The Incursion and Expansion of West Nile Virus into Canada

Dr. Paul Sockett, Public Health Agency of Canada
A Webber Training Teleclass

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Paul Sockett PhD
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Acknowledgement
We wish to acknowledge the contribution of our federal and provincial partners who participate in the National West Nile Virus Surveillance Program

Surveillance in Canada: 2000 - 2004

• Monitoring activities include surveillance in:
  • Dead birds
  • Mosquitoes
  • Horses
  • Humans

Results: Canada 2001

• First confirmed positive dead bird collected in Windsor, Ontario on 8 August
• WN virus was confirmed in 128 dead birds from 12 health regions in Ontario
• Virus also confirmed in nine mosquito pools from Ontario
• WN virus confirmed in pool of over-wintering mosquitoes, collected January 2002
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Positive Test Results:
Canada 2001

<table>
<thead>
<tr>
<th>Province</th>
<th>Number of Confirmed Positive Dead Birds</th>
<th>Number of Confirmed Positive Mosquito Pools</th>
<th>Number of Presumptive* or Confirmed Positive Horses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ontario</td>
<td>128</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Canada</td>
<td>128</td>
<td>9</td>
<td>0</td>
</tr>
</tbody>
</table>

* Requires additional testing before it can be considered a confirmed result

Results – Canada 2002 (1)

• First confirmed positive dead bird found on 19 May in Peel Region, southern Ontario
• Quebec confirmed first two positive dead birds found on 13 June in Montreal-Centre
• Ontario confirmed first positive mosquito pool collected on 27 June in York Region
• Manitoba confirmed first positive dead bird found on 12 July in Interlake Region

Results – Canada 2002 (2)

• Saskatchewan confirmed first positive dead bird found on 28 July in the city of Regina
• Quebec confirmed first positive mosquito pool collected on 1 August in Oka
• Manitoba confirmed first two positive mosquito pools collected on 8 August in Winnipeg
• Manitoba announced first presumptive positive horses on 16 August
• Nova Scotia confirmed first positive dead bird found on 20 August in Halifax Region

Canada to the last week of December 2002

<table>
<thead>
<tr>
<th>Provinces with WN virus activity</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human cases</td>
<td>NS, QC, ON, MB, SK</td>
</tr>
<tr>
<td>Dead birds</td>
<td>426 (20)</td>
</tr>
<tr>
<td>Domestic Animals</td>
<td>556</td>
</tr>
<tr>
<td>Mosquito Pools</td>
<td>356</td>
</tr>
</tbody>
</table>

1 WNv activity in a bird, mosquito pool, horse or humans
2 probable and confirmed (number of deaths in brackets)
3 confirmed positive (number tested in brackets)
4 presumptive or confirmed
5 Several cases are related to travel outside Canada
6 These figures represent the number of positive results reported to the CFIA as per the Immediately Notifiable Disease Regulations

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### Spatial distribution in Ontario, 2002

![Map of Ontario with regions marked]

- Toronto (6.23)
- Peel (5.36)
- Halton (14.91)
- Hamilton-Wentworth (3.50)
- Niagara (4.20)
- Windsor-Essex (9.34)

### Alternate Modes of Transmission of Human Infection due to WN virus: Canada 2002

<table>
<thead>
<tr>
<th>Route of transmission</th>
<th>Presumed</th>
<th>Confirmed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood transmission</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Tissue/organ transplant</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Breast milk</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Transplacental</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Needle/Scalpel blade</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

### 2003

- CANADA'S WORST NIGHTMARE...
  - A MAD COW IN A SARS MASK BEING BITTEN BY A WEST NILE MOSQUITO.
Key Findings for 2003 - Canada (1)

- Human cases from 24 July to late November; peak from late August to late September
- 1494 human cases (146 WNNS), 14 deaths
- First confirmed positive bird in Ontario in mid-April – by June, positives birds from Alberta to East Coast

Key Findings for 2003 – Canada (2)

- 1633/11,332 positive birds in 2003 (556/3,219 in 2002
- Culex spp. primary vector (Culex tarsalis in West and Culex pipiens/Culex restuans in East)
- 445 positive horses, most in AB (180) and SK (162)
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Cumulative WNV Human Cases, by Report Week, Canada, 2003 & 2004

Number of, and Percentage of, Dead Birds Tested Positive for WNV, by Report Week, Canada 2003 & 2004

Number of human cases of West Nile Virus by classification and symptom onset date in Canada 2004 (n=25)

Cumulative WNV Human Cases, by Report Week, Canada, 2003 & 2004

Cumulative # cases
2003 1 1 3 4 6 13 23 29 62 129 400 750 1024 1141 1187 1220 1229 1233 1233
2004 0 0 0 0 0 0 0 0 1 1 6 1 32 12 12 42 52 62 92 9

Number of human cases of West Nile Virus by classification and symptom onset date in Canada 2004

West Nile Fever (n=12)
West Nile Neurological Syndrome (n=13)

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### Age profile of human cases of West Nile virus by classification in Canada

<table>
<thead>
<tr>
<th>Classification</th>
<th>Mean (SE)</th>
<th>Median</th>
<th>Range</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>WNv Fever</td>
<td>46.1 (0.5)</td>
<td>47</td>
<td>3 to 92</td>
<td>1240</td>
</tr>
<tr>
<td>WNv Neurological Syndromes</td>
<td>55.0 (1.2)</td>
<td>54</td>
<td>0 to 92</td>
<td>217</td>
</tr>
<tr>
<td>All cases</td>
<td>47.4 (0.4)</td>
<td>47</td>
<td>0 to 92</td>
<td>1486</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Classification</th>
<th>Mean (SE)</th>
<th>Median</th>
<th>Range</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>WNv Fever</td>
<td>44.6 (5.2)</td>
<td>45.5</td>
<td>5 to 83</td>
<td>12</td>
</tr>
<tr>
<td>WNv Neurological Syndromes</td>
<td>48.5 (6.3)</td>
<td>50</td>
<td>3 to 88</td>
<td>13</td>
</tr>
<tr>
<td>All cases</td>
<td>46.6 (4.1)</td>
<td>47</td>
<td>3 to 88</td>
<td>25</td>
</tr>
</tbody>
</table>

### Number and rate of West Nile virus illness by age group in Canada 2004

#### Rate per 100,000

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Number of Cases</th>
<th>Rate per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 9</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>10 to 19</td>
<td>0</td>
<td>0.02</td>
</tr>
<tr>
<td>20 to 29</td>
<td>0</td>
<td>0.05</td>
</tr>
<tr>
<td>30 to 39</td>
<td>0</td>
<td>0.02</td>
</tr>
<tr>
<td>40 to 49</td>
<td>0</td>
<td>0.10</td>
</tr>
<tr>
<td>50 to 59</td>
<td>0</td>
<td>0.04</td>
</tr>
<tr>
<td>60 to 69</td>
<td>0</td>
<td>0.12</td>
</tr>
<tr>
<td>70 to 79</td>
<td>0</td>
<td>0.10</td>
</tr>
<tr>
<td>80 and over</td>
<td>0</td>
<td>0.14</td>
</tr>
</tbody>
</table>

### Communications Approach

- To date
  - Served as a credible source of information
  - Ensured consistent messaging and reached high risk populations

- For 2005, PHAC will continue its coordinating role with regional offices, P/Ts and other federal Departments. Key objective will be to sustain messaging while supporting provincial/territorial efforts
  - Facilitate information-sharing through communications committee
  - Continue public education with in-store promotion
  - FNHB’s public education campaign will focus on personal protective measures (avoiding mosquito bites and eliminating sources of standing water)
  - Host media technical briefing early in the season

### Summary

- [Provinces with WN virus activity](#)
- [Human cases](#)
- [Dead birds](#)
- [Domestic Animals](#)
- [Mosquito Pools](#)

<table>
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<td>426</td>
<td>1494</td>
<td>260</td>
</tr>
<tr>
<td>NS, NB, QC, ON, MB, SK, AB</td>
<td>556</td>
<td>1633</td>
<td>416</td>
</tr>
</tbody>
</table>

- [Confirmed positive (number tested in brackets)](#)
- [Probable or confirmed](#)
- [Several cases are related to travel outside Canada](#)
- [These figures represent the number of positive results reported to the CFIA as per the Immediately Notifiable Disease Regulations](#)

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West Nile virus Spread: August 1999 to December 2004

Year | Canada | USA
--- | --- | ---
1999 | 62 (6) | -
2000 | 26 (2) | -
2001 | - | -
2002 | 264 (9) | 4156 (284)
2003 | 3388 (14) | 9862 (264)
2004 | 2670 (88) | -

Human Cases
Canada and USA: 1999-2004

<table>
<thead>
<tr>
<th>Year</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>62 (6)</td>
<td>21 (2)</td>
<td>66 (9)</td>
<td>4156 (284)</td>
<td>9862 (264)</td>
<td>2470 (88)</td>
</tr>
<tr>
<td>Canada</td>
<td>426 (20)</td>
<td>1494 (14)</td>
<td>26 (2)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Change in Human Cases of West Nile Virus in North America between 2002 and 2003

Change in Human Cases of West Nile Virus in North America between 2003 and 2004

Prevalent Locations Where West Nile Virus has been isolated at Least 1 Human in Each Species between 2002-2004

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For more information, please consult the Public Health Agency of Canada’s WN virus website at:
www.westnilevirus.gc.ca

Pour plus d’informations, consulter le site Web d’Agence de santé publique du Canada sur le virus du Nil occidental à l’adresse suivante:
www.virusd unin occidental.gc.ca

Other 2005 Teleclasses
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June 2 – Skin Rashes & Infection Control – Spot That Spot
with Dr. Justin Graham

June 9 – Measuring the Cost of Hospital Infection
with Dr. Barry Cookson

June 14 – Controlling Mumps in the Community
with Dr. Isabel Oliver

June 16 – Antiseptic Practice and Procedure with Sue Crow

June 30 – Infection Control in First Response Emergency Services with Margaret McKenzie

Questions? Contact Paul Webber paul@webbertraining.com