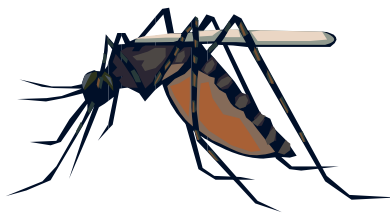


ALBERTA WEST NILE VIRUS

2010 Summary Report



**Government
of Alberta** ■

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1. Introduction

West Nile virus Interdepartmental Committee

The purpose of this report is to summarize Alberta's response to West Nile virus (WNV) in 2010. An interdepartmental committee has met each year since 2003 to prepare a provincial response plan to address potential WNV risks in Alberta. The interdepartmental committee in 2010 included the following members:

Kristy Madsen	WNV Provincial Co-ordinator (Chair) Alberta Health and Wellness
Lisa Lachance	Communicable Disease Nurse Consultant Alberta Health and Wellness
Pamela Steppan	Epidemiologist Alberta Health and Wellness
Edi Skoropad	Information Officer Alberta Health and Wellness
Dr. Raymond Tellier	Medical Microbiologist Provincial Laboratory for Public Health
Brett Oliver-Lyons	Data and Research Analyst Alberta Agriculture and Rural Development
Dr. Mark Ball	Wildlife Disease Specialist Alberta Sustainable Resource Development
Jock McIntosh	Pesticide Specialist Alberta Environment

West Nile virus Response Plan for 2010

The purpose of the WNV Response Plan in 2010 was to minimize the risk of WNV infection to humans.

The key components of the plan were the following:

- Communications**
- To inform Albertans of the potential consequences of a WNV infection, the steps that can be taken to prevent being bitten by mosquitoes and the most effective means of reducing the risk of infection.
- Humans**
- Testing of individuals for WNV infection by the Provincial Laboratory for Public Health
 - Protection of the blood supply by notifying Canadian Blood Services if it is suspected that an individual has WNV and there is a history of either donating or receiving blood or blood products
 - Reporting and follow-up of WNV cases by Alberta Health Services
- Mosquitoes**
- WNV mosquito surveillance will not be conducted in Alberta in 2010.
 - Mosquito surveillance from 2003 to 2008 has provided an understanding of the factors that influence virus activity and identified the period of greatest risk for Albertans
- Birds**
- Bird surveillance is no longer a significant indicator of WNV in Alberta
 - WNV bird surveillance will not be conducted in Alberta in 2010
- Horses**
- Cases of WNV in horses will be monitored, used to identify the presence of the virus and provide information to alert the public.
 - Provide information for veterinarians and horse owners
 - Passive surveillance of WNV cases is based on reporting from veterinarians and laboratories

2. Epizootiology of West Nile virus

Overview

The transmission cycle of WNV is complex, and the virus requires several hosts to complete its lifecycle. The cycle begins when an infected adult *Culex tarsalis* mosquito takes a blood meal from a bird and at the same time injects virus-containing saliva, thus infecting the bird. Within the bird, WNV multiplies in various tissues and circulates in the blood. When a second mosquito feeds on the infected bird, the mosquito becomes infected. After a short dormancy period – a few days to weeks, depending on the weather – the second mosquito is able to transmit WNV to another host. The bird-to-mosquito cycle continues, and may or may not lead to disease in the bird, though most species of birds are not affected by WNV. There is also some evidence that some species of infected female mosquitoes pass the virus to their offspring¹.

The lifecycle of WNV is influenced by a complex interaction of biological and non-biological factors. Their species, distribution, migratory habits, immune response and previous exposure to WNV all affect WNV's success in birds. Similarly, mosquito species distribution and life-stages affect its success in mosquitoes. WNV infected birds and mosquitoes must also survive in sufficient numbers to establish and maintain the transmission cycle.

Humans, horses and other small mammals and pets act as dead-end, incidental hosts for WNV. When a mosquito feeds on and infects a human or a horse, WNV may cause disease; however WNV does not circulate in the blood of these hosts and therefore cannot be transferred to a mosquito, thus ending the cycle.

There is no evidence to suggest that humans can transmit WNV through contact with someone who is infected or who has treated an infected person. Likewise, there is no evidence to date to show that WNV spreads from infected animals to people². However, in a very small number of cases, there is evidence of WNV being transmitted via blood transfusions, organ transplants, breastfeeding and during pregnancy from mother to baby³.

WNV first appeared in Alberta in the summer of 2003. WNV came into the province by way of migrating birds and established local viral populations in *Culex tarsalis* mosquitoes. By the end of summer 2003, there was evidence of extensive viral activity in birds, mosquitoes, horses and humans throughout the southern and central areas of Alberta.

¹ Public Health Agency of Canada. *Infectious Diseases: West Nile Virus*. "Transmission." <phac-aspc.gc.ca/wn-no/transmission-eng.php>

² *Ibid.*

³ U.S. Centers for Disease Control and Prevention. *CDC Fact Sheet*. "West Nile Virus: What You Need To Know." <cdc.gov/ncidod/dvbid/westnile/wnv_factsheet.htm>

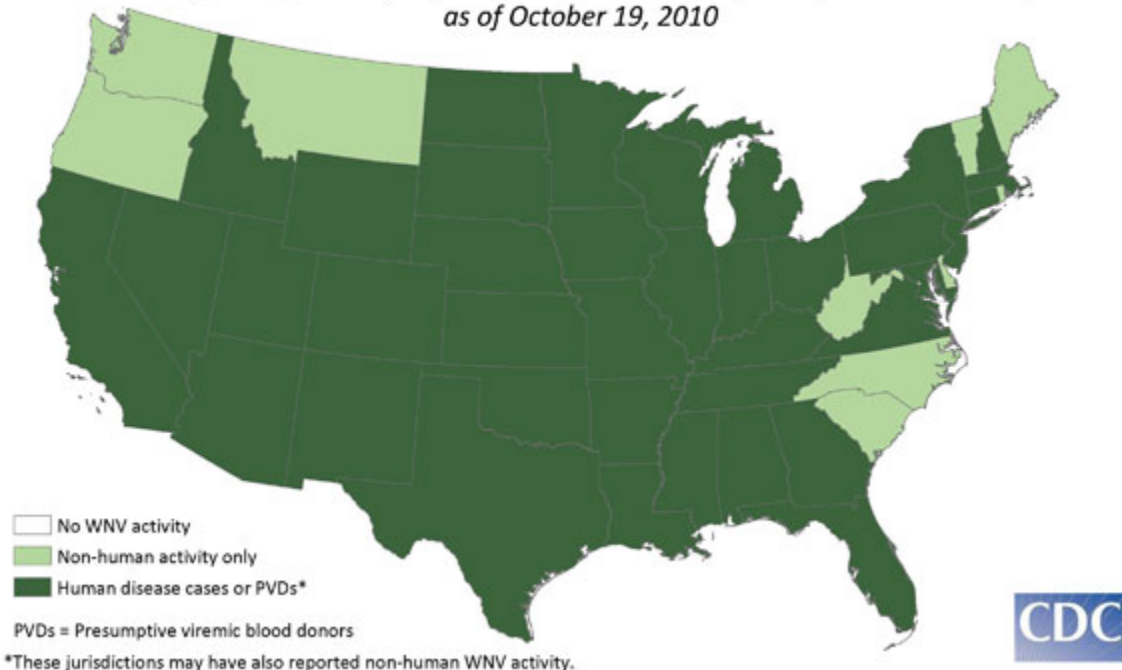
Surveillance in the United States and Canada

WNV was first detected in North America in 1999 in the northeastern United States (U.S.). To date, WNV in humans, birds, horses or mosquitoes has been reported in all states except Hawaii and Alaska.

In many areas of the southern U.S., *Culex* species do not go dormant during the winter months and thus year-round transmission of WNV occurs from the Atlantic and Gulf Coast regions of the U.S. westward to southern California. In northern areas, WNV can overwinter in a few dormant, individual mosquitoes. WNV is still extending its continental range and establishing populations within Mexico, as well as Central and South America.

Figure 1: West Nile virus Activity in the United States in 2010⁴

West Nile virus (WNV) activity reported to ArboNET, by state, United States, 2010
as of October 19, 2010



The map shows the distribution of non human activity (shaded in light green) and human infections including PVDs (dark green) occurring during 2010 by state. If West Nile virus infection is reported from any area of a state, that entire state is shaded.

In Canada, WNV has spread south and east of the Rocky Mountains. Virus activity in northern areas is limited to summer months when environmental and biological conditions support amplification of WNV in suitable birds and mosquitoes.

The 2010 surveillance information on human cases of WNV throughout Canada shows a low number of cases with no human cases reported in the Territories, Maritimes, Manitoba or Quebec (Table 1).

⁴ *Ibid.* West Nile Virus Home. "West Nile virus (WNV) activity reported to ArboNet, by state, United States, 2010." <<http://www.cdc.gov/ncidod/dvbid/westnile/Mapsactivity/surv&control10MapsAnybyState.htm>>

Table 1: 2010 Human West Nile Virus Cases and Asymptomatic Infections (Canada)⁵

Province/Territory	Neurological Syndrome	Non-Neurological Syndrome	Unclassified/Unspecified	Total *	Asymptomatic Infection**
Newfoundland and Labrador	0	0	0	0	0
Prince Edward Island	0	0	0	0	0
Nova Scotia	0	0	0	0	0
New Brunswick	0	0	0	0	0
Quebec	0	0	0	0	0
Ontario	1	0	0	1	0
Manitoba	0	0	0	0	0
Saskatchewan	0	2	0	2	0
Alberta	0	1	0	1	0
British Columbia	0	1	0	1	0
Yukon	0	0	0	0	0
Northwest Territories	0	0	0	0	0
Nunavut	0	0	0	0	0
TOTAL	1	4	0	5	0

* Total probable and confirmed clinical cases is the sum of WNV Neurological Syndrome + WNV Non-Neurological Syndrome + WNV Unclassified/Unspecified

** Most asymptomatic infections reported to PHAC are identified through testing blood donors. Asymptomatic infections will not be included in the total.

⁵ Public Health Agency of Canada, 2010.

As seen in Table 2, cooler weather dampened the amplification of WNV across the country.

Table 2: West Nile virus Human Cases Reported Across Canada 2002 – 2010.

Province/Territory	2002	2003	2004	2005	2006	2007	2008	2009	2010
British Columbia	0	20*	0	0	0	19*	1*	3**	1
Alberta	2*	275**	1*	10**	40**	320**	1*	2	1*
Saskatchewan	0	947**	5*	61**	20**	1,456**	17	1	2
Manitoba	0	143**	3	58	51	587	12	1*	0
Ontario	394	89**	14*	101**	42**	15**	3	1	1
Quebec	20	17	3*	5	1	2*	2	0	0
Maritimes	0	3*	0	3*	0	1*	0	0	0
Territories	0	1*	0	0	0	0	0	0	0
Canada***	416	1,495	26	238	154	2,401	36	8	5
<p>* All travel-related cases ** One or more travel-related case included in total *** Total includes West Nile virus Asymptomatic Infection Source: Public Health Agency of Canada, 2010</p>									

3. Communications

The primary objective of the 2010 WNV communication plan was to inform Albertans and travellers to the province, especially in the medium and high-risk zones in southern Alberta, about the potential consequences of a WNV infection. This included the personal precautions individuals could take to prevent being bitten by mosquitoes and the most effective means of reducing the risk of WNV infection.

The 2010 media campaign's messaging reminded the public to use what continues to be the best personal protective measures of wearing long-sleeved shirts and pants when outdoors during peak periods of mosquito activity and to wear insect repellent containing DEET.

Under Alberta Health and Wellness' (AHW) leadership, a provincial WNV plan was developed with support from the following Alberta government departments:

- Agriculture and Rural Development;
- Environment;
- Sustainable Resource Development.

Alberta's Interdepartmental Committee evaluated Alberta's WNV plan within the context of weather conditions, combined with mosquito activity in the province, as well as the WNV infection rates occurring nationally and internationally.

West Nile Non-Neurological Syndrome and the West Nile Neurological Syndrome, the more serious form of these WNV infections, were reported to regional Medical Officers of Health, AHW, Public Health Agency of Canada (PHAC) and when necessary, to Canadian Blood Services (CBS).

Mosquito surveillance since 2003 has provided an understanding that the period of greatest risk of WNV transmission to humans from *Culex tarsalis* mosquitoes is from mid-July to August. The presence and number of *Culex tarsalis* mosquitoes during the summer of 2010 was not significant due to cool weather and unfavourable conditions for *Culex tarsalis* breeding and activity levels.

2010 communication strategy goals included:

- Inform all Albertans about the potential consequences of a WNV infection and the appropriate personal precautions an individual could take to protect their health, particularly active seniors aged 50+ and outdoor enthusiasts.
- Distribute and post on the AHW public website the 2010 West Nile virus: Alberta's Response Plan, a planning reference and guide for Alberta Health Services (AHS), MLAs and constituency offices, medical officers of health and health zone contacts.
- Provide information and links to government ministry websites with reliable up-to-date information on WNV human surveillance. WNV infection rates were monitored and reported as they occurred.

- Maintain, or heighten if required, public awareness during summer months about the risk and consequences of WNV infection.
- Inform stakeholders about specific WNV strategies and responses.
- Adjust public messaging if required.

Communications Strategy

The 2010 communication strategy was targeted at visitors to the province and Albertans, who have consistently received WNV information since 2003.

Updates were made to the radio advertising campaign Let's Go Outdoors, a paid series of interview questions and answers that are about two minutes in length. These radio ads aired from June to September. Two additional personal testimony radio ads, about 30-seconds in length, were aired province-wide from July to mid-August.

Ads ran in magazines and in daily and weekly newspapers in the WNV high-risk months of July and August. The costs for advertising in this part of the campaign were reduced significantly from previous years.

Fight the Bite Public Awareness Campaign

The Fight the Bite public awareness campaign, which included radio, magazines, and daily and weekly newspapers was targeted at Albertans and included travellers within the province, outdoor enthusiasts and active seniors who are known to be at a higher risk of more severe health consequences from WNV infection.

The 2010 campaign began in June and ended in the middle of September, informing Albertans of the potentially high health risks and consequences of contracting the virus. The campaign also provided information on the measures Albertans needed to take to protect their health. This public campaign included:

- Newspaper ads co-ordinated through the government's Public Affairs Bureau and an ad agency. Ads appeared in daily, weekly and community newspapers province-wide during July through to the middle of August.
- Magazine ads published in senior and sport-enthusiast publications such as Grandparent and Alberta Outdoorsman. Ads were placed in prominent positions for readability.
- Two 30-second personal testimonial radio ads ran throughout the province in June through to the middle of August, with a greater play frequency in the southern high-risk zones.
- A series of four two-minute radio spots called Let's Go Outdoors with Michael Short that involved a dialogue on various WNV topics such as infection and symptoms, protecting oneself, child and adult use of insect repellents with DEET, immunity and treatment, as well as nursing, pregnancy, transplants and blood transfusion. Responses were provided by the Chief Medical Officer of Health (CMOH), Dr. André Corriveau.

- Brochures, brochure stands and posters were distributed to golf courses, seniors' residences, visitor centers, Fish and Wildlife offices, and AHS.
- A household brochure was mailed in the first week of July with distribution focused on Calgary and the southern and central zones of Alberta. Print materials were sized to go through Canada Post' mail delivery service more cost-effectively.
- A two-page fact-filled brochure, posters and a warning sign were available to the public on the website at fightthebite.info.

Information bulletin

One information bulletin was distributed province-wide on June 25 to promote general awareness about the beginning of WNV season: it urged Albertans to protect themselves against mosquito bites.

As of September 24 there was one travel-related case of West Nile Non-Neurological Syndrome. There were no other confirmed WNV cases in Alberta. This information was posted under the "West Nile virus – Surveillance evidence in Alberta" section of the AHW fightthebite.info website and not distributed as a news release.

Media Relations

Media inquiries regarding WNV information were handled by the communications branch at AHW. All requests were for general information, as there were no serious issues during the 2010 WNV season.

Website

The public had access throughout the 2010 WNV season to cumulative numbers of cases of humans infected with WNV on the AHW website fightthebite.info.

The site also provided responses to commonly asked questions and gave the public access to printable materials like posters and brochures used in the public awareness campaign. Other online links provided the public with up-to-date WNV information on reputable websites such as Health Canada, the U.S. Communicable Disease Control Centre and Alberta's ministry partners.

Top Doc videos

In 2010, communications added three social marketing videos as a new aspect to the WNV campaign, and as another means of connecting with Albertans. The CMOH and public took part in a question-and-answer format discussion on three WNV subject areas including protection against WNV, how WNV is spread and the symptoms of WNV.

Call Centre

The government's Service Alberta telephone operators and HealthLink Alberta operators provided general WNV information, as well as specific information on personal protective measures.

Service Alberta: 310-4455 throughout Alberta
Health Link Alberta: 780-408-5465 in Edmonton
403-943-5465 in Calgary
1-866-408-5465 elsewhere in Alberta

Summary of 2010 Communications Campaign

- One information bulletin was released on June 25. The first and only human case of WNV was reported in September.
- Media calls: between April to mid-September AHW communications handled about four calls from the media on general WNV information.
- Newspaper articles: There were about 15 newspaper articles covering WNV between April and September.
- Radio: 30-second personal testimonial ads aired in the high and medium risk zones about 840 times in July and August.
- Specialty radio programs: Let's Go Outdoors paid informational two-minute radio interviews aired 836 times from the end of June through September. In the three months, radio features aired on 323 occasions, 30-second commercials ran 323 occasions and weekly editorials ran 190 occasions.
- The WNV Fight the Bite website received 11,621 visits from June 1 to September 30, 2010. The top five visited pages out of 26 available pages were:
 - West Nile virus home page: 3,145 visits
 - Symptoms and Treatment: 1480
 - Common Questions: 804
 - Response plan: 689
 - Protect yourself: 623
- Top Doc video visits on YouTube as of November 1, 2010;
 - What are the symptoms of WNV – viewed 494 times;
 - How is WNV spread – viewed 263 times; and
 - How do you protect yourself against WNV? – 132 times.
- Number of inquiries about WNV topics received through emails to the government's Alberta Connects and health.ahinform@gov.ab.ca, were less than five.

4. Human Surveillance

The surveillance of WNV in humans continued in 2010 via physician requests for blood testing, blood donor screening, and organ/tissue testing. All positive laboratory results were reported to AHW by the Provincial Laboratory of Public Health (ProvLab) through a previously established electronic reporting system.

Cooler weather this summer resulted in extremely low numbers of *Culex* mosquitoes with low WNV infection rates. This limited the spread of WNV from birds to mosquitoes and ultimately, there were few infected mosquitoes to bite humans.

West Nile Virus Cases in Alberta

A probable case of WNV Non-NS was reported to AHW. Symptoms began the middle of August 2010 with a headache, muscle and joint pain, weakness, stiff neck, rash and lethargy while traveling in Saskatchewan. The individual has since recovered.

Canadian Blood Services (CBS) Screening

There were no WNV positive blood donors detected by CBS in 2010. There have not been any Canadian transfusion-transmitted WNV infections detected since CBS began testing blood donors in July 2003.

5. Mosquito Surveillance

There was no mosquito surveillance conducted in Alberta in 2010.

Six seasons of mosquito surveillance, between 2003 and 2008, achieved the program's WNV objectives and confirmed the expected time period when and where Albertans would be at most risk for contracting WNV infection. Developing and understanding the relationship between the success of WNV as a vector-borne disease and how it is influenced by mosquito species and numbers, and how they are both influenced by climatic conditions was a critical component of the response plan. As a result, effective communication campaigns are developed around the period of greatest risk, particularly in years where climatic conditions favour virus development.

Information regarding past mosquito surveillance, including trapping locations and the operational and testing procedures for West Nile virus detection in mosquito specimens can be obtained from any of the previous *West Nile Virus in Alberta: Response Plans* or by contacting the Alberta Environment Information Centre (780-427-2700 or env.infocent@gov.ab.ca).

2010 Weather Conditions Affecting WNV Amplification

Previous years have demonstrated that the month of June is a critical period where *Culex tarsalis* adult females that have successfully overwintered attempt to establish a first seasonal generation of new adults. Once again in 2010, the cooler evening temperatures during this month prevented population development and successful interaction (blood-feeding) of the mosquitoes with bird populations (preferred host) nesting in proximity to their larval development sites. Two successive years in a row has also deterred the increase in *Culex* populations through the July and August months that would lead to virus amplification and spread through southern Alberta.

6. Provincial Laboratory for Public Health

Diagnostic Testing

The same combined serology/molecular approach implemented in 2007 and used in 2008 and 2009 was used during the 2010 season. Nucleic acid amplification testing (NAAT) of plasma or cerebrospinal fluid (CSF) was undertaken on acute cases. The laboratory had previously validated two in house assays, NASBA and real time RT-PCR, which have equivalent performances; due to the growing difficulty in securing NASBA reagents, increasing use of the real time RT-PCR has occurred this season. For serological testing, anti-WNV immunoglobulin M (IgM) and Immunoglobulin G (IgG) were assayed using the same algorithm and reagents than in 2009, using the Focus assays, with IgM confirmed by background subtraction assay, and IgG testing supplemented by avidity determination. As in 2009, there was very little WNV activity in Alberta, which translated into reduced testing compared to years of high activity.

Transplantation

NAAT testing on plasma specimens continued for 2010 on organ donors and recipients, as requested by each transplant programs. Testing was performed from June 1 to November 1, 2010. In addition, transplant screening was undertaken outside of this period for out of country donors or those with a travel history.

Beginning September 8, 2008, tissue and eye bank screening for WNV was transferred to Mount Sinai Hospital Laboratory in Toronto for testing using the Health Canada and FDA approved GenProbe assay. ProvLab has also now transferred all the serological testing for tissue donors to the Mount Sinai Hospital Laboratory, which uses the kits and procedures approved for donor screening. This new modality of screening for donors of tissues, stem cells and bone marrow is now mandatory, as per Health Canada regulations. Solid organ donors continued in 2010 to be screened at ProvLab using kits validated for diagnostic testing, given the more urgent nature of the testing.

Mosquito Testing

Mosquito pool testing was discontinued at ProvLab in 2009.

Table 3: WNV human testing summary for January 1 to December 13, 2010

Test	Population	Specimens tested	Specimens / Patients Positive
Serology (IgM screen with follow-up IgM extraction, IgG and avidity testing as required)	human diagnostic	615	1 IgM positive after background subtraction, with IgG low avidity.
CSF NAAT	human diagnostic	143	0
Plasma NAAT	human diagnostic	496	0
Plasma NAAT	transplant screen	265	0
Total tests		1519	

NAAT: Nucleic Acid Amplification Test (= PCR or NASBA)

Source: Provincial Laboratory for Public Health, 2010

7. Wild Bird Surveillance

Overview

When WNV arrived in Alberta in 2003, local bird populations had not been previously exposed and they had no natural immunity or resistance to infection. Members of the crow family (*Corvidae*: crows, magpies, jays, and ravens) were particularly susceptible and many died as a result of WNV infection. These dead birds became an early warning system to show where and when WNV was active in the province. Health professionals, veterinarians, and the public used the information to assess the risk of possible infection.

However, since dead bird surveillance was initiated in Alberta, a great deal has been learned about WNV activity. We now know that suitable conditions for WNV are limited largely to the Grassland Natural Region of southeastern Alberta where conditions are most favourable for development of *Culex tarsalis* mosquitoes. In addition, the number of dead corvids each summer has declined significantly since WNV first appeared, although the populations of crows and magpies did not decline. It is likely that crows and magpies, as well as all the other birds species exposed to WNV, adapted to the presence of WNV in the ecosystem and developed protective immunity.

The monitoring of dead birds was discontinued in 2007 because it no longer provided new information about WNV; however testing is conducted on suspect cases as a response to public concern.

Specimen Information

In 2010, the Alberta Fish and Wildlife Division did not receive any bird specimens for WNV testing. WNV testing is only performed for cases where there is a direct public concern or an unusually large die-off of birds.

8. Horse Surveillance

Introduction

Horses become infected with WNV when they are bitten by mosquitoes carrying WNV. Research suggests that most horses bitten by infected mosquitoes will not develop clinical disease, but instead eliminate WNV asymptotically. Symptoms of WNV in horses can include weakness, depression, muscle tremors, ataxia and an inability to rise. There is no specific treatment for horses affected with WNV. Up to 35 per cent of horses that develop clinical signs may die or have to be euthanized due to complications from the illness.

WNV in horses became a provincially reportable disease in Alberta in 2003, meaning all suspected or confirmed cases must be reported to the Office of the Chief Provincial Veterinarian (OCPV). Since January 1, 2009 and the implementation of the Alberta *Animal Health Act*, WNV in horses has been a provincially notifiable disease with similar reporting requirements as under previous legislation.

From 2003 to 2005, Alberta Agriculture and Rural Development asked Alberta veterinary practitioners to complete surveys on each horse suspected of having WNV. In 2003 and 2004, the surveys focused on horse location, clinical signs and vaccination information. Potential environmental and age/sex/breed risk factors were also queried in order to gain some insight into what factors may contribute to a horse becoming infected. Surveys in 2005 were shortened to only include location, clinical signs and vaccination history. In 2006 and 2007, veterinarians were asked to provide additional information only on horses that tested positive for WNV, not suspect cases. In 2008, a new one-page form was developed that included location, vaccination and travel information, as well as a request for clinical symptoms. The same form was used for the 2009 and 2010 WNV seasons.

WNV in all species of animals is immediately notifiable under Canada's *Health of Animals Act*, which means veterinary laboratories are required to contact the Canadian Food Inspection Agency (CFIA) when diagnosing the disease.

Table 5: Summary of reports received by the OCPV of lab confirmed WNV in horses in Alberta from 2003 to 2010⁶

Year	Positives	Deaths (%)
2010	0	0
2009	1	0
2008	0	0
2007	46	19 (41.3%)
2006	9	unknown
2005	3	1 (33.3%)
2004	4	1 (25.0%)
2003	170	59 (34.7%)

Objectives

The objectives of the 2010 WNV horse surveillance program were to determine the:

- number of horses tested as positive for WNV in Alberta,
- location of positive horses in the province, and
- vaccine usage and clinical signs of positive cases.

Methods

Because WNV in horses is a notifiable disease in Alberta, an owner of an animal or an authorized person who knows, or ought to know, that a notifiable disease is, or may be present in an animal, must report it to the OCPV within 24 hours. Veterinarians and/or private diagnostic laboratories are to notify the OCPV of positive cases and the results of laboratory tests (IgM Elisa serology), to confirm the disease.

Results

The first suspected case of WNV in horses was reported in early June, with reporting continuing until late October 2010. Four horses were suspected of having WNV in the 2010 season with none testing positive.

Summary

In 2010, no horses tested positive for WNV.

⁶ Alberta Agriculture and Rural Development, 2010.

9. Acknowledgements

Thank you and appreciation is extended to the following organizations:

- Provincial Laboratory of Public Health for collecting and analyzing data for the 2010 WNV summary report.
- Alberta Health Services, government agencies and departments for support and expertise in monitoring and responding to WNV in Alberta.
- Alberta Veterinary Medical Association (AVMA) for publicizing WNV information.
- Office of the Chief Provincial Veterinarian and the veterinary practitioners in Alberta and horse owners for their cooperation.
- Interdepartmental WNV Working Committee members for coordinating the 2010 WNV response.