Mitigating disease spread:
What could the livestock and poultry industries learn from Covid-19?

By: Tim Nelson, President and CEO, Farm Health Guardian

Who would have thought humans could teach the livestock and poultry industries anything about biosecurity and mitigating disease spread? But Covid-19 does have some important lessons for our national and global livestock and poultry sectors when it comes to managing disease spread. Just like the livestock and poultry industries, humankind, it turns out, is just a huge flock of globally networked individuals. Commentators and academics such as Prof. J-P Vaillancourt at the University of Montreal, no stranger to the international poultry sector, and Dr. Rob Renema from the University of Alberta have for some time been easing us into the idea that when it comes to disease prevention, our industries are only as strong as our weakest link. As Renema points out, this is because "our industry is on wheels and therefore inextricably connected."

To combat Covid-19 we humans are working together as members of an 'exposed' network. We collaborated in unprecedented displays of national co-operation by isolating ourselves and keeping safe distance between each other when we emerged from self-isolation. And it worked. Infection rates within the human flock plateaued and dropped as the virus found less and less people to infect. We did this together.

Of course, we treated individuals showing symptoms in the best way we could, many people recovered but sadly many didn't. As more and more people crowded intensive care units around the world the virus simply kept on spreading and it soon became clear that treating individuals was not an effective way to stop the spread of the coronavirus. Eventually, we started to behave like an integrated collaborative network by self-isolating and consequently the number of cases started to fall, hospital staff breathed a collective sigh of relief and things started to return to normal. Lives were lost, but it could have been far worse.

It's no different for infectious diseases that affect livestock and poultry. Once a pathogen infiltrates a network it spreads rapidly and before we see any clinical signs on a farm it is likely to have already moved on rapidly infecting other farms in the network. We see this pattern time and again with production limiting diseases such as Infectious Bronchitis in poultry and a variety of influenzas in pigs. Occasionally we see this manifest itself in catastrophic outbreaks, such as Foot and Mouth in the UK in 2001, Porcine Epidemic Diahorrea (PEDv) in the US in 2013 and Avian Influenza (AI) in the US in 2015. Because we failed to control these pathogens, in all three cases they wreaked untrammelled havoc, causing destruction of livestock and poultry, devastating livelihoods and costing billions of dollars. With a more proactive approach to managing escalating disease spread the impact of two of these disasters (PEDv and AI) could have been significantly reduced.

Once diagnosed, individual farm treatment of the disease is important but treating the individual occurrence (as with Covid-19) will not prevent the pathogen from spreading, it's simply too little too late. What is important is to get in front of the outbreak and take action before it hits the exponential

phase, as clearly demonstrated by the successful management of Covid-19 outbreaks of South Korea, Germany and New Zealand.

So what do we currently do when disease infiltrates our network? Usually we 'self-isolate' by increasing individual farm biosecurity to unprecedented levels. But as with Covid-19 some people are better at self-isolating than others and the consequences of slow action on this front were clear. And the consequences of failure to act are all too clear. The UK for example at the time of writing this piece has the highest number of deaths per capita of any country in the world and the critics blame the delaying of the move to self-isolation.

It's corny but true, in any network you are only as strong as your weakest link and as Vaillancourt points out, "you cannot bio-secure a region by simply bio-securing each farm individually." So we need to do 'more.' It's also clear from the Covid-19 experience that the 'more' is the ability to trace contact with infected and potentially infected individuals, issue warnings and map the outbreak more quickly. These ideas are gaining traction in multiple jurisdictions which are looking at ways to enable individuals to report when they have become infected with Covid-19 and where they are located. This enables those responsible for managing the outbreak to develop a clear picture of how quickly the virus is moving and where it might be spreading. In 2013 the World Health Organization stated that "the ability to predict movement of a pathogen is vital for its containment and control" Individual monitoring of peoples' proximity to others who may have been exposed is being used to provide those potentially affected with early warning so they can seek advice, get tested and if needed early treatment. This is not a new idea, in fact the lesson of COVID-19 is that it brings us back to basic public health principles, like hand hygiene and contact track and tracing.

What can our sector learn from successful response to COVID-19? I believe the livestock and poultry sectors should look seriously at network biosecurity systems such as those being trialed in humans, from both a national and international perspective. Some forward-thinking private companies are already employing systems within their own networks and some are pushing for collaboration between themselves and others within geographical regions. But pathogens are not restricted in their movement by company or by geography. Pathogens move freely on any agent that is capable of transmitting them to any property where there are hosts.

Unfortunately, it is inevitable that pathogens will penetrate our networks which could have a devastating impact on herds or flocks, costing a lot of money, livelihoods and jobs. It's more likely that a network will suffer incursion of a pathogen which will knock 1 or 2 points off productivity without being devastating, but over time this will seriously affect the entire network.

We're human and as demonstrated by Vaillancourt, we're not great at maintaining watertight levels of biosecurity on our farms 100% of the time. And because pathogens remain undetected for some time before clinical signs appear, they're already spreading throughout our networks by the time the alarm is raised.

When the alarm is raised, we have to be able to immediately predict potential pathogen movement and respond efficiently and effectively in order to prevent the outbreak reaching the exponential stage. This requires ongoing monitoring of the condition of the herd/flock and real-time tracing of staff and visitor movements within the network. Importantly, it also requires efficient mechanisms to enable immediate alerts to potentially affected properties and people, so that action can be taken to mitigate spread in a timely and effective manner. The major threat livestock producers face now is African Swine

Fever (ASF), but if truth be told we are always under threat of pathogen infiltration. PEDv is a great example of this.

We need to be ready and we need to do all we can to halt spread once a pathogen is in the network. All it takes is co-operation and collaboration. We are showing how it can be done for Covid-19, we can do it for livestock and poultry.