

Animal Health Monitor

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Abbotsford Agricultural Centre
Animal Health Branch, BC Ministry of Agriculture and Lands
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From the Chief Veterinary Officer

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Ever since John Gummer, the then Minister of Agriculture in the UK publicly fed his child a hamburger to show that he did not believe that BSE was transmissible to humans, governments around the world have become more cautious about making

any definitive statements about the potential threats from animal diseases. No-one will say that chronic wasting disease of deer, another transmissible spongiform encephalopathy like BSE, cannot transmit to humans, although currently there is absolutely no evidence that it does. The precautionary principal has been applied and efforts are in place to control its spread, and hunters have been encouraged to submit samples from their kills for testing. Similarly with influenza. When H5N1 in poultry was identified in Asia as being transmissible and sometimes fatal to humans, the World Health Organization initiated a massive campaign to protect

the world from the next pandemic – it wasn't a question of if, but when, was the often quoted message. However, the virus has failed to spread around the globe, and the population has been spared, only to be threatened by a novel H1N1. This virus did achieve pandemic status, as defined by WHO, and governments were put on high alert; the CBC initiated Flu Watch to keep the public informed of new hot spots, and the progress of vaccine development and supply.

But now reports out of the Centre for Disease Control in the USA indicate that the pandemic “is much milder than officials expected or have let on so far”. “It is probably going to be the mildest pandemic on record compared to the three that happened in the 20th century”, says Dr Marc Lipsitch, a professor of epidemiology at the Harvard School of Public Health *. The messaging to the public has been confusing from the start, not least when it was suggested that there was scientific evidence that vaccination against seasonal flu actually increased the risk from pandemic flu.

What then will likely happen when we are warned of the next disease threat to the human population? Everyone is familiar with the fable about the little boy crying wolf. But what if the next time the threat has a real potential to cause widespread death and economic destruction? Will a

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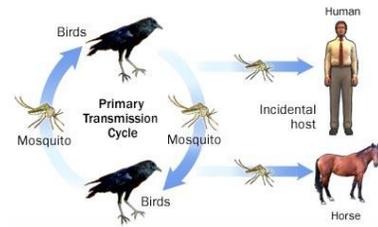
disaster exhausted public respond in time, or will they rationalize inaction by reference to BSE, H5N1, and H1N1? The precautionary principal is not without its dangers.

*Pandemic influenza (H1N1) 2009 (125) : the mild pandemic. Promed, Dec 9th 2009.
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West Nile virus Roulette Is it worth the risk?

Ann Britton

Starting in 1999, a newly introduced pathogen, West Nile Virus (WNV) spread across North America leaving thousands of dead birds and horses in its wake. As the virus moved into new areas, valuable experience was gained regarding the transmission, diagnosis, treatment and outcomes of WNV infection in horses and in people. For horse owners, one of the most important developments that arose from this epidemic, was the development of safe and effective vaccines to protect horses from this highly fatal infection.

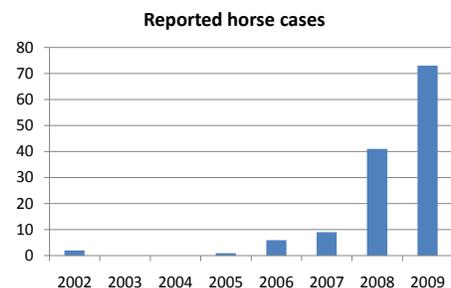


WNV in BC : In August 2009, WNV was first detected in mosquito pools and 2 human residents of the South Okanagan. In September 2009, three horses, two from south Okanagan, and one from the Fraser Valley were diagnosed with WNV.

WNV is transmitted to susceptible hosts, such as horses, birds and humans by infected mosquitoes. The disease is not directly transmitted from horse to horse, horse to human, or bird to horse or human. Signs of WNV infection in horses include staggering, muscle twitching, off feed, and head pressing. WNV encephalitis (inflammation of the brain causing neurologic symptoms) develops in approximately 10% of horses that are bitten by infected mosquitoes. In horses with WNV disease, 30% to 40% will die or require euthanasia. Although horses under 5 and older than 15 years of age are believed to be at increased risk, horses of any age can be affected.

Looking south of the border, the Washington state experience lends helpful information as to what we might expect in BC in coming years. In 2008 and 2009, Washington had the highest number of reported equine WNV cases of any state or province in North America. All of the affected horses in Washington were unvaccinated or had lapsed vaccination against WNV.

West Nile Virus Washington State, 2002-2009



Some horse owners may be tempted to postpone WNV vaccination until the virus is detected in their area however that is a risky decision as it is impossible to know with precision when and where this virus will turn up. Mosquito monitoring is sporadic and cannot possibly cover every geographic area and there is often no early indication that WNV is circulating before a horse becomes ill. This was the case in the Fraser Valley in September 2009 when an ill horse was the first indication that West Nile virus was circulating locally. There is evidence that the virus can overwinter in mosquitoes so it will not be a surprise if new cases are found in BC in 2010.

Vaccination of horses should be administered well before the mosquito season arrives as it takes about 6 weeks and two vaccines for full immunity to develop. Weather patterns are unpredictable, so the recommendation is to vaccinate horses in the spring, well before the weather warms up. Since 2001, over 30 million doses of WNV vaccine have been administered to horses in North America and vaccination has been shown to be extremely safe and effective in preventing disease, without adverse side effects.

All in all, horse owners in BC are lucky. It took 10 years for the virus to arrive here and we now have good tools to protect horses from this highly fatal disease. Opting out of WNV vaccination is akin to taking a spin of the roulette wheel with your horse. If you have not already done so, contact your veterinarian regarding WNV vaccination for your horse.

For veterinarians, there is an expectation that cases of WNV in horses will be reported to the Animal Health Centre. We are developing a form that can be faxed to facilitate this effort. If you have questions about this, please contact Dr. Mira Leslie at (604) 556-3013 or mira.leslie@gov.bc.ca.

CA-MRSA. What is it and what's the veterinary significance?

Jane Pritchard

Staphylococcus aureus is a significant human pathogen that causes a wide range of infections, including skin and wound infections, toxic shock syndrome, arthritis, endocarditis, osteomyelitis, and food poisoning.

In the 1960's, following closely on the development of resistance of *Staphylococcus aureus* (SA) to penicillin and the subsequent use of methicillin to treat SA, MRSA (Methicillin Resistant SA) strains emerged. MRSA have since become endemic in many hospital environments (HA-MRSA or hospital acquired) and frequently exhibit resistance to a variety of other common antibiotics. The epidemiology of MRSA then changed again in the 1990's. Infections were no longer confined to the hospital setting, but also appeared in healthy community-dwelling individuals without established risk factors for the acquisition of MRSA. Although CA-MRSA (Community Acquired-Methicillin Resistant SA) infections are usually mild, they may also be severe, and can result in hospitalization and death.

The prevalence of CA-MRSA in human infections varies markedly between geographical areas, being as high as 60% in parts of the USA, 40% in southern Europe but <1% in northern Europe. Carriers of CA-MRSA have a high risk of complications following any surgical procedure.¹⁰

In BC, as reported by the BCCDC in the August 2008 'Antimicrobial Resistance Trends in the Province of BC', the percentage of *Staphylococcus aureus* isolates that were methicillin-resistant (MRSA) significantly increased between the years 1998 to 2007, with the rates stabilizing in 2008. This increase is said to be primarily due to the prevalence of community-associated (CA) isolates as opposed to HA-MRSA. CA-MRSA strains are now seen causing nosocomial outbreaks in hospitals.

MRSA currently makes up approximately 1 in 5 *S. aureus* isolates processed in BC labs. The decrease in non-susceptibility rates for most of the tested antimicrobials seen from 2002 to 2008 reflects an increased proportion of CA-MRSA strains, which have been typically more susceptible to antimicrobials than their hospital-acquired counterparts. This distinction between HA-MRSA and CA-MRSA is beginning to blur now, with CA-MRSA endemic in many hospitals nowadays, and treatment options for both becoming more limited.¹¹

Resistance to methicillin and all other beta-lactam antibiotics is caused by the *mecA* gene, which is situated on a mobile genomic island, the Staphylococcal Cassette Chromosome *mec* (SCC*mec*). Seven main SCC*mec* types, I to VII, have been distinguished. *Spa* refers to Staphylococcus protein A, a surface protein that is thought to be involved in phagocytosis avoidance, also an important virulence factor. CA-MRSA harbors SCC*mec* type IV, V or VII, has a genetic background that is often distinct from HA-MRSA, and is often associated with the toxin Panton-Valentine leukocidin (PVL).

CA-MRSA is now an emerging veterinary and zoonotic pathogen as evidenced by recently published articles documenting cases of transfer of CA-MRSA between humans and household pets directly, between veterinarians and horses, and between swine and anyone working with swine. In the Netherlands, a swine farmer or member of their families is considered 600 times more likely to be carrying MRSA than anyone in the general population.

The first report of MRSA in domestic animals was in dairy cattle mastitis cases in Belgium in 1972. Since that time there have been sporadic cases of infection with MRSA in a variety of other domestic animals. CA-MRSA infections in horses and equine veterinarians, associated with wide dissemination of a particular clonal lineage (Canadian epidemic MRSA-5, *spa* type 7) have been documented in Canada and around the world^{2,3}. CA-MRSA in dogs, cats their owner and veterinary clinics has also been documented in Canada, as has CA-MRSA in pigs, school teachers, pet therapy dogs and chickens.^{4,5,6,7,8,9}

Epidemiological evidence, including phenotypic and molecular typing data, suggests that MRSA isolates from dogs and cats are indistinguishable from human healthcare isolates, whereas strains of MRSA isolated from horses, swine and associated personnel are different¹⁰. Initially these strains of CA-MRSA from livestock could not be classified by the tests used to do so for human strains and were designated as either LA, Livestock Associated, or NT, Non-Typeable. Classification for MRSA's now looks at variation in several components of the bacteria; these are *mecA*, SCC*mec*, and *spa*, as well as applying PFGE (Pulse Field Gel Electrophoresis)

and MLST (MultiLocus Sequence Typing) technologies. This has led to the ability to further characterize the LA-MRSA's which aids Bacterial Source Tracking.

The Animal Health Lab has multiple levels of surveillance for MRSA. There is screening of all *Staphylococcus aureus* isolated from mastitis milk cultures and any other source for MRSA attributes. Additionally we have done active sampling from skin in dairy cows in 2006 as part of the surveillance for zoonotic enteric pathogens, and active sampling of 442 bulk milk samples in 2007. These were all negative. In fact, since 2006, we have had only 2 confirmed isolates of MRSA, and both were from pet birds.

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2. Weese et al. *JAVMA* .2005 Feb15; 226(4):580-3
3. Weese et al, *Emerg Infect Dis*. 2005 Mar;11(3):430-5.
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7. Hanselman et al, *Can J Infect Dis Med Microbiol*. 2008 Nov;19(6):405-8
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9. Persoons et al. *Emerg Infect Dis*. 2009 Mar;15(3):452-3.
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11. BCCDC August 2008 'Antimicrobial Resistance Trends in the Province of BC'

Identification of *Neospora caninum* Infection in Marine Mammals of the Pacific Northwest

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The apicomplexan protozoan parasite *Neospora caninum* has long been recognized as an important cause of abortion and neuromuscular disease in terrestrial domestic and wild animals worldwide¹. Recently, antibodies to *Neospora* have been detected in various marine mammal species,^{2,3} but to our knowledge, infection with this parasite has not been documented. In this study, tissue samples were collected from stranded dead marine mammals along the Northern Oregon, Washington and British Columbia coasts between 2004 and 2009. Tissue specimens were identified as infected with *Neospora sp.* using multi-locus polymerase chain reaction PCR-DNA sequencing at pan-coccidian 18S and ITS-1 loci. Of 158 individuals examined, one Pacific harbor seal (*Phoca vitulina richardsi*) was PCR-DNA sequence positive for *Neospora caninum*, and 13 individuals were PCR positive for orthologous coccidian parasites whose DNA sequences most closely resembled that of *Neospora caninum*. The *Neospora caninum* infected individual was a male pup from Gertrude Island, Washington that was co-infected with another protozoan parasite *Toxoplasma gondii*, the causative agent of toxoplasmosis. The presence of *Neospora sp.* infection in marine mammals demonstrates a broader host range for this parasite than previously envisaged and supports the hypothesis that canid fecal contamination, the only definitive hosts known to excrete *Neospora caninum* oocysts, is an important factor for marine mammal exposure.

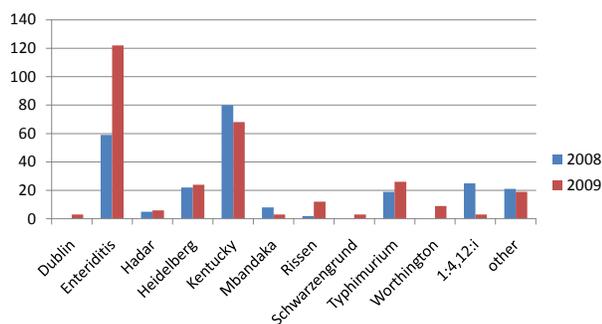
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Salmonella at the Animal Health Center

The genus *Salmonella* was named in 1885 after [Daniel Elmer Salmon](#), an American veterinary pathologist. There are more than 200 serovars of *Salmonella* bacteria. Most of them are not host specific and many are zoonotic.

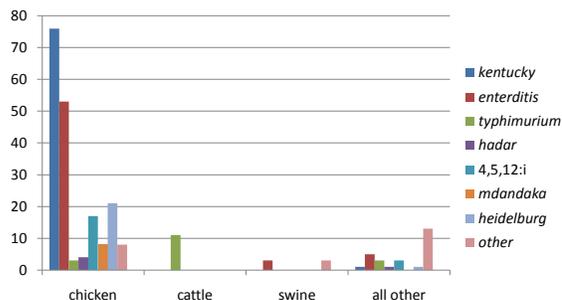
Salmonella by serotype

Animal Health Centre, 2008 and 2009



Salmonella isolates by animal type,

Animal Health Centre, 2008



The Animal Health Center laboratory isolates approximately 200- 350 *Salmonella* from animal sources annually, >85% are from poultry. Provincial public health reports between 600-800 salmonella illnesses in BC residents annually. Efforts are underway to integrate the animal and human health data to better understand and analyze the impact of *Salmonella* on public health and animal health in BC.

This edition of the Animal Health Monitor was written and edited by: Paul Kitching, Mira Leslie, Ann Britton, Jane Pritchard, Stephen Raverty

We are always pleased to receive feedback from our readers. Suggestions on future topics and potential contributions are encouraged. You can find past and current issues of these bulletins on our website: <http://www.agf.gov.bc.ca/ahc/ahcwho.htm>.

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