Yeah. Thanks for that. Look, it's a different arrangement to the MLA arrangement. It's through Animal Health Australia and it's done on the basis of the deed that's established that industries are signatory to. A Response plan is drawn up, following the consultative committee on emergency animal diseases, considering that plan. Industries then, as signatories to the deed, make the contribution into the response plan, depending on the categorization of the disease.

Steve Peios: Understood. Understood. The supplementaries here, Malcolm, that have come through, regarding who contributes and how ... What's the industry funding mechanism? And there's a comment here just about some higher level indications would be appreciated, if that's possible, please.

Malcolm Letts: Well, as I say, the industries are signatories to the deed already. As part of that mechanism, the industry bodies are required to contribute to the cost of the response, once there's an agreement in relation to the response plan being signed off.

Steve Peios: Thank you very much for that, Malcolm. Allison, thank you very much for joining us today. I have a question here that's been sent through for you. The question is, what is the best prevention plan for LSD when a vaccine is not available?

Allison Crook: The best prevention plan is being informed about what lumpy skin disease is, what it looks like and being alert and aware. If anyone notices anything suggestive of lumpy skin disease, please, it's nationally notifiable. Let us know. We've had the hotline number up already, 1800 675 888. But as Dr Schipp also said previously, it is better to be alert to something and find out it isn't, than not alert and find out it is.

Steve Peios: I believe the comments before were that a false alarm, Allison, is very important, that you'd rather have a false alarm than something that's missed, for example and then becomes a more significant issue later. We'll continue to keep repeating that number and providing that, as well, in our slides, towards the back end. But thank you very much for that answer.

Andrew, thanks very much for joining us. I have a question for you, please, here, regarding LSD. If it were to be detected in Australia, what would happen? What would be the next steps, if that was to be found here?

Andrew Tongue: We would go into the normal disease management arrangements. Mark would convene his colleagues amongst the chief veterinary officers. We would follow our lumpy skin disease plan. I would be working with my colleagues, my co-chair, Malcolm, at the National Biosecurity Committee. We would invoke the ADRA, the deed and we would get active as quickly as we could.

I think the key challenge here is, particularly, if the disease came on a natural pathway, so the wind from, say, Indonesia or Timor eventually. There's 10,000 kilometres of post coastline and about 3.5 million square kilometres of country, with a very thin population. Our challenge is to build a surveillance system that allows to get to observe cattle and water buffalo in Northern Australia and find out quickly if we get the disease. The quicker we can find out that we have the disease, the better. Then we can deploy all the tools that we've been hearing about today, to help us manage an outbreak. If we are slow off-the-mark, that gives the chance for the disease to spread more quickly and we'll just make our situation that much harder to dig out of.

Steve Peios: With regards to resourcing for that, Andrew, I assume that we're well placed to be able to implement that, as soon as that were to happen, if it was to happen, of course. But we're ready to go, immediately, with that widespread action plan.

Andrew Tongue: Yes. We were notified on the 2nd of March, by Indonesia, formally notified. The budget on the 28th of March, the government's allocated $60 million for us to work with states and territories and industry on lumpy skin disease and other animal diseases that might come through Northern Australia. We're already working with states and territories and industry on the best ways to maximise that resource. We're already spending $20 million a year on the Northern Australia quarantine strategy. So we're already active in surveillance in the north. Our feeling is that we need to come up a level on that surveillance, engage industry at a local or regional level, support industry in the surveillance task, work with our state and territory counterparts, build our diagnostic capability and also get prepared, so exercising and bringing as many people as we can, so that we all understand what'll happen when the disease arrives. All the chief vets will be making judgments about their jurisdiction and how they would manage their jurisdiction, in the event that lumpy skin emerges. The more we can spread the word on how we will all play our roles, in the event the disease emerges, is incredibly important and that work's already begun.

Steve Peios: Fantastic, Andrew. That's very reassuring to hear that we are prepared and ready to go. I think that will provide a lot of information for everybody out there listening and reassurance that we are ready to go. Thank you for that.

Mark, a question that's coming for you, please. What are the implications of a vaccination strategy on market access, especially with relation to the export market?

Dr Mark Schipp: If we have lumpy skin disease or whether we vaccinate with a live vaccine, the market access implications are exactly the same, so that we would be considered a country that has lumpy skin disease and we would lose market access for live cattle, dairy products, some meat products and skins and hides. It's difficult to evaluate accurately, in advance, how other countries would respond to such a significant change in our animal health status, but we anticipate that, certainly, we would lose those products and probably more. But we are working through those attestations, now, to identify what would be the impacts on trade. If we were to have the disease or were that we were to vaccinate against the disease, but using the live vaccine, which is the only effective vaccine that's available now, the market access consequences are exactly the same.

Steve Peios: Excellent. Thank you very much for that, Mark. Sue, thanks very much for joining us today. I'll have a question for you. How can we deal with and vaccinate the free ranging feral, in brackets, animals in Northern Australia?

Dr Suzanne Fitzpatrick: Thanks for that question. Obviously, vaccination of free ranging, whether it be cattle, buffalo, banteng, is an incredibly logistically challenging issue. At present, we are exploring a range of strategies to manage free ranging susceptible species in Northern Australia and working with our pastureless as well as traditional land owners and parks, to reduce the number of susceptible animals in Northern Australia. The reality is, depending on whether we have a vaccination available or not, there will be some depopulation, as well as vaccination in managed herds. While we don't have the lumpy skin disease virus in Australia, we'll be working with those landholders and livestock owners to reduce the susceptible population.

Steve Peios: Fantastic. Thank you very much for that, Sue. Noting what you've just mentioned there, James, I've got a question here for yourself and following on from that discussion there about vaccines. Now, I know this also came up in one of your slides, towards the end, as well, that I was listening intently to. There's a question here about, are inactivated virus vaccines available?

James Watson: Yes, there is one inactivated vaccine that's just recently reached market, but as I mentioned briefly in that presentation, it's not nearly as effective in preventing the disease as the live virus vaccines, over the longer term. It's quite good in the short term. But it also presents major issues for Northern Australia, where having to give three or four shots of vaccine to each animal in a year is not likely to be a very practical option.

Steve Peios: Absolutely. I think we listened to that earlier and then we sort of thought about that and thought that could be a very difficult logistical program to take place, and also when it comes to the animals and their welfare, as well. Allison, a question for you, please. What will happen if the disease is suspected or confirmed on a property? Will all the livestock be killed?

Allison Crook: Okay. The AUSVETPLAN has already been mentioned. That is the document that guides our national agreed response and strategy to lumpy skin disease. As a chief veterinary officer, my job is to assess the situation and to make a recommendation around an appropriate response plan. The first thing, I'm glad to hear, if it's suspected, people have notified us, so we've been able to do something about that. Then indeed, if it's confirmed, the first step for me is to put that property under movement restrictions and that prevents animals moving and products moving off that place, while we assess the situation. That's going to be done by epidemiological assessment. We're going to have some samples collected, sent away to our colleagues at ACDP. While that's happening, we're also undertaking tracing and surveillance, so we've got a better understanding of what's going on. Heard also about the types of things that we're thinking about in terms of vectors, cattle that have moved, products that might have moved. So all of that is happening. It's all happening very, very quickly and that we're putting a lot of effort into that.

Of course, then the assessment is about what to do. As you heard from Dr Galon, I like that analogy. Not everything's black and white and it does certainly depend on the context we find ourselves in and in how early that we do find the situation. You've heard about the stamping out policy, which is the destruction of susceptible animals. What that looks like on a particular premise would depend on how big it is, how early we find it, et cetera. Then, of course, you've heard the conversation around vaccination. If vaccine is available to me as a chief veterinary officer at that time, that is also factored into what our response would look like.

Steve Peios: Fantastic, Allison. Thank you. I think that also reiterates the message that we've been talking about a lot today and that is that prevention and getting ahead of the curve is very important. We encourage members of the public and everybody involved in the industry to call the numbers, the hotlines. Get in touch as soon as we can, if there is any suspect of this being around. Thank you very much for that response.

Andrew, question for you, please. It's regarding support. What support will the government be providing to industry if LSD does occur in Australia?

Andrew Tongue: I think I'd go where Allison went and say it depends on the nature of what we find. I think, Steve. A widespread outbreak has a different character to a more localised outbreak. We have the management arrangements and cost sharing arrangements, as outlined in the deed, the ADRA. Then beyond that, it will depend where the CVOs in all the jurisdictions go in their management of the situation, movement restrictions, for example, but we're already working on, what are all ramifications that flow from such a situation? That's part of a wider plan beyond biosecurity. That's why we're going to take a whole-of-department approach to this, because there are implications for industry support policies, for trade, for biosecurity. We'll be working both at a whole-of-department and whole-of-government level to work through all the possible scenarios.

Steve Peios: Is it fair to say, Andrew, as well, I'm taking really positive vibes out of this, that we're getting prepared and getting on the front foot and working so collaboratively, with the states, with the territories, at the federal level, to make sure that, as soon as it happens ... and I think Allison mentioned that point, a moment ago, about everything not being black and white, about assessing the situation in front of us at the time, but also having the tools and capabilities to address whatever that circumstance is, in front of us and being able to attack it head-on, straight away.

Andrew Tongue: Absolutely, Steve. The key thing is to be prepared. We started work on five major animal diseases that Mark alerted us to, late the year before last. We'd already started work on a number of those animal diseases and really what the emergence of the disease in Indonesia has done is just prompt us to lift again and get everybody prepared. That's our challenge now.

Steve Peios: Fantastic. Great to hear that we're getting ready. Mark, a question that's come through for yourself, please. You've talked about and highlighted two areas of spread of the vector being by, one, marine and also air transport, in or on feed commodities. What new measures are being discussed to increase observance or reduce risk of entry via these routes?

Dr Mark Schipp: There's additional vigilance at the border. We, traditionally, catch exotic mosquitoes at airports, for example, as part of our surveillance for those vectors. We've certainly noticed an uptick in exotic mosquitoes from Malaysia, in the past few months. The reason for that is that Malaysia's been used as a hub for bringing COVID rapid antigen tests into Australia, from China. When they're filling those holds of planes with those rapid antigen tests, then mosquitoes move in as well. We're picking those up when they're unloading those boxes in airports in Australia. We've also given advice to the live export industry, that they be very vigilant about the cleanliness of returning vessels and that those who are undertaking inspections of those vessels before they're allowed into port to be particularly attentive to making sure that there's no insects onboard. All of those vessels, on every deck, have got insect appliances to try and knock down the insects. Those traps are checked, but also those vessels are inspected before they come into port, to make sure that they're free of insects and free of debris, which might transmit lumpy skin disease.

Steve Peios: Fantastic, Mark. Thank you very much for that. Malcolm, questions that are here for you, please. We just heard Andrew a moment ago, talking about that collaboration across all levels of government. Now, obviously there's the communication, there's the regular meetings, NBC, those type of things. The question here is about how else the ... or any other ways, are the various levels of government working together and what is Queensland doing to support surveillance and early detection?

Malcolm Letts: Yeah. Thanks, Steve, for the question. Andrew and I have been meeting with our Western Australian colleagues, as well, in preparation to look to work with industry in the future, going forward, to work through the various scenarios, to look at the surveillance requirements, to actually do some planning around what needs to happen in the short term and the medium and longer term. All that work has already been initiated and there's very good levels of cooperation across government. One of the beauties of the national biosecurity system is that we already have AUSVETPLAN. We already have the deed. We already have all of these mechanisms in place, that allow us to work, when we have a response, together. What we also need to do is get ahead of that response phase and have the same levels of cooperation and collaboration and with industry, around the surveillance and the preparedness piece. We've done some wonderful work in Queensland, over the last two years, with the pork industry, around the threat of African swine fever. That placed us in a really good place to be able to respond to Japanese encephalitis, for example.

All of that work you can do prior to an incursion happening, pays off in spades when you actually get into the response phase. That collaboration and cooperation is critically important over the coming weeks and months, and we are looking to work very closely with, particularly, the Northern jurisdictions, but not excluding any jurisdiction and the Commonwealth working together around that preparedness place.

There's also lots of discussions happening with industry. Our minister, for example, is hosting an industry roundtable in the coming weeks, specifically around lumpy skin disease, to start that dialogue in relation to how we work together, going forward. Thanks.

Steve Peios: Fantastic, Malcolm. If I could just ask you, as a supplementary on top of that, you talked there about industry being engaged and how successfully that's worked and a previous example there of African swine fever. What is the best way for industry to be engaged, that your finding? We've talked here about the minister and roundtables, but is it, for example, webinars like this, information sessions where we can have people attend? What do you see as the best way to have that engagement take place, so we can get on the front foot, as you and Andrew have talked about?

Malcolm Letts: I think there's a range of different levels of that engagement, Steve. There's the engagement with the producers themselves and what they might be thinking about in relation to surveillance and being aware of the symptoms of the disease, so they can keep an eye out. There's some work to be done in that space. There's the work with the state farming organisations, in relation to how we plan together, what we might do going forward, in relation to being better prepared. There's even work with the supply chain partners, the beef processors and all through the supply chain, because there'll be obvious knock on impacts, if we were to get lumpy skin disease in Australia, to all of those players along the supply chain. So having conversations with them is really important going forward. There's a range of stakeholders and the communication needs will vary, depending on them. There's a general awareness piece, there's a planning piece and there's a preparedness piece, in relation to what we need to be putting in place now.

Steve Peios: Fantastic, Malcolm. Thank you very much. That's very comprehensive and something that everybody can look forward to and be prepared for, if and when the time comes.

Sue, I have a question here that's come from a member of the industry in the north. We thank you very much for your question. A comment was made that monitoring activities are already underway. What are those monitoring activities and how else can those members of the north assist? What can they do to get on the front foot to help you?

Dr Suzanne Fitzpatrick: Ah, thank you. That's a great question. In the north, we have been monitoring the situation overseas with the spread through Asia. In 2017, we actually prioritised lumpy skin disease as a priority disease for our surveillance. That led on to have increased awareness through our Northern Australian veterinary network, through the indigenous ranger network and also with the producers in the north.

This year, the Northern Australian quarantine strategy commenced active surveillance for lumpy skin disease. That's in their routine range land or feral animal surveys that they conduct, anywhere from Broome right across to Cairns. That's an active surveillance that's ongoing now. We've initiated a lumpy skin disease preparedness action plan with our extensive network of government industry and other stakeholders, to deliver the actions, so a targeted LSD information campaign, specifically for those in the north.

We know that in Bos indicus or Brahman breed cattle and buffalo, the clinical signs may be subtle. That's something that's different to our southern friends with the Bos taurus breeds. The veterinary network is active and certainly looking for lumpy skin disease. We've initiated training for producers, indigenous rangers and park rangers in the north, for awareness, surveillance and potentially sampling for suspect animals. Recently, at the Northern Territory Cattleman's Association, we launched lumpy skin disease sampling kits, specifically for those that are in the remote regions, that can sample those.

In addition, we are looking at enhanced vector monitoring. We've got existing and national arbovirus monitoring program, which is sentinel cattle. We've also got a sentinel chicken monitoring program. We're looking to enhance existing programs and where there's gaps, ensure that our vector surveillance is sufficient across the north.

Steve Peios: Wonderful, thank you very much for that, Sue. Very comprehensive and I appreciate you providing that level of detail in the answer. James, question for you, please. The question has come in from one of our listeners. Can you please be more specific about vaccine side effects in a dairy context?

James Watson: I can give that a shot. The side effects, I assume, are largely ... we're talking about the live vaccines. Essentially, there can be a level of fever and a transient skin reaction that produces a much smaller lesions than the actual disease ones. In a dairy context, to the extent that you saw the reaction, there would probably be some impact on production. The majority of animals, you probably would not see that. In any case, it's massively less than the impact on production, of the disease.

Steve Peios: Excellent. Thank you very much for that, James. Mark, a question that's coming for yourself, please. It says here, Dr Schipp, did you observe LSD in any cattle, of Australian origin, in Indonesia, especially Australian Brahman cattle? Much of the footage shown has been of Bos taurus cattle, not Bos indicus, which is the predominant cattle in Northern Australia.

Dr Mark Schipp: No, I only saw infected cattle in Singapore. The affected province in Indonesia was quite remote. I went to the capital of the province and met with the controlling authorities, but it was, for our journey, one way to get out to the areas that were affected. But speaking to them, they said that the clinical signs are typical across all three types of cattle. The Bos indicus, the Bos taurus and the banteng cattle all showed typical clinical signs. As we've heard, the thicker skinned cattle, the Bos indicus and the water buffalo, show less signs, but the thinner skin, the dairy cattle and the Southern cattle show more obvious signs. That's why they tend to predominate in the photos, because the signs are quite obvious.

The other point I pull out is that animals that are in good health and good condition don't show very many signs at all, but animals that are poor and weak will be quite badly affected, to the extent that they'll go down, not able to feed themselves, not able to walk. In a dairy situation, that's fine. You can manage individual animals. But in an extensive Northern Australian cattle scenario, you wouldn't be able to handle animals that are not able to get up and walk and feed themselves, so it could have significant impacts across the north.

Steve Peios: Absolutely. Thank you very much for that, Mark. Great answer. Allison, question that's come in for you. Hi, Allison. We have sentinel chickens along the Murray River. Can you have sentinel cows along the northern coastal areas?

Allison Crook: Sure. Good question. I think Sue touched on that previously, about sentinels that can be used to give us early warning. It's certainly something that is being factored into all of our preparedness considerations.

Steve Peios: Excellent. Thank you very much. Andrew, question for you, please. Regarding the industries that are signatories and providing financial input, is the buffalo industry involved?

Andrew Tongue: That's a really good question. I'd have to take some advice on that, is my honest answer. I can't recall. Maybe Malcolm might know. I'll put him on the spot.

Malcolm Letts: Thanks, Andrew. I'm going to throw to Sue, because the buffalo industry is Northern Territory based. So I'm not sure, either, whether the buffalo industry is a signatory. They really only talking a handful of producers.

Dr Suzanne Fitzpatrick: Yeah. At present, the buffalo industry isn't a signatory to the deed, but obviously they're susceptible livestock. So the response would include buffalo. Because compensation is paid for response measures under state and territory legislation, buffalo would be covered under the territory legislation for compensation and response activity. But I understand that Animal Health Australia are engaged with the buffalo industry council.

Steve Peios: Thank you very much, Sue. Great teamwork there, team. That's good to see that we got to the right answer, after all of that. Thank you. Sue, question for you again. Would northern surveillance be observation-based or collection of insects along strategic locations?

Dr Suzanne Fitzpatrick: The surveillance strategy would be both. Certainly, anyone that is observing the susceptible livestock, we'd ask them to report any suspect clinical signs, but as I suggested before, we are working with those stakeholders to train them so that we can have kits there, available for them to collect samples. We are certainly increasing our vector surveillance, as well. It's a combination of all of those surveillance strategies.

Steve Peios: Great to hear, Sue. Thank you very much. James, a question for yourself, please. Can you explain what DIVA, D-I-V-A, tests are, please?

James Watson: Yeah, I did gloss over of that one, fairly quickly. The concept of a DIVA test is having a vaccine that induces an immune response, such that you can buy a blood test, tell whether or not the antibodies that an animal has are from the vaccine or from the disease. It's obviously pretty important to, when you're trying to reestablish freedom after an outbreak, to be able to tell whether your animals that are testing positive actually did have the disease or not. It's also very important in the active stages of the outbreak, where you have vaccinated animals, to be able to tell whether they've been exposed to the virus, as well, on top of the vaccination. It's basically having the matched vaccines and tests, that enable that sort of distinction to be made.

Steve Peios: Fantastic. Thank you very much for that, James. Question here, Malcolm, for yourself, please. The Northern Territory and Northern Western Australia have geographic features, for example, deserts, that can assist with zoning. What plans are there to implement zoning in Queensland?

Malcolm Letts: Yeah. Thanks for the question. It's a good question. And it's a little bit like the black and white answer before. Allison's response earlier is absolutely right, in this instance. It would really depend on the nature of the response. The response plan would be framed around the nature of the incursion. Once we understood where the disease was and what the limits were, then we would make decisions about zones and movement controls and the range of other things that would be put in place under the power that the various states and territories had. If it was an isolated case, then that would be one set of scenarios, in relation to what the response plan looked like. If it was widespread, it would be an entirely different scenario. The movement controls ... I would anticipate that movement controls would apply in most scenarios, but once again, we would need to see what the nature of the disease was, how widespread it was and exactly where it was in the first instance.

Steve Peios: Thank you very much.

Malcolm Letts: I should make a call out, as well. In my previous response, I neglected to mention the north Australian private vets who are part of a network. I think that's really important as part of that. Keeping them in the loop in the communication piece is critically important. They play an absolutely vital role for us in the surveillance piece and they will, also, in the response. Thanks.

Steve Peios: Thank you very much, Malcolm. No, I appreciate you adding that on to your responses. Thank you. Mark, question for yourself, please. Is LSD only transmitted by a vector? If so, why is the import of products from areas of outbreaks and issue?

Dr Mark Schipp: No, it's not only transmitted by vector. The vector is the main and the major root of transmission. It can be transmitted through products such as dairy products. Also can be passed through genetic materials, such as semen and embryos. It can be spread through the scabs that form on the skin after a lesion. It can be spread through mucosal secretions, through nose-to-nose contact and the like. But all of those are minor and far more easily managed than the vector aspect of this disease. The vector-borne nature of this disease is the biggest challenge and the one that we really need to get to grapple with.

Steve Peios: Fantastic. Thanks very much for that, Mark. We're approaching the end of our time here. I think I've got time to ask one more question. Sue, is the need to use vets for vaccination programs, due to security of the live virus vaccine available now?

Dr Suzanne Fitzpatrick: In terms of the current AUSVETPLAN, the arrangement are vet only, but I think with industry discussions and certainly where we were looking at broad scale preventative vaccination, if that was to, for us going forward, potentially we could look for third parties, other than vets, to be trained and accredited for vaccination.

Steve Peios: Fantastic, Sue. Thank you very much for that. Another great question that's come through ... There's been so many brilliant ones today and a big thank you to everybody for sending those through. We're just approaching the end of our time now. As it turns out, we probably could have used a little bit more time, because we've had so many great questions that have been sent through to us as part of our webinar today, on lumpy skin disease. What we'll do is, anybody who's sent through the questions, will do our best to get the answers through. And, of course, in the slides at the end of our webinar today, we will also have those email addresses and contact points for you to continue to provide any further questions that you have, and anything if you want directed to a particular panel member today. But we've seen with everybody that we've had on our panel today, it's been absolutely wonderful and a great array of people.

Thank you very much to everybody for joining us today. On the screen, we have other channels, as well, to connect you to our work and details if you would like to be added to the invitation list for this webinar series.

I'd like to say, finally, another massive thank you to all of our panellists and attendees for their time and engagement. It's been a great panel and a great session today, with lots of wonderful questions and great answers provided. Thank you, everybody that has phoned in, as well, for all of your wonderful answers and responses. We'll see you next time on our next webinar for the Australian Biosecurity Series. Thank you very much.

[Session ends]