An Overview of the Ontario Wildlife Rabies Control Program

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Rabies...

- One of the oldest known zoonotic diseases
- Caused by a virus that attacks the CNS
- Any mammal can get rabies, including humans
- Spread to humans through contact with infected saliva (bite/scratch from domestic or wild animal)
- Once symptoms develop, rabies is fatal
In Ontario, rabies control is implemented to:

- Protect the health and safety of the public, their pets and livestock, and provincial wildlife populations ...

- Prevent economic losses
Strains of the Rabies Virus in Ontario


- **‘bat’**: bats, humans. 1961–present.
Ontario has a 20-yr history of rabies control…

Methods have varied depending on the rabies vector species involved (fox vs. raccoon vs. skunk)

Aerial baiting, OS bait
ERA oral vaccine
20 baits/km² – 2.0km spacing

Aerial baiting, UL bait
ONRAB oral vaccine
300 baits/km² – 0.5km spacing

PR, TVR & Aerial baiting
Imrab®3 & V-RG vaccines
75 baits/km² – 0.75km spacing
First large rabies control program was implemented in E Ontario to control ‘arctic’ rabies in red foxes…

**Method → Aerial Baiting (OS baits + ERA vaccine)**

Drop large numbers of oral rabies vaccine baits ($\geq 500,000$) in late summer/early fall using MNR Twin Otter aircraft.

Oral Rabies Vaccination (ORV) Supported by WHO (1966)
1989 – Start of aerial baiting program in E Ontario (5 year trial program)

- large-scale oral vaccination of red foxes
- dropping rabies vaccine baits out of low-flying aircraft

Rabid foxes in E Ontario 203
Total rabid foxes 891
Total rabies cases 1,870

Data Source: Animal Diseases Research Institute, Nepean, Ontario
Decline in ‘arctic’ strain rabies in E Ontario 1989 - 2008

No rabid foxes with ‘arctic’ strain rabies since 1994
No rabid cows since 1996
No rabid skunks with ‘arctic’ strain rabies since 1997

Aerial baiting begins in Eastern Ontario
Decline in ‘arctic’ strain rabies in E Ontario 1989 - 2008

- No rabid dogs since 1996
- No rabid cats since 1993

Aerial baiting begins in Eastern Ontario
Decline in ‘arctic’ strain rabies in **SW** Ontario 1989 - 2008

Aerial baiting begins in C and SW Ontario
Second rabies control program was implemented in E Ontario to control ‘raccoon’ rabies in raccoons…

**Methods → Population Reduction, Trap-Vaccinate-Release & Aerial Baiting (V-RG)**

**PR – Live-trapped, anesthetized and then humanely euthanized (T-61)**

- Remove clinically rabid animals or animals incubating the virus

**TVR – Vaccinated (Imrab®3), ear-tagged and then released at the point of capture**
Rabies control begins in NY State:
ORV using V-RG rabies vaccine

'Raccoon' rabies enters NY State
No rabies control

Support for rabies control programs...

Without control, additional rabies-related costs may have been as high as $12-18M!

1st – 8 cases, 3rd – 95 cases
After 7 yrs – rabies free
Total – 132 cases

1st – 108 cases (245 total)
5th – 6,368 cases (7,424 total)

'Raccoon' rabies enters Ontario
Rabies control = PR + TVR + ORV

Ontario
NY_RS
NY_All
Oral rabies vaccination program in 2008

- **Fox**
  - 430,000 UL ONRAB
  - 25,000 km²
  - 20 baits/km²

- **Skunk plots**
  - 516,000 UL ONRAB
  - 2,500 km²
  - 300 baits/km²

Legend:
- OS ERA - 20 (2.0 km)
- UL ONRAB - 300 (0.5 km)
- TVR
  - Cat (2)
  - Cow (7)
  - Dog (3)
  - Horse (2)
  - Red Fox (2)
  - Striped Skunk (25)
Current research...

Longitudinal serology studies using captive animals

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<th>Species</th>
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<th>Bait</th>
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Field research...

Bait acceptance, serology, and vaccine efficacy in raccoons and striped skunks
ONRAB Study Plots in 2006, 2007 and 2008

Legend:
- 2006 - 150 baits/km²
- 2006 - 300 baits/km²
- 2007 - 75 baits/km²
- 2007 - 400 baits/km²
- 2008 - 300 baits/km²

North
Pattern of infection...

1. Raccoon bitten by a rabid animal.

2. Rabies virus enters the muscle through infected saliva.

3. Incubation (3-12 wks)... virus spreads from the muscle to the spinal cord and brain within nerves.

4. Virus multiplication... in the brain the virus multiplies rapidly and then passes to the salivary glands and saliva.

   Most animals begin to show signs of disease at this time.

   Respiratory & cardiac failure

5. Infected animal usually dies within 7 days of becoming sick. Respiratory & cardiac failure

   Also, a bite by the animal during this period does not carry a risk of rabies because the virus is not in saliva.

   The animal does not appear ill during this time.
2009 Terrestrial Rabies Cases to April 16
It is currently cheaper to control rabies than to payout for all rabies-related costs in an uncontrolled situation.
Questions...

Collaborative Agencies:

- Artemis Technologies – vaccine development & bait production
- Canadian Food Inspection Agency – sera sample analyses & rabies challenge experiments
- Centre for Disease Control, Atlanta, GA – rabies challenge experiment

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http://rabies.mnr.gov.on.ca/