ALBERTA west nile virus wild bird surveillance: 2002

SUMMARY:

To date (December 11, 2002), a total of 245 dead birds was received during the west nile surveillance program implemented by the Alberta Fish and Wildlife Division in 2002. The majority (85%) was corvids of the target species (117 crows, 91 Magpies) as well as 14 ravens, 4 blue jays, and 19 birds of various species. Birds were collected over a wide geographic range throughout the province. Selection criteria were applied and only those birds for which cause of death could not be identified or which died with an empty gut were forwarded for formal west nile testing. Nestlings were not examined. A total of 55 birds was sent for west nile testing: 22 crows, 25 magpies, 5 ravens, 1 blue jay, 1 bald eagle, 1 grackle. To date (December 11, 2002), we have received final lab results of 42 birds and have results pending on 13 birds. All those for which we have final results were negative for west nile virus. Seventy-four (30%) of the birds received were unsuitable for analysis (dried, rotten, or too young). Twenty-four (14%) of the remaining birds died with no visible lesions and cause of death could not be determined. Of the birds with a known cause of death (n=147), blunt trauma was by far the most common cause of death in all species (55%). A further 12% died as a result of small calibre gunshot wounds.

The Virus:

West nile virus (WNV) occurs in a wide geographic area throughout the world. It was first detected on the North American continent in 1999 in northeast USA. To date, it has spread in migrating wild birds and local mosquitoes to encompass most of the US and southern Canada, except some areas along the spine of the Rocky Mountains. Virus activity in northern areas is limited to summer months when mosquitoes are active. A variety of mosquito species are able to draw virus from the blood of infected individuals and pass it on to other individuals. Birds are the primary habitat for west nile virus and it is maintained in a wide range of bird species with little or no clinical effect. However, members of the corvid family (crows, Magpies, ravens, jays) are particularly susceptible and fatal infections are relatively common. Mammals generally are quite resistant to infection but rare fatal cases have been documented in horses and humans. Although it is readily apparent that this virus is here to stay, the full picture of west nile virus in a North American context is still evolving.

Additional background material about west nile virus in Alberta can be found on the websites of

- Alberta Health and Wellness
  http://www.health.gov.ab.ca/healthier/diseases/west_nile.html
- Alberta Agriculture, Food and Rural Development
  http://www.agric.gov.ab.ca/surveillance/west_nile_virus.html
- Fish and Wildlife Division of Alberta Sustainable Resource Development
  http://www3.gov.ab.ca/srd/fw/diseases

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The Program:

Early in 2002, representatives from Alberta Health, Alberta Agriculture, and the Fish and Wildlife Division developed a contingency plan to address the potential risks posed by WNV in Alberta. The contingency plan contains two primary components: communication and surveillance. Communication is facilitated largely through public information in departmental web pages and fact sheets (see above) as well as technical information provided directly to health care professionals and veterinarians. The surveillance programs focus on monitoring "at risk" populations—physicians monitor human illness, veterinarians monitor horse health, and the Fish and Wildlife Division monitors mortality of wild corvids found dead by the public. The surveillance programs are designed to support the needs of assessing the health risks to humans and to assist Alberta Health in providing appropriate provincial information to health care professionals and to the public.

The current report deals only with the wild bird component of the provincial west nile virus surveillance program. In 2002, the program focused on crows and Magpies as the primary species that were likely to exhibit fatal infections and thus reflect the presence or absence of the virus in Alberta populations. Ravens and blue jays, close relatives of crows and Magpies, also were accepted. Fresh dead corvids were collected by the public and dropped off at any Fish and Wildlife office. A few additional birds of other species also were received.

Fresh or frozen birds were transported to one of the regional diagnostic labs of Alberta Agriculture and forwarded to Edmonton. Birds were assessed by a pathologist and/or wildlife disease specialist for cause of death. If the bird was emaciated, had an empty gut, or a cause of death could not be determined, the carcass was frozen and sent to the Canadian Cooperative Wildlife Health Centre in Saskatoon. Specified tissues were collected and sent to the Health Canada diagnostic lab in Winnipeg for west nile testing.

The Data:

Species composition

Two hundred forty five birds were received (Table 1). The majority of birds were crows and Magpies (85%). A few ravens and blue jays as well as one or two individuals of 14 other species also were received.

Geographic Distribution

Most birds were collected in Edmonton (n=68) or Calgary (n=45), with remaining birds collected widely throughout the province.

Diagnoses

Thirty (12%) of the birds received were unsuitable for diagnostic evaluation (5 dried, 25 rotten). In addition, 44 (18%) birds were nestlings considered too young for valid inclusion in the surveillance sample. Twenty-four (14%) of the remaining birds died with no visible lesions and cause of death could not be determined Of the birds with a known

cause of death (n=147), blunt trauma was by far the most common cause of death in all species (55%) (Table 2). A further 12% died as a result of small calibre gunshot wounds.

West nile results

A total of 55 birds was forwarded for specific west nile testing (Table 3). To date (December 11, 2002), we have received final lab results of 42 birds and have results pending on 13 birds. ***All those for which we have final results were negative for west nile virus.***

Discussion

The west nile virus surveillance of wild birds in Alberta in 2002 was designed to reflect the estimated provincial risk. At the end of 2001, the western edge of the known distribution of the virus in Canada and the United States was Ontario and Arkansas, respectively. It was present in migratory birds along the Atlantic Flyway, with limited evidence in birds using the Central Flyway. There was reason to believe that the primary spring dispersal in 2002 would return the virus to northern states and provinces in eastern North America, with a subsequent build-up in northern bird populations throughout the summer. As the virus established in northern birds, secondary movements of birds and mosquitoes during the summer were likely to extend the western edge of the virus distribution. As such, it was appropriate for Alberta to begin preliminary surveillance of susceptible populations in the spring of 2002.

The provincial WNV Contingency Plan laid the foundation for the summer programs and identified dead crows and Magpies as the primary surveillance tool to assess the presence/absence of the virus in Alberta. Given the media reports and general concerns expressed in eastern North America, the public in Alberta soon began calling Fish and Wildlife offices to report instances of dead birds. Callers were advised that if the dead bird was a crow or a Magpie, it could be included in the west nile surveillance program. People were asked to collect fresh-dead crows and Magpies and submit them to any office of the Fish and Wildlife Division. Information regarding appropriate precautions when handling any wild animal found dead of unknown causes was provided. It was reiterated that these were general precautions and did not reflect a specific health risk from handling birds dead of west nile virus. There is no known health risk from handling birds that have died of west nile virus.

By mid-summer 2002, west nile virus was reported in all states east of the Rocky Mountains as well as Quebec, Ontario, Manitoba, and Saskatchewan. This information lead to a reassessment of the potential risk that the virus may have moved into Alberta. At this time, the provincial wild bird surveillance program was amended so that all corvids received in emaciated condition or with an empty gut were submitted for west nile testing, regardless of cause of death.

No surveillance program can ever be 100% effective. However, the sensitivity of crows and Magpies to west nile virus indicates that these species are a good measure to reflect the potential presence of the virus and, secondarily, useful for assessing the potential risk to humans. The absence of detected cases in the wild birds collected in Alberta in 2002 suggests it is unlikely the virus occurred in the province this year, or if it did, it was here with a very limited population and distribution. There was no detectable evidence that the virus caused mortality in crows or Magpies and given the inherent low risk to human health even in areas where the virus is well established in bird populations, the risk of human infection occurring in Alberta in 2002 was extremely low. Indeed, Alberta Health and Wellness detected only two cases of human west nile infection and both were in people who had traveled to areas where the virus is known to have been present for a number of years..

FUTURE OUTLOOK

If the pattern of dispersal holds true, there is little doubt that west nile virus will appear in Alberta in the summer of 2003. Migratory birds are currently overwintering in areas where the virus is known to occur (Texas, Louisiana, southern California) and overlapping with birds from infected populations from other states and provinces. It is likely that some spring migrants will return to Alberta carrying infections of west nile virus. Susceptible populations of mosquitoes occur within the province and, given appropriate weather conditions, it is likely that these species may become involved in passing on the virus and thus, increasing the number and distribution of infected birds during the summer of 2003. The Fish and Wildlife Division will continue using fresh-dead crows and Magpies as the primary surveillance tool to determine whether the virus actually occurs in Alberta. Confirmation of a case in a wild bird from Alberta will raise the provincial risk category and appropriate measures will be taken to ensure that human and veterinary health practitioners will be aware of the current status in Alberta and can advise clients accordingly.

It is readily apparent that west nile virus is here to stay and will establish populations across the continent wherever suitable bird and mosquito species exist. Given the wide range of suitable species, there is a high potential that the virus will occur in all states and provinces from the Atlantic to the Pacific. The virus also has the ability to overwinter in native mosquitoes and can circulate year-round in southern states. With such a broad range of transmission potential, any attempt to control or eradicate west nile virus is doomed to failure. Fortunately, it is a relatively benign virus and the evidence to date indicates limited direct impact on wildlife. Sporadic cases in horses and humans are likely to continue but with limited overall impact.

Table 1: Species composition and results of birds submitted to the Alberta west nile virus surveillance program in 2002.

Species	*Age*	*# Received*		*# Sent for WNV*		*WNV results*	
		n	*total*	*n*	*total*	*negative*	*pending*
Blue jay	adult	3	4	1	1	1	0
	juvenile	1		0			
Crow	adult	72	117	17	22	17	5
	juvenile	45		5			
Magpie	adult	54	91	22	25	17	8
	juvenile	37		3			
Raven	Ad	11	14	4	5	5	0
	juvenile	3		1			
Other	adult	16	19	2	2	2	0
	juvenile	3		0			
Totals			245		55	42	13

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Table 2: Post mortem results of suitable birds received in 2002

diagnosis	*n*
aspergillus	6
avian TB	2
blunt trauma	81
cranial congestion	8
dermatitis	1
drowning	3
electrocution	2
emaciation	9
gizzard ulceration	1
gunshot	17
meningeal haemorrhage	1
miscellaneous bacterial infections	7
no visible lesions	24
predation	6
pulmonary haemorrhage	1
pulmonary congestion	1
trichomonas	1
TOTAL	171

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Table 3: Birds collected in Alberta and submitted for specific west nile testing.

	Age	Location	Diagnosis	West nile results
Bald eagle	Adult	Red Deer	unknown	negative
Blue jay	Adult	Edmonton	cranial congestion	negative
Crow	Adult	Calgary	emaciation	pending
Crow	Adult	Calgary	emaciation	pending
Crow	Adult	Claresholm	gunshot	negative
Crow	Adult	Edmonton	no visible lesions	negative
Crow	Adult	Edmonton	pulmonary haemorrhage	negative
Crow	Adult	Edmonton	emaciation	negative
Crow	Adult	Edmonton	trauma	negative
Crow	Adult	Edmonton	no visible lesions	negative
Crow	Adult	Lethbridge	unknown	negative
Crow	Adult	Lethbridge	trauma	pending
Crow	Adult	Lloydminster	unknown	negative
Crow	Adult	Medicine Hat	no visible lesions	negative
Crow	Adult	Red Deer	no visible lesions	negative
Crow	Adult	Red Deer	trauma	pending
Crow	Adult	Red Deer	trauma	pending
Crow	Adult	Taber	bacterial hepatitis	negative
Crow	Adult	Vermilion	trauma	negative
Crow	YOY	Cochrane	no visible lesions	negative
Crow	YOY	Cochrane	no visible lesions	negative
Crow	YOY	Edmonton	no visible lesions	negative
Crow	YOY	Red Deer	no visible lesions	negative
Crow	YOY	Wainwright	no visible lesions	negative
Grackle	Adult	Medicine Hat	pulmonary congestion	negative
Magpie	Adult	Bonnyville	no visible lesions	negative
Magpie	Adult	Brooks	cranial congestion	negative
Magpie	Adult	Brooks	cranial congestion	negative
Magpie	Adult	Brooks	cranial congestion	negative
Magpie	Adult	Calgary	no visible lesions	negative
Magpie	Adult	Calgary	no visible lesions	negative
Magpie	Adult	Calgary	dermatitis	negative
Magpie	Adult	Calgary	cranial congestion	negative
Magpie	Adult	Calgary	trauma	pending
Magpie	Adult	Calgary	trauma	pending
Magpie	Adult	Calgary	trauma	pending
Magpie	Adult	Calgary	trauma	pending
Magpie	Adult	Calgary	trauma	pending
Magpie	Adult	Edmonton	aspergillus	negative
Magpie	Adult	Edmonton	cranial congestion	negative
Magpie	Adult	Edmonton	cranial congestion	negative
Magpie	Adult	Edmonton	unknown	negative
Magpie	Adult	Edmonton	no visible lesions	pending
Magpie	Adult	Edmonton	no visible lesions	pending
Magpie	Adult	Edmonton	trauma	pending
Magpie	Adult	High River	meningeal haemorrhage	negative
Magpie	Adult	High River	no visible lesions	negative

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Magpie	YOY	Cochrane	no visible lesions	negative
Magpie	YOY	Edmonton	no visible lesions	negative
Magpie	YOY	Edmonton	unknown	negative
Raven	Adult	Edmonton	cranial congestion	negative
Raven	Adult	Edson	trauma	negative
Raven	Adult	Evansburg	emaciation	negative
Raven	Adult	Peace river	drowning	negative
Raven	YOY	Grande Cache	gunshot	negative