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Canada

Climate Change
&
Emerging Infectious Diseases:
What Family Physicians should know about Zika virus

Dr. Michel P. Deilgat, MD

Centre for Food-borne, Environmental and Zoonotic Infectious Diseases

Infectious Diseases Prevention & Control Branch

Public Health Agency of Canada

FMF 2016, Vancouver, BC

November 10, 2016

PROTECTING AND EMPOWERING CANADIANS
TO IMPROVE THEIR HEALTH

Objectives

- Review the emergence of recent infectious diseases in Canada
- Describe the clinical manifestations and the investigation of mosquito- and vector-borne diseases
- Describe the appropriate management and reporting of these diseases

PLAN

Part 1 - Climate Change on Human Health

Part 2 - Changes in Vector Ecology

Part 3 - Clinical update and recent recommendations about Zika virus

Q&A - Discussion

Declaring and Disclosing Conflict of Interest

NONE

no financial conflict of interest

"Try this—I just bought a hundred shares."

Public Health and Climate Change Adaptation

The Way Ahead

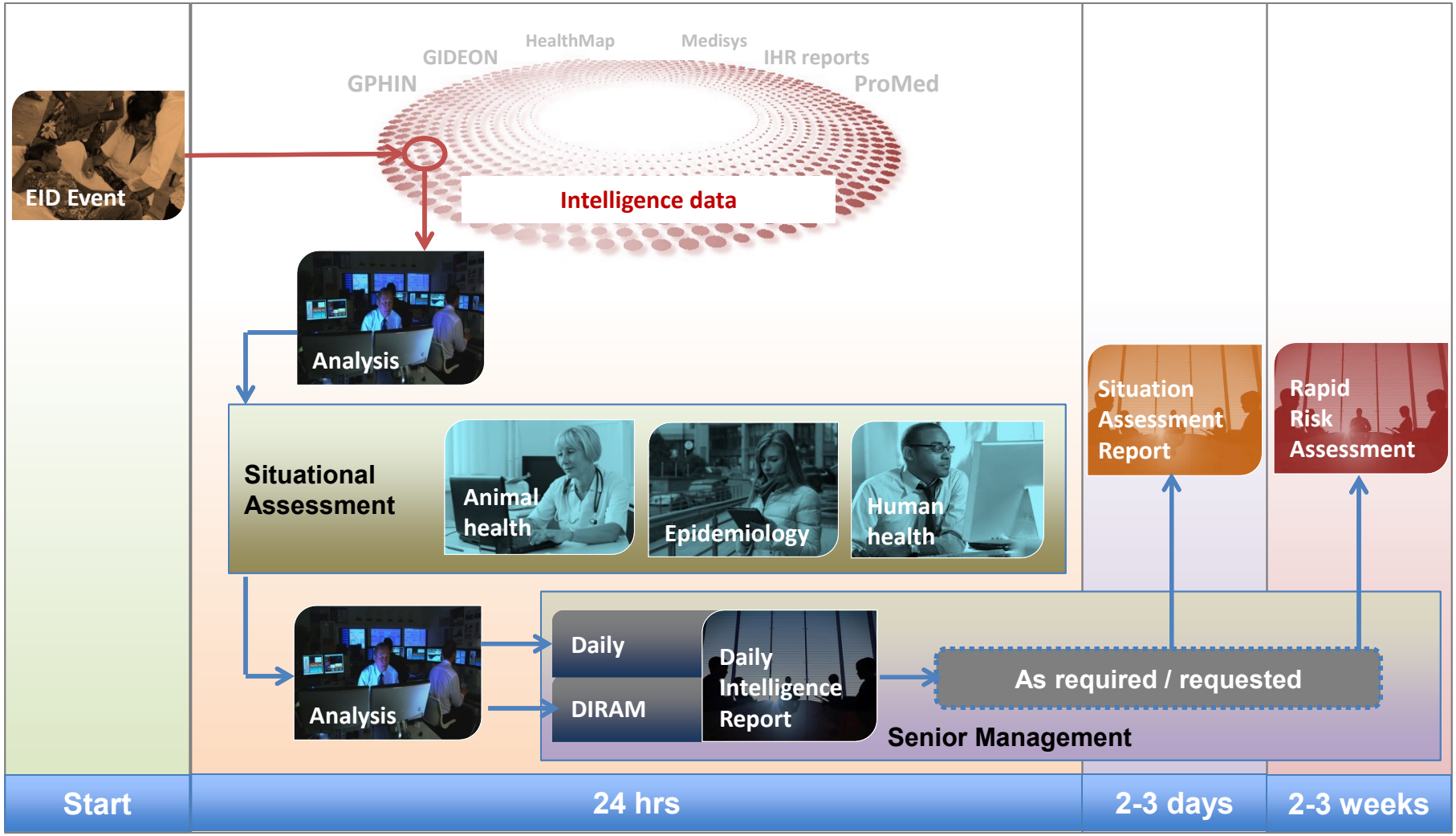
NCR

Saskatoon

Guelph

Saint-Hyacinthe

ESP Business Cycle



Daily Intelligence Report Template

PS&E ESP
Plate-forme de la surveillance des infections émergents
Emerging Infections Surveillance Platform

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July 11, 2016

ESP: Daily Intelligence Report

Event: **UPDATE**: Avian Influenza H5N2 LPAI in birds in Ontario

Event ID: 2016-100

Type: Domestic

Risk: Low

Trajectory: ↑

Summary:

Background: **On July 7, 2016 the CFIA informed PHAC-CFEZID of a positive Influenza in ducks on an Ontario farm. The virus has been identified by a low-pathogenic subtype of H5N2 by NCFAD**. The CFIA activated their NEOC on July 8, 2016. Euthanasia of birds occurred on July 10, a quarantine zone was established.

Current status: CFIA is leading the response and monitoring trade impact. Messaging around Control Zone is being established. CFIA to hire a private contractor to provide security for the Control Zone.

Start date	Source of intelligence	Level of Involvement	Public Communications	Responsible agency	CDN Cases	Int'l Cases	CDN Hosp	CDN Deaths
Jul 7 2016	CFIA Export Surveillance	Briefing/risk characterization	CFIA has issued press release.	Canadian Food Inspection Agency (CFIA)	0	0	0	0

Actions done to date by PHAC-ESP

ESP is leading human Rapid Risk Assessment; work started on July 11, in collaboration with CIRID and CFIA.

Recommended actions for PHAC-ESP

ESP to continue to lead human Rapid Risk Assessment; first draft expected Friday July 22, 2016. ESP in reactive communication and supportive role only.

Action Requests

- No action ☐
- Continue monitoring ☐
- Initiate Situation Assessment Report (SAR) (1-2 days) ☐
- Update situation assessment report (SAR) (1-2 days) ☐
- Initiate Rapid Risk Assessment (RRA) (2-3 weeks) ☐
- Update Rapid Risk Assessment (RRA) (1-2 weeks) ☐
- Other ☐ _____

Part 1 – Climate Change

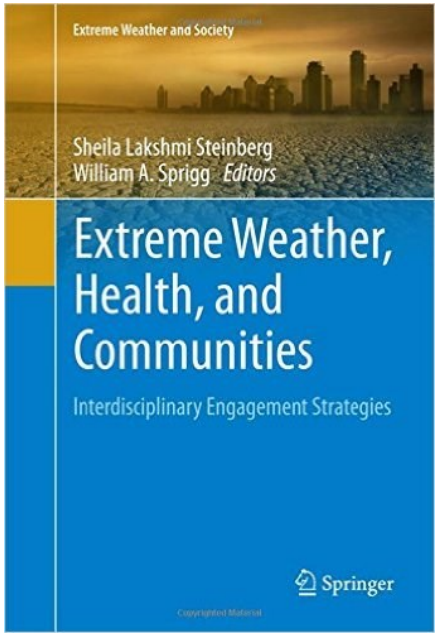
Part 1 – Climate Change and Human Health

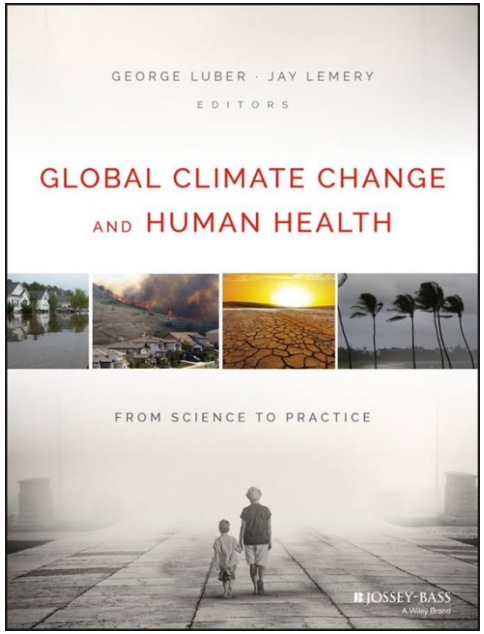
Dengue is a disease of the 21st century" Professor Jeremy Farrar (WHO)

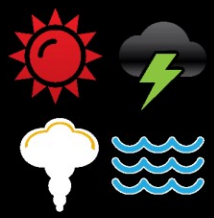
« On the threshold of a new era of consequences, it seems the evidence of climate change is not speaking to medical education and training, and vice versa » Bell, 2009

« Medical Providers as Global Warming and Climate Change Health Educators: A Health Literacy Approach »
Villagran et al. 2010

« Doctors have a crucial role in climate change mitigation and health system adaptation to prepare for emergent health threats and a carbon-constrained futures» Maxwell et al. 2016







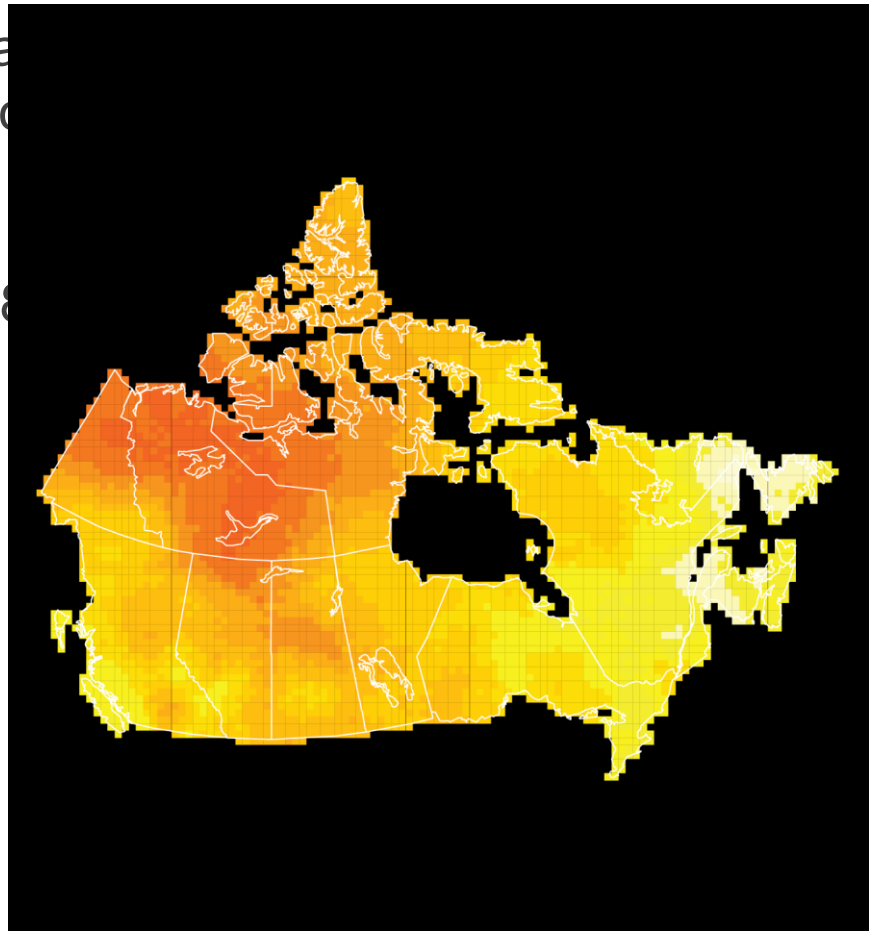
CLIMATE CHANGE – A global challenge

- The scientific evidence is clear: clima
  challenges of our time and also one c

- Global temperatures have already
  increased by about 0.85°C since 18

- Canada has warmed by 1.6°C,
  about twice the global average;
  Canada's North is warming
  even more quickly.

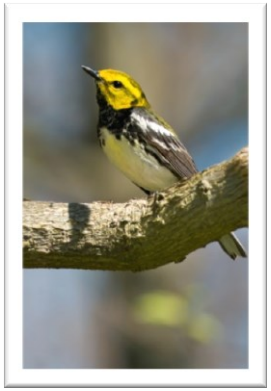
- Canada's emissions are projected
  to increase if significant action is not



Impacts of Climate Change in Canada

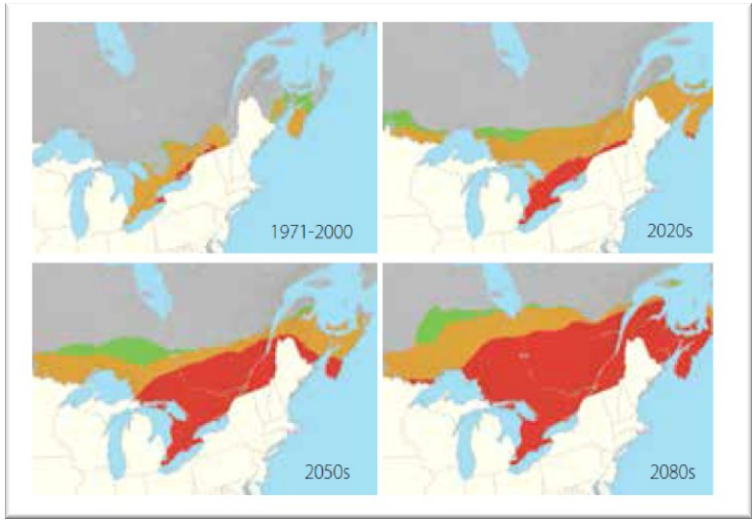
Fiona J. Warren and Donald S. Lemmen (Natural Resources Canada)

Natural environment - documented changes include earlier flowering of plants, northward shift of species, declines in bird populations and increased mortality rates in salmon.



Economic sector impacts - include the mountain pine beetle outbreak in western Canada, impacts of permafrost thaw on infrastructure and shorter winter road seasons.

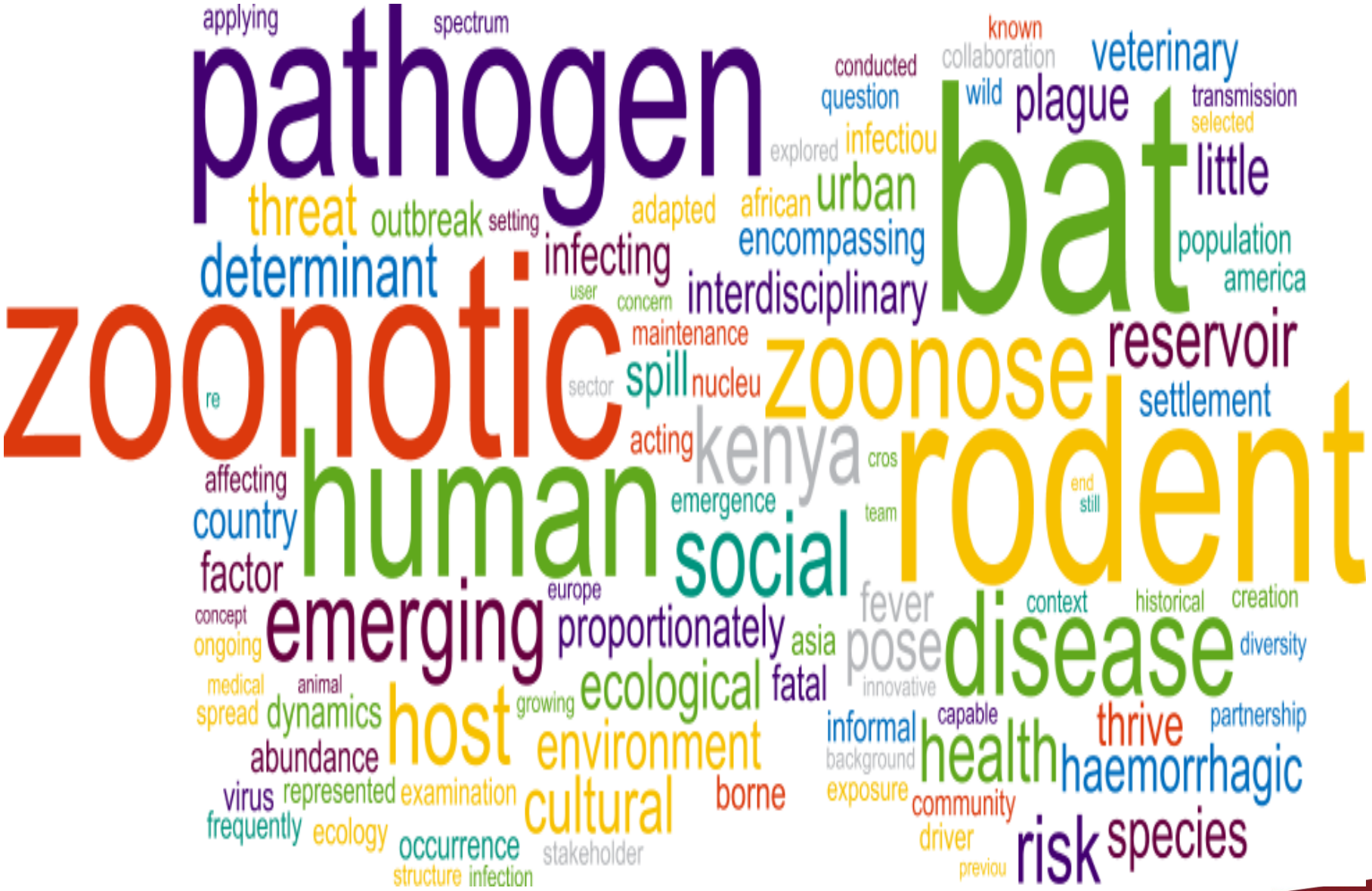
Observed health impacts - longer ragweed season, spread of Lyme disease vectors and longer and more extreme heat events.



Establishment and spread of Lyme disease vector

Examples provide an indication of the types of impacts we will see more of as the climate continues to change.

(Diavik Diamond Mines, Inc.)


applying
spectrum
pathogen
known
conducted
collaboration
veterinary
question
wild
plague
transmission
selected
explored
infectiou
bat
little
threat
outbreak
setting
adapted
african
urban
encompassing
population
determinant
infecting
interdisciplinary
america
user
concern
zoonotic
maintenance
reservoir
zoonose
re
sector
spill
nucleu
settlement
acting
kenya
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rodent
affecting
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emergence
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country
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factor
europe
fever
context
historical
creation
concept
emerging
proportionately
asia
pose
disease
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abundance
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represented
examination
cultural
borne
exposure
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frequently
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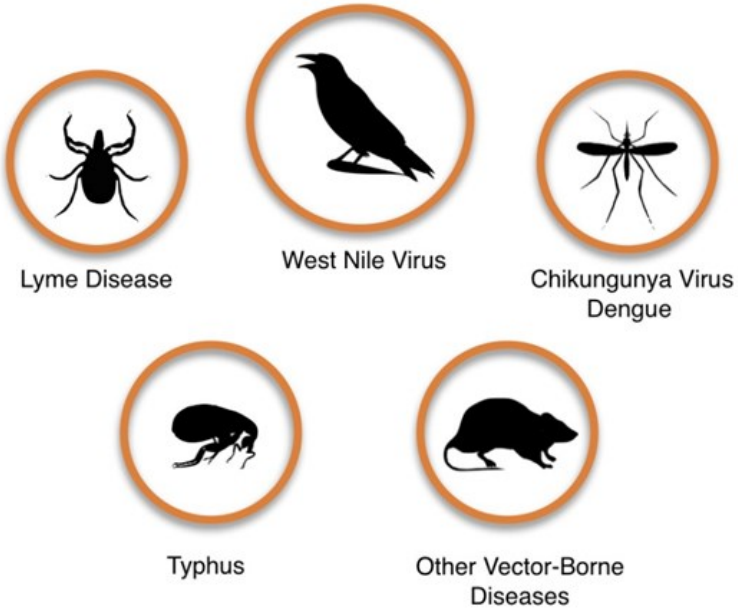
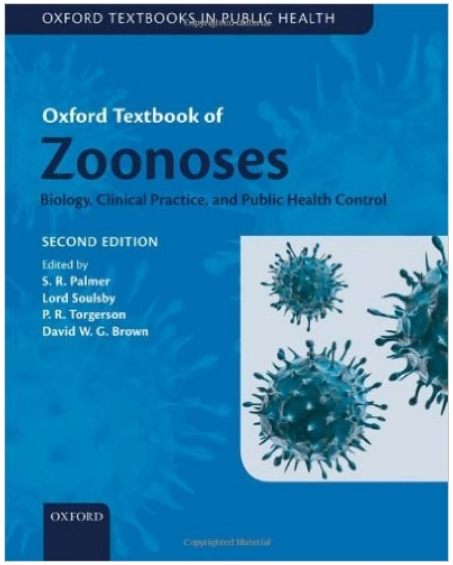
occurrence
stakeholder
driver
risk
species
structure
infection
previou

Part 2 – Changes in Vector Ecology

Zoonoses comprise approximately 60% of all known infectious diseases, while 75% of emerging infectious agents are zoonotic.

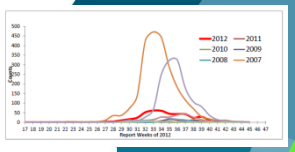
Jones KE, Patel NG, Levy MA et al. Global trends in emerging infectious diseases. Nature 2008; 451: 990–993.





Emergence & Re-emergence of Vector-borne diseases

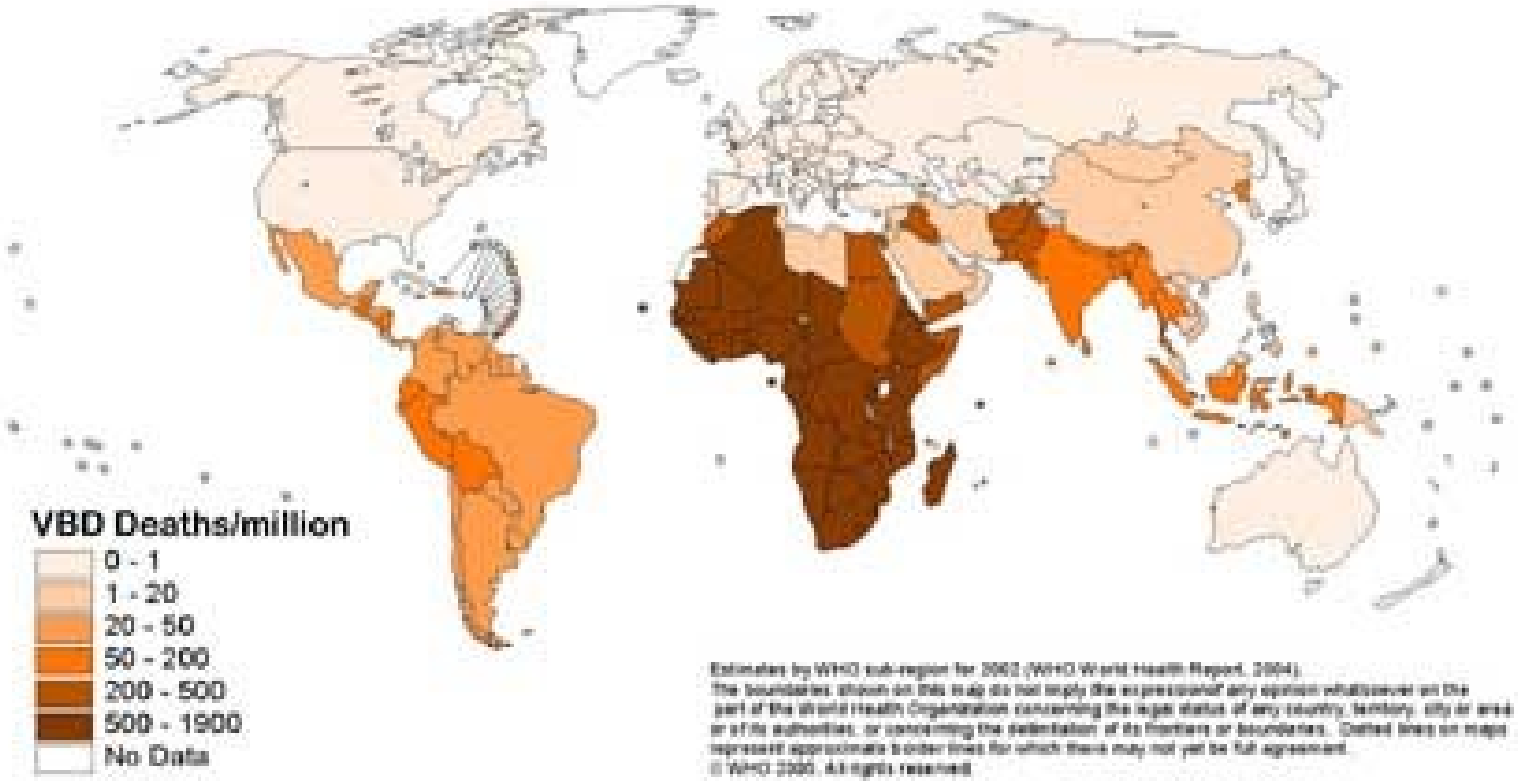
Warming & climate variability in Canada: Epidemics/re-emergence of endemic VBDs West Nile, California serogroup, …



Warming in Canada Climate change abroad: Introduction of exotic VBDs Dengue, Rift Valley, Japanese Encephalitis, Malaria, …

Warming in North America: Northward spread from the US
Lyme, Chikungunya, Zika, Eastern Equine Encephalitis (EEE), St Louis…

Deaths from vector-borne disease



Invited Review

Zika virus—a review for clinicians

Yin Mo, Brenda Mae Alferez Salada, and Paul Anantharajah Tambyah

Accepted 27 April 2016

Key words: Zika virus, microcephaly, Guillain–Barré syndrome

Introduction

Special Theme — Environment and Health

Climate change and vector-borne diseases: a regional analysis

Andrew K. Githeko,[1] Steve W. Lindsay,[2] Ulisses E. Confalonieri,[3] & Jonathan A. Patz[4]

...gests that inter-annual and inter-decadal climate variability have a direct influence on the ... diseases. This evidence has been assessed at the continental level in order to ... expected future climate change.

...peratures will have risen by 1.0–3.5 °C, increasing the ...st effect of climate change on transmission is ...mission occurs. For many diseases ... and dengue fever ... most

Transfusion-transmitted babesiosis in Ontario: first reported case in Canada

Kevin C. Kain, Salha Bu Jassoum, I. William Fong, Barbara Hannach

Abstract

BABESIOSIS HAS ONLY RECENTLY BEEN REPORTED in Canada, but a number of transfusion-transmitted cases of this infection have been reported from the United States. We present a case of transfusion-transmitted babesiosis that occurred in Canada. Canadian physicians must consider babesiosis in the differential diagnosis of patients who experience fever or a hemolytic reaction after blood transfusion. Prompt recognition and treatment are important, because *Babesia* infections can be severe or fatal in certain risk groups. Better strategies to prevent transfusion-transmitted babesiosis are required.

Case report

Review

Synthèse

Drs. Kain and Bu Jass... with the Centre for T... and Tropical Medicin... Division of Infectious Diseases, Departmen... of Medicine, Toront... General Hospital, U... Health Network, Un... of Toronto, T...

Emerging Vector-borne Zoonoses in Canada

Non-enteric zoonotic diseases of high-risk of emergence in Canada

24 diseases included in a prioritization exercise by provincial and territorial public health stakeholders in Canada in 2013

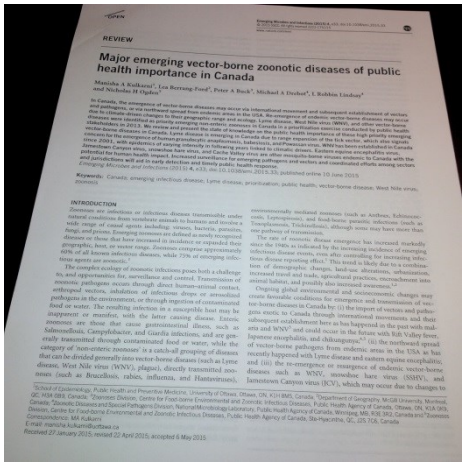
Vector-borne Zoonoses

- **Babesiosis**
- **Anaplasmosis**
- Erlichiosis
- **Lyme disease (Boreliosis)**
- Powanssan virus
- **West Nile virus**
- **Eastern equine encephalitis** (EEE)
- Western equine encephalitis
- California serogroup viruses (incl. La Crosse virus. California encephalitis virus, Jamestown Canyon virus, snowshoe hare virus)
- Cache Valley virus

Kulkarni et al (2015) Major emerging vector-borne diseases of public health importance in Canada, Emerging Microbes and Infections, 4

Other non-enteric Zoonoses

- Anasakiasis
- Anthrax
- Tuberculosis (caused by M. Bovis)
- Brucellosis
- Plague
- Echinoccosis
- **Hantavirus**
- Zoonotic influenza
- **Rabies**
- Toxoplasmosis
- Trichinellosis
- Tularemia
- Q fever
- Leptospiroris



REVIEW

Major emerging vector-borne zoonotic diseases of public health importance in Canada

INTRODUCTION

Disease priority list by human and animal health professionals

Ng, V., Sargeant, M. (2015) Prioritizing Zoonotic Diseases: Differences in Perspectives Between Human and Animal Health Professionals in North America, in Zoonoses and Public Health.

Human Health

1) Rabies
2) Influenza (H1N1)
3) Listerioris
4) Nipah virus encephalitis
5) Ebola virus haemorrhagic fever
6) Variant Creutzfeldt-Jakob disease
7) Marburg haemorrhagic fever
8) Influenza (H5N1)
9) Cryptosporidiosis
10) Leishmaniasis

…

62) St. Louis encephalitis

Animal Health

1) Rabies
2) Nipah virus encephalitis
3) Variant Creutzfeldt-Jakob disease
4) Influenza (H1N1)
5) Ebola virus haemorrhagic fever
6) Marburg haemorrhagic fever
7) Influenza H5N1
8) Listeriosis
9) Botulism
10) Hendra virus

…

62) St. Louis encephalitis

Vector –borne Diseases and Climate Change

Prioritization of vector-borne diseases that may be affected by climate change and warrant synthesis research

Mosquito-borne diseases

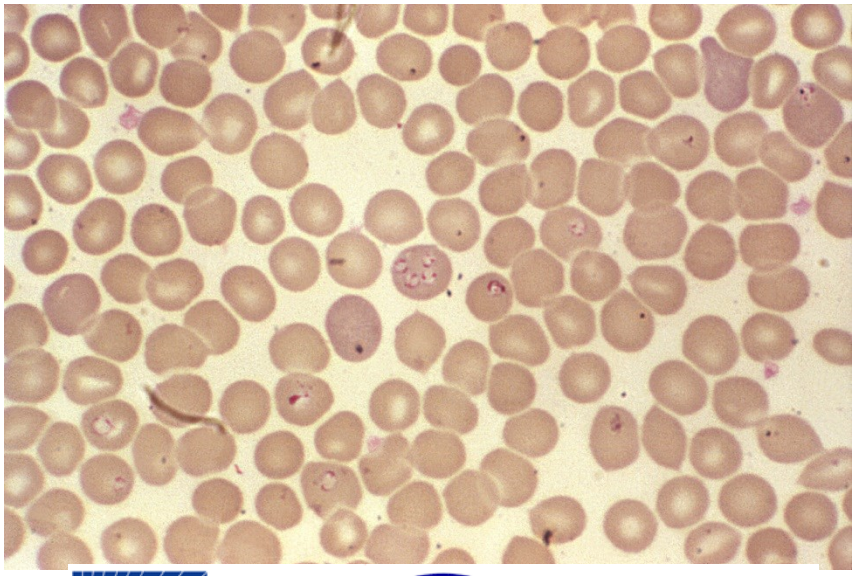
1) Chikungunya
2) Dengue
3) EEE
4) Malaria
5) St. Louis encephalitis
6) West Nile
7) (no opinion)

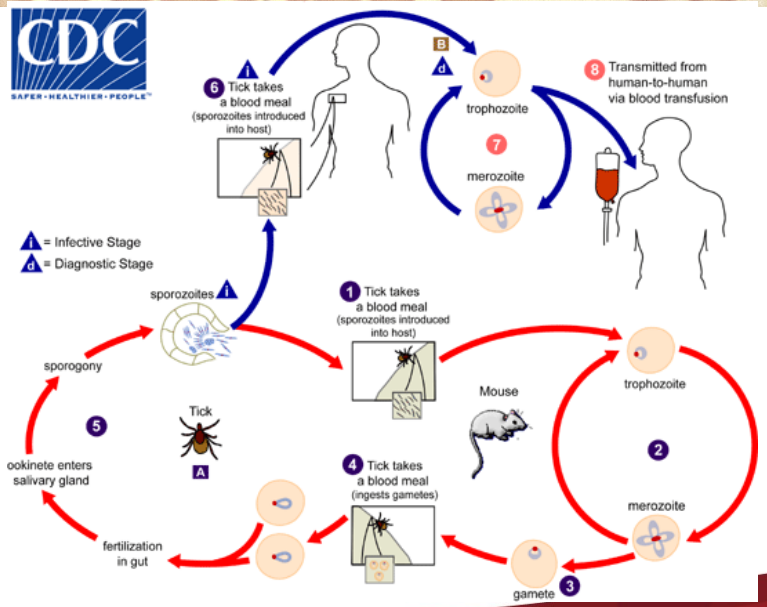
Non-mosquito Vector-borne diseases

1) Babesiosis
2) Chagas Disease
3) Colorado Tick Fever
4) Murine Typhys
5) Powassan
6) Rocky Mountain Spotted Fever
7) Tularemia
8) (no opinion)

Babesiosis

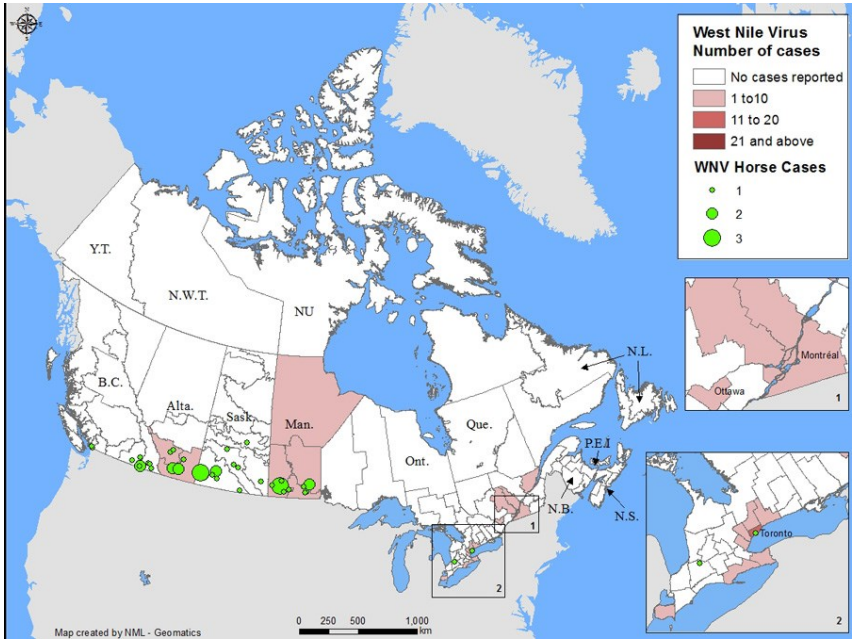
- Malaria-like disease caused by the protozoan parasite *Babesia microti*
- *Risk of transmission via **blood transfusion***
- *Subclinical to severe symptoms*
- *Usually develop within a few weeks or months after exposure*
- *In more severe cases, symptoms similar to malaria occur, with fevers up to 40.5°C shaking chills, and severe anemia **(hemolytic anemia)***
- *Diagnosis of babesiosis requires a **high index of suspicion**, in part because the **clinical manifestations are nonspecific***





West Nile virus infections (WNV)

- Zoonotic mosquito-borne viruses currently or recently endemic to Canada
- WNV is transmitted from birds to humans via the bite of an infected mosquito and is transmissible through **blood transfusion and tissue and organ transplantation**
- ***Culex tarsalis*** & ***Culux pipiens*** are the most common vectors
- Most human infections cause no illness, while about 20% suffer from WN fever, and less than 1% experience severe **neurological disease** including **meningitis** and **encephalitis**

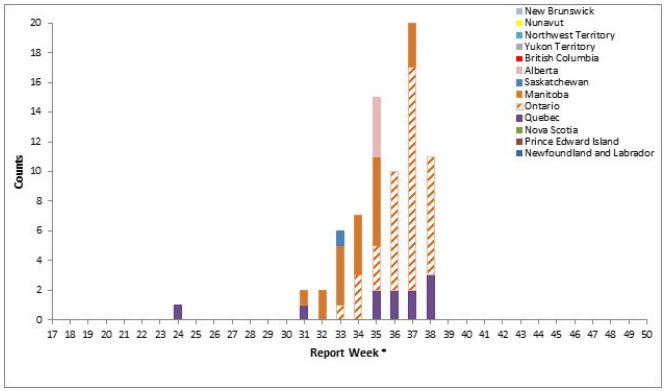


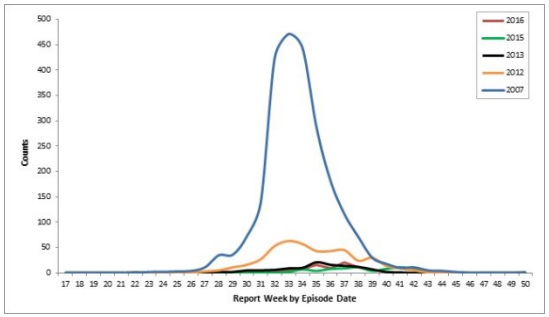
National West Nile Virus Surveillance System

A multi-species surveillance system – established in 2000

NDC since 2003 to present

2002: 414 cases
2003: 1481 cases
2004: 25 cases
2005: 225 cases
2006: 151 cases
2007: 2215 cases
2008: 36 cases
2009: 13 cases
2010: 5 cases
2011: 101 cases
2012: 428 cases
2013: 115 cases
2014: 21 cases
2015: 80 cases





Lyme disease *(Borrelia burgdorferi)*

- Federal Framework on Lyme Disease Act S.C. 2014, c. 37 Assented to 2014-12-16

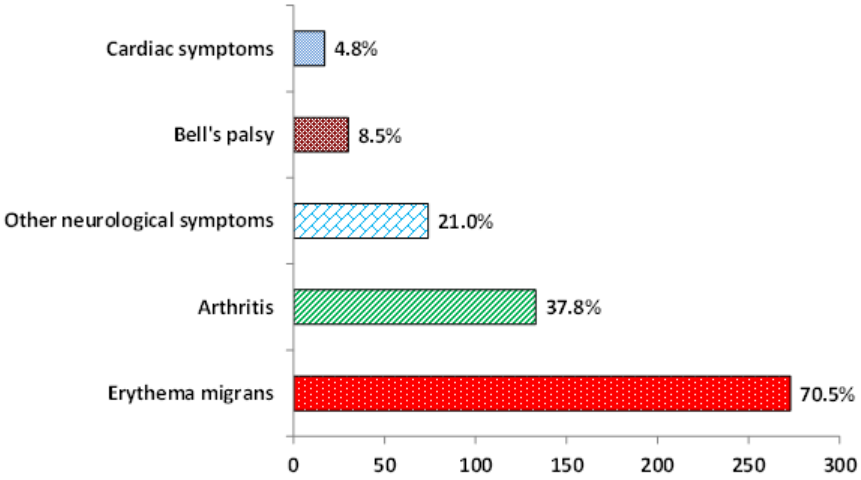
✓ National medical surveillance program
✓ Guidelines regarding the prevention, identification, treatment and management
✓ Standardized educational materials

Clinical manifestations:
Symptoms sometimes appear in overlapping stages, as:
• early localized Lyme disease (< 30 days)
• early disseminated Lyme disease (< 3 months)
• late Lyme disease (> 3 months)

The Government currently has data for Lyme disease cases reported between **2009 and 2015:**
2009: 144 cases
2010: 143 cases
2011: 266 cases
2012: 338 cases
2013: 682 cases
2014: 522 cases
2015: **917 cases**

Lyme Disease Enhanced Surveillance System (LDES)

The clinical manifestations of Lyme disease cases for which these data were reported, **2009-2012**



CONFERENCE TO DEVELOP A FEDERAL FRAMEWORK ON LYME DISEASE

MAY 15 – 17, 2016

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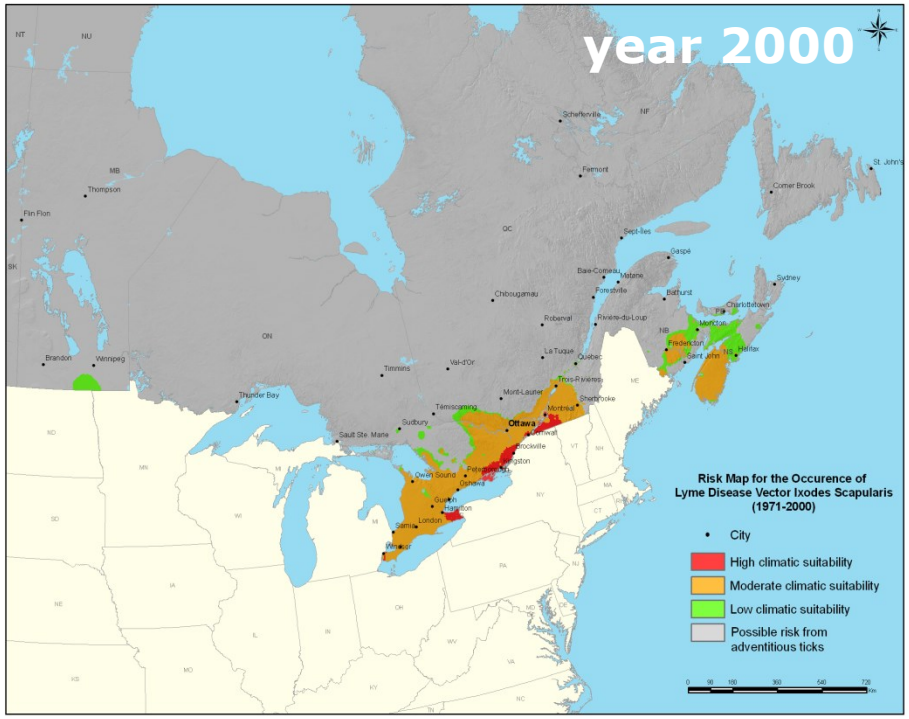
What the future may hold



High risk

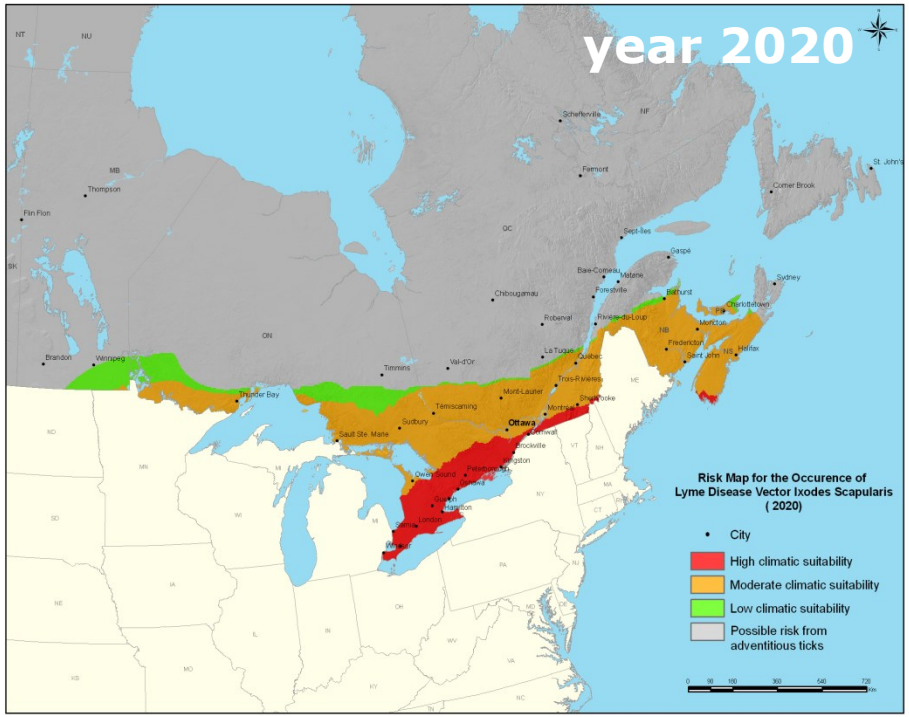
Moderate risk

Low risk

Risk of bird-borne ticks

Ogden et al., Int J Health Geogr 2012

What the future may hold



High risk

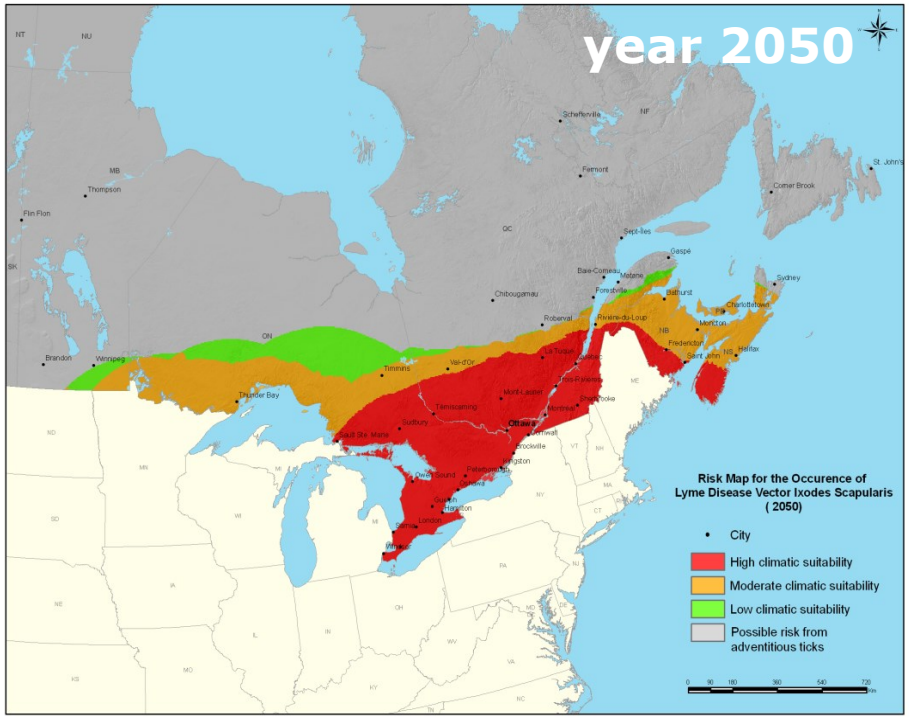
Moderate risk

Low risk

Risk of bird-borne ticks

Ogden et al., Int J Health Geogr 2012

What the future may hold



High risk

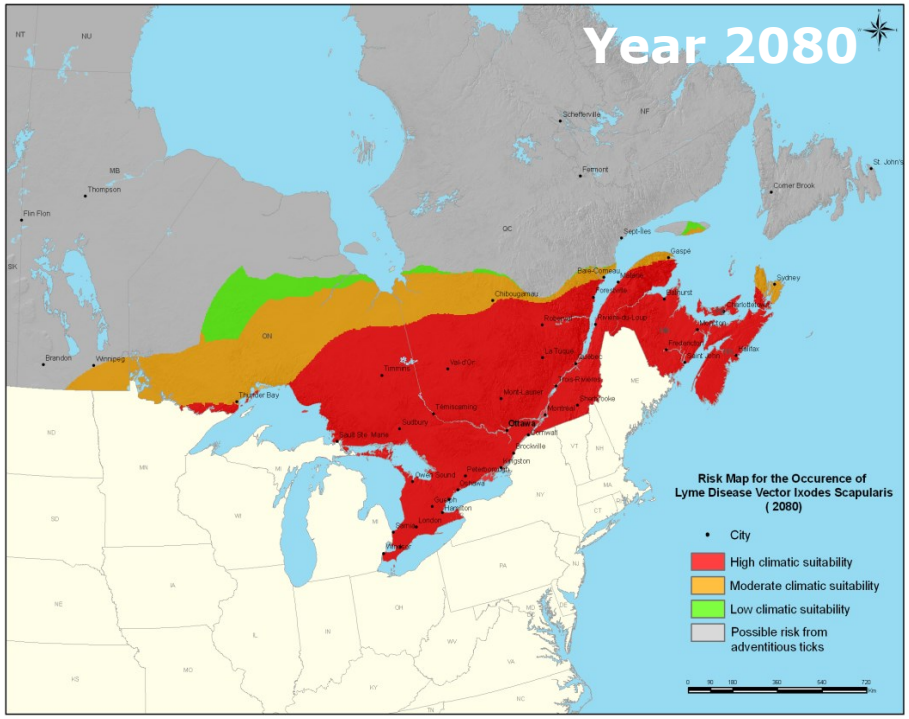
Moderate risk

Low risk

Risk of bird-borne ticks

Ogden et al., Int J Health Geogr 2012

What the future may hold



High risk

Moderate risk

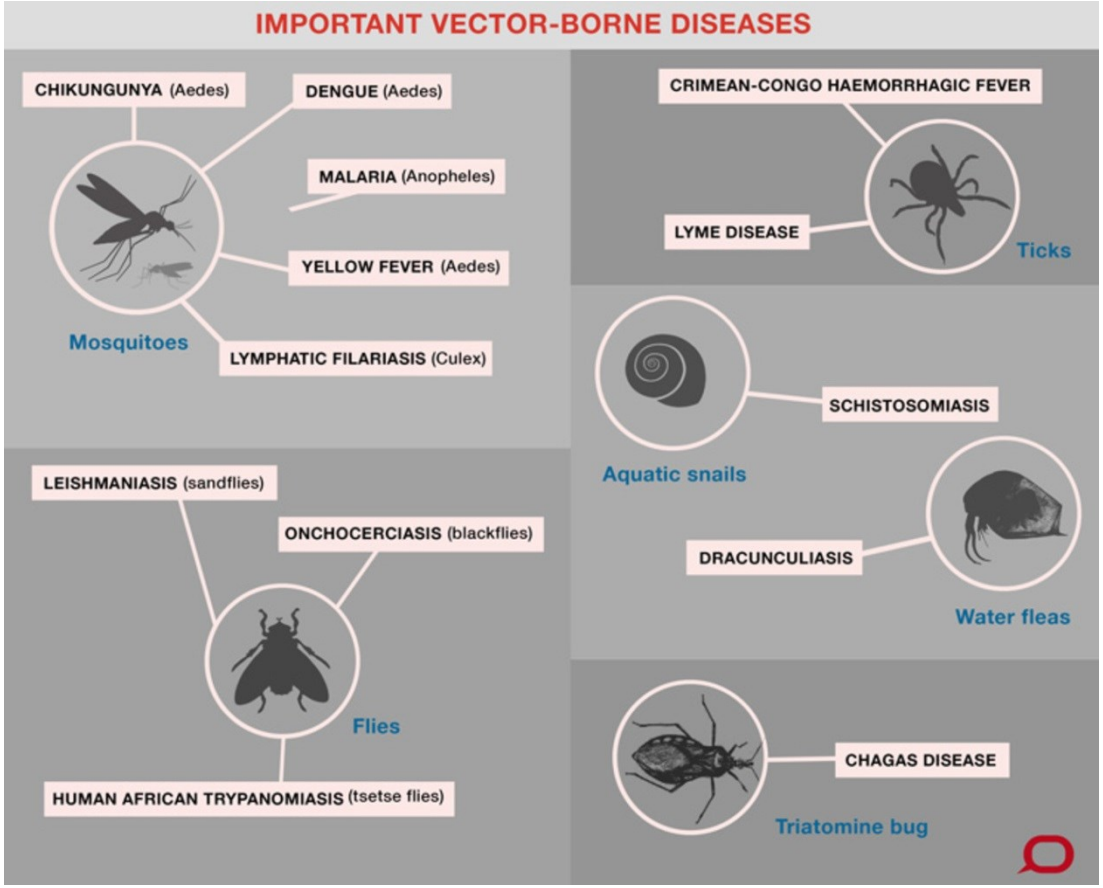
Low risk

Risk of bird-borne ticks

Ogden et al., Int J Health Geogr 2012

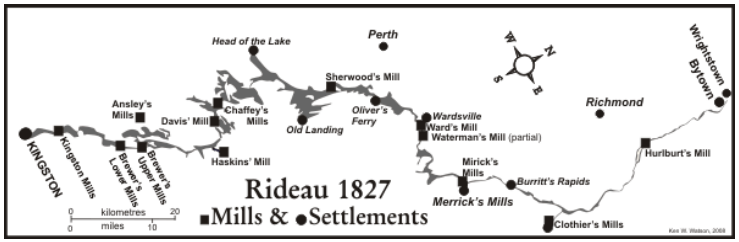
Main vectors and diseases they transmit

Mosquitoes
Aedes
Chikungunya
Dengue fever
Rift Valley fever
Yellow fever
Zika
Anopheles
Malaria
Culex
Japanese encephalitis
Lymphatic filariasis
West Nile fever
Sandflies
Leishmaniasis
Sandfly fever (phelebotomus fever)
Ticks
Crimean-Congo haemorrhagic fever
Lyme disease
Relapsing fever (borreliosis)
Rickettsial diseases (spotted fever and Q fever)
Tick-borne encephalitis
Tularaemia
Triatomine bugs
Chagas disease (American trypanosomiasis)
Tsetse flies
Sleeping sickness (African trypanosomiasis)
Fleas
Plague (transmitted by fleas from rats to humans)
Rickettsiosis



Malaria on the Rideau (1826-1832)

Among the many diseases that ravaged workers during the building of the **Rideau Canal**, three of the worst were **dysentery**, **small pox** and **malaria**. Malaria, extremely rare today in North America, is a mystery disease to many. It has been suggested by some that malaria was unique to the Rideau, perhaps brought by the soldiers working on the Rideau who had previously been stationed in tropical climates where malaria was rampant. This isn't true; **malaria was in Ontario both before and after the building of the Rideau Canal**.



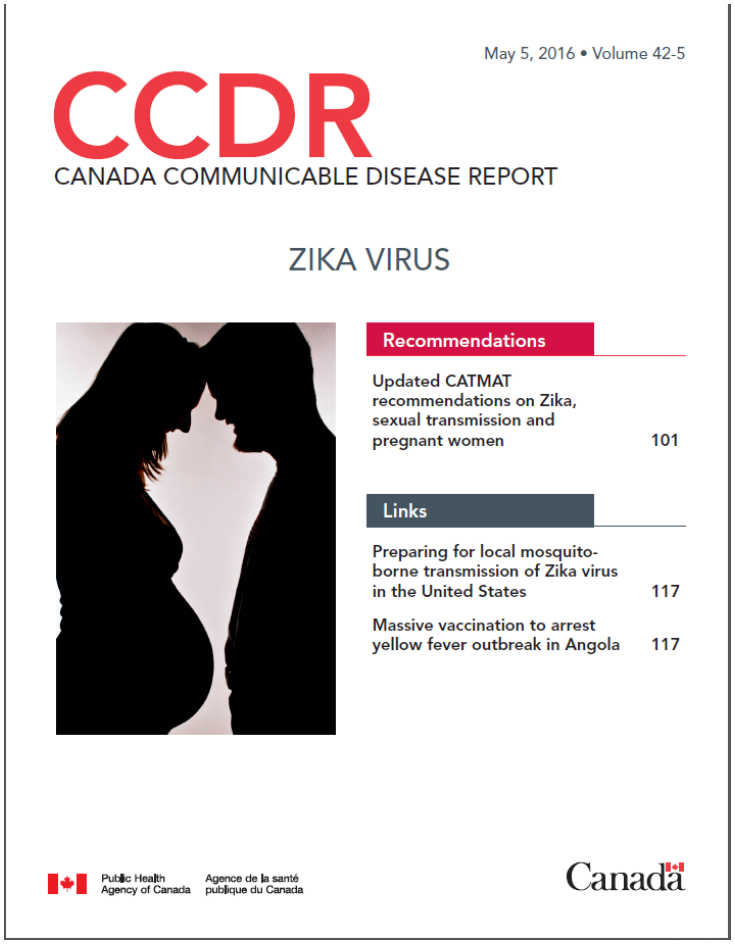
Part 3

Emergence of Zika virus in the Americas (2015)

Committee to Advice on Tropical Medicine and Travel (CATMAT)

Zika Working Group

Libman M (chair)
Boggild A
Bui Y
Brophy J
Drebot M
Geduld J
McCarthy A
Safronetz D
Schofield S
Tataryn J
Vanschalkwyk J
Yudin M



May 5, 2016 • Volume 42-5

CCDR
CANADA COMMUNICABLE DISEASE REPORT

ZIKA VIRUS

Recommendations

Updated CATMAT recommendations on Zika, sexual transmission and pregnant women 101

Links

Preparing for local mosquito-borne transmission of Zika virus in the United States 117

Massive vaccination to arrest yellow fever outbreak in Angola 117

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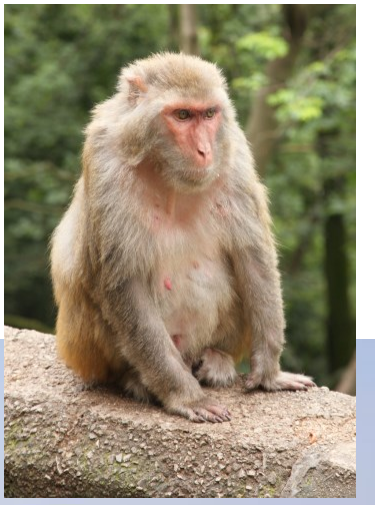
Brief History of an Emerging Virus
The Zika Forest - 1947

- **1947**: Zika virus was first isolated from a rhesus macaque in the Zika forest in Uganda (Africa)

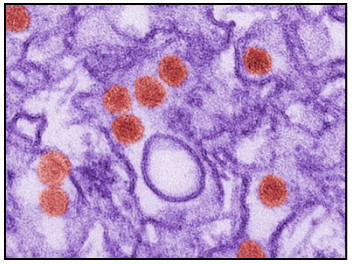
- **1952**: The 1st human cases were reported in Uganda and Tanzania

- **2007:** 1st major outbreak on the island of Yap (Micronesia)

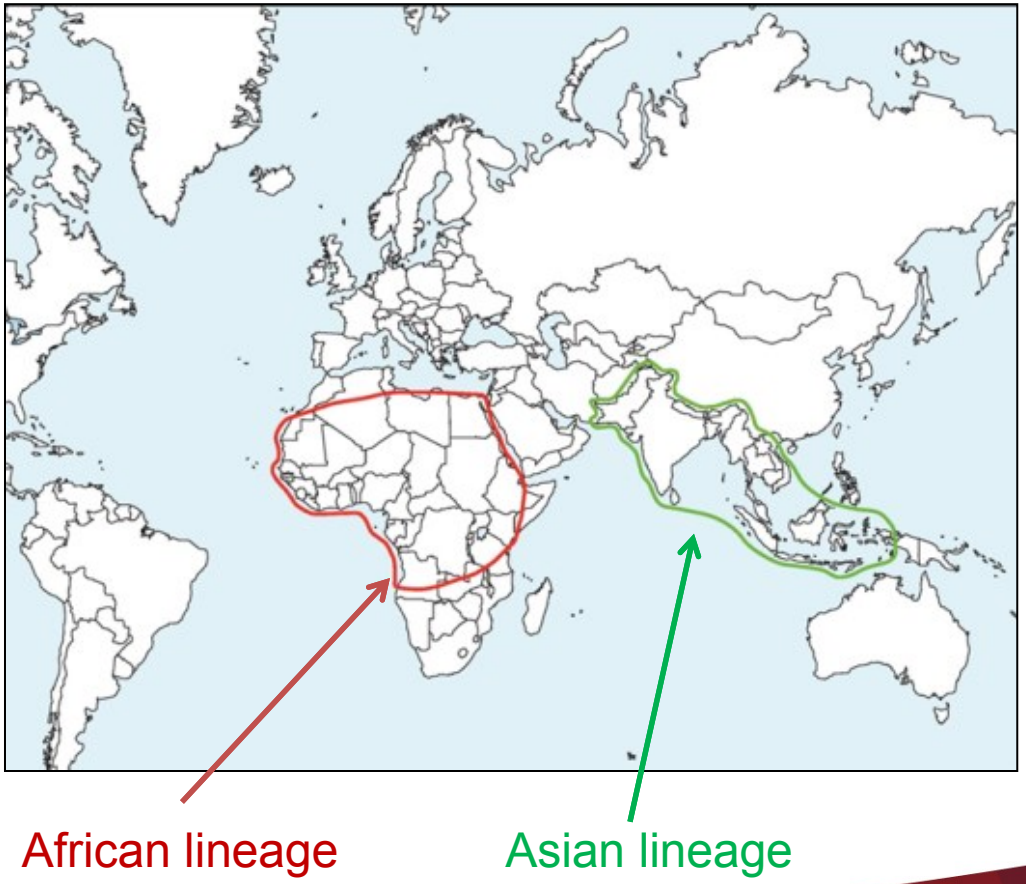
- **2013-2015**: additional outbreaks in French Polynesia, Cabo Verde, and Easter Island



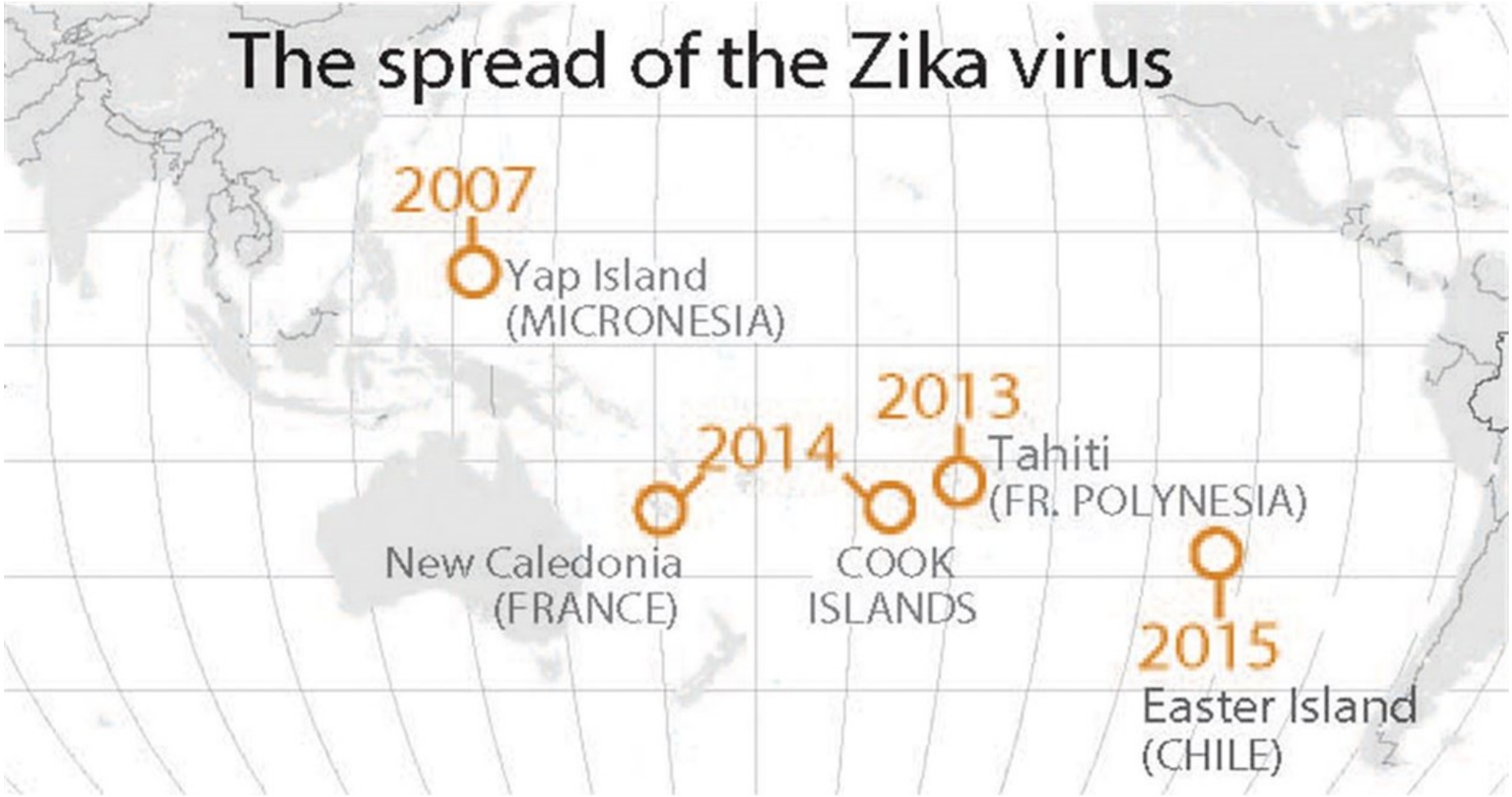
Zika Virus (ZIKV)



- Single-stranded, positive sense, enveloped RNA Flavivirus from the *Flaviviridae* family
  - Other *Flaviviridae* members:
    - Japanese encephalitis virus
    - West Nile virus
    - Yellow fever virus
    - St. Louis encephalitis virus
    - Dengue virus
- Two lineages:
  - African lineage
  - Asian lineage
    - recently emerged in the Pacific and the Americas



Zika virus: 2007-2015



THE WASHINGTON POST

ZIKV – Vector Transmission

- Primary vector - ***Aedes (Ae) aegypti***

- Possible vectors - other *Ae* species
  - *Ae. albopictus* (the role in the current outbreak is uncertain)
  - *Ae. africanus (vector for Yellow fever)*
  - *Ae. luteocephalus (a.k.a. Stegomyia)*
  - *Ae. hensilli (Yap State)*
  - *Ae. polynesiensis (South Pacific)*
  - *Ae. unilineatus*
  - *Ae. vittatus*

  - *Others? Culex?*

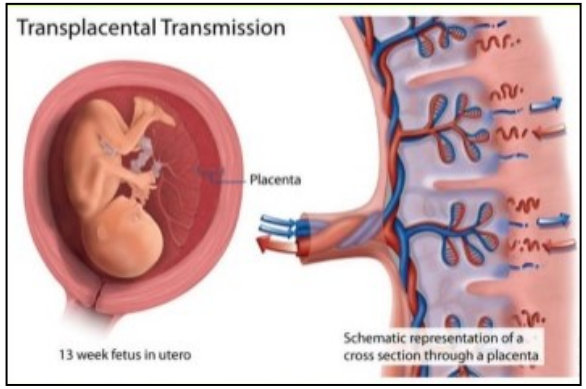
Day & night biting

Peak biting in the morning and late afternoon

ZIKV – Transmission Modes

1. Vector transmission
   - *Aedes* mosquito

2. Vertical
   - Transplacental



3. Sexual contact

4. Blood transfusion & tissue transplant

ZIKV – Sexual Transmission

- ZIKV found in semen for extended periods of time (up to **62 days**)
  - Male to female, male to male

- Travel-related risk of sexual transmission:
  - Transmission from symptomatic male travellers to their sexual partners, who have not travelled, has been reported

  - Because the likelihood of infection with ZIKV is considered low, so too is the likelihood of transmission via this route (*low likelihood, medium confidence*)*

  - However, if a man becomes infected with ZIKV, the likelihood of transmission to his sexual partners is assessed as *medium* (*low confidence*)

* CATMAT recommendations 2016

PHAC CCDR ZIKA

Canadian recommendations

Recommendations for ZIKV

Action	Group	Recommendation
Decision to travel to areas of risk	All travellers	Health care providers should discuss current knowledge about ZIKV, associated risks, and preferences and values with patients. Some travellers may wish to postpone travel to areas of risk.
	Pregnant women	Pregnant women should avoid travel to areas of risk.
	Women planning a pregnancy	Women planning a pregnancy should consider postponing travel to areas of risk.
Prevention of mosquito borne transmission	All travellers	All travellers to areas of risk should strictly adhere to recommendations for the use of personal protective measures against mosquito bites through all hours of the day and night.
Prevention of sexual transmission	Pregnant women and their male partner	Couples should practise abstinence or use condoms while in a risk area and for the duration of the pregnancy.
	Couples planning a pregnancy	Women planning a pregnancy should wait ***at least two months*** after their return from an area of risk before trying to conceive. Male partners who have travelled in an area of risk should delay trying to conceive for ***six months*** after their return.
	Couples outside the context of current or planned pregnancy	Male partners who have travelled in an area of risk should consider using condoms for ***six months*** after their return.
Screening and management	All travellers	Testing should be considered for any ill traveller with compatible epidemiologic and clinical history, when symptom onset is within three days after arrival in, to 14 days after departing from an area of risk. Serology and RNA testing in Canada is only available for symptomatic individuals and pregnant women. Testing of asymptomatic individuals (men or non-pregnant women) is not routinely offered
		Acutely unwell patient with less than 10 days of symptoms, both RT-PCR and serology should be requested to maximize sensitivity.
		Convalescent patient with symptom onset over 10 days ago, only serology should be requested.
	Male partners	Serologic testing may be considered for male returned travellers whose clinically compatible illness has resolved, and are at least two weeks post exposure, in order to assess for potential contagiousness to sexual partners.
	All pregnant women	All pregnant patients with a travel history to an area of risk should have further evaluation.
	Asymptomatic pregnant women	Asymptomatic pregnant women should consider testing; this would consist of serology at least two weeks after the last potential exposure and fetal ultrasounds, (unless found to be seronegative) at a frequency to be determined in consultation with the woman's obstetrician.
	Symptomatic pregnant women	***Acutely unwell patient*** with less than 10 days of symptoms, both RT-PCR and serology should be requested to maximize sensitivity.
		Convalescent patient with symptom onset over 10 days ago, only serology should be requested. Repeated ultrasound monitoring is indicated, unless the woman is found to be negative on laboratory testing.
	Fetus of pregnant women with confirmed or suspected ZIKV infection	Pregnant women with confirmed or suspected ZIKV infection in pregnancy should receive serial ultrasounds (every 3-4 weeks).
	Infant born to a woman with confirmed or suspected ZIKV infection or with suspected congenital ZIKV infection	Infants born to women with confirmed or suspected ZIKV infection in pregnancy, or those with microcephaly, intracranial calcifications or other symptoms of congenital ZIKV infection in whom the mother had potential exposure to the virus, should be tested. This testing should include serology, PCR of serum (umbilical cord or infant sample), and PCR of placenta; if CSF is sampled, this can also be sent for PCR and serology.

ZIKV: Epidemiological Overview in Canada

ZIKV infection cases (as of November 3, 2016)

- Total confirmed (PHAC-NML): **363**
- Travel-related cases (from Central / South America & Caribbean): **359**
- Sexually-transmitted: **2**
- Maternal-to-fetal transmission: **2**

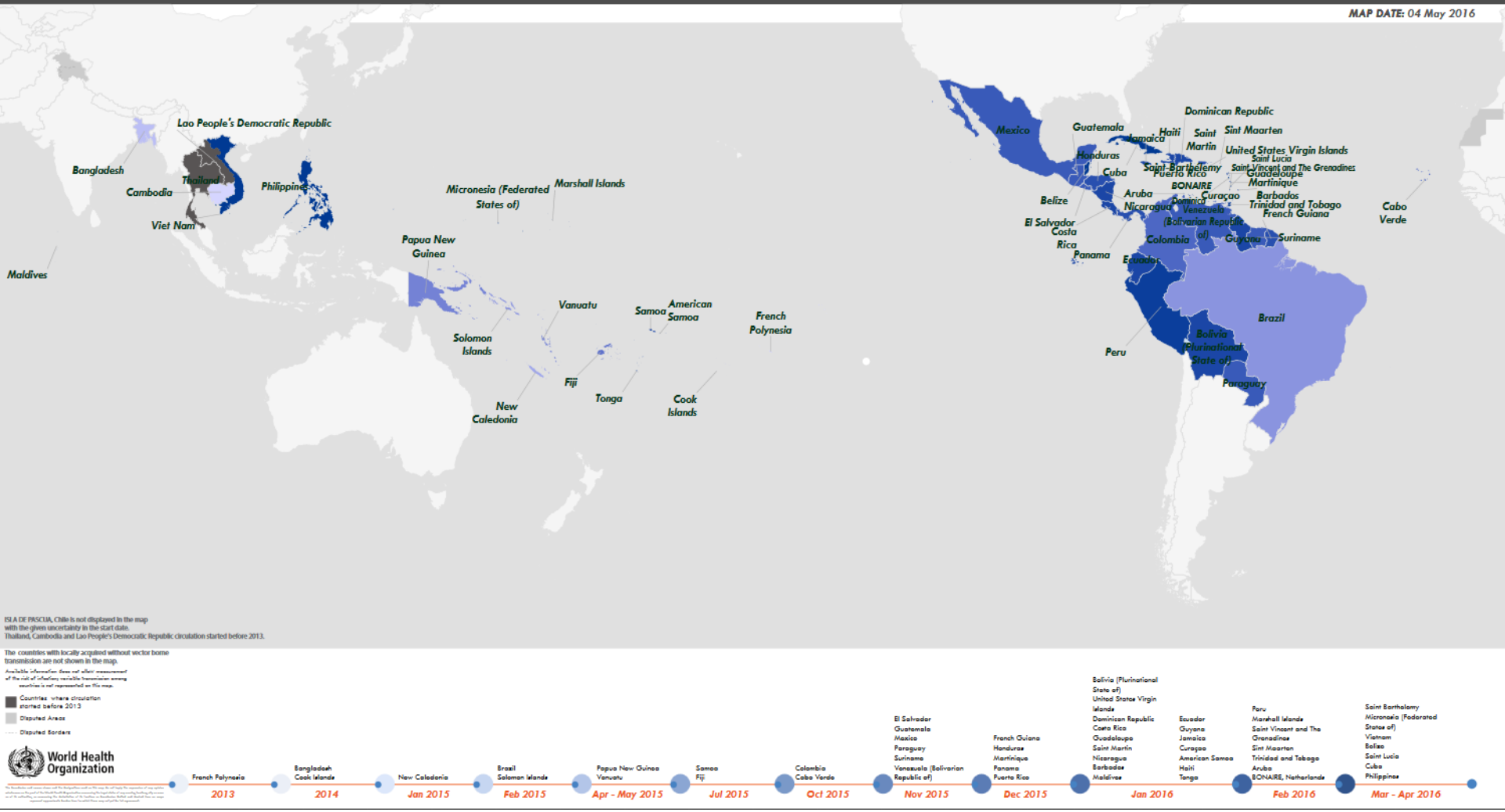
Reports of pregnancies and maternal-to-fetal transmission

- Number of pregnancies reported among Zika-infected women: **16**
- Anomalies observed (no Zika-related): **1** Zika-related: **1**

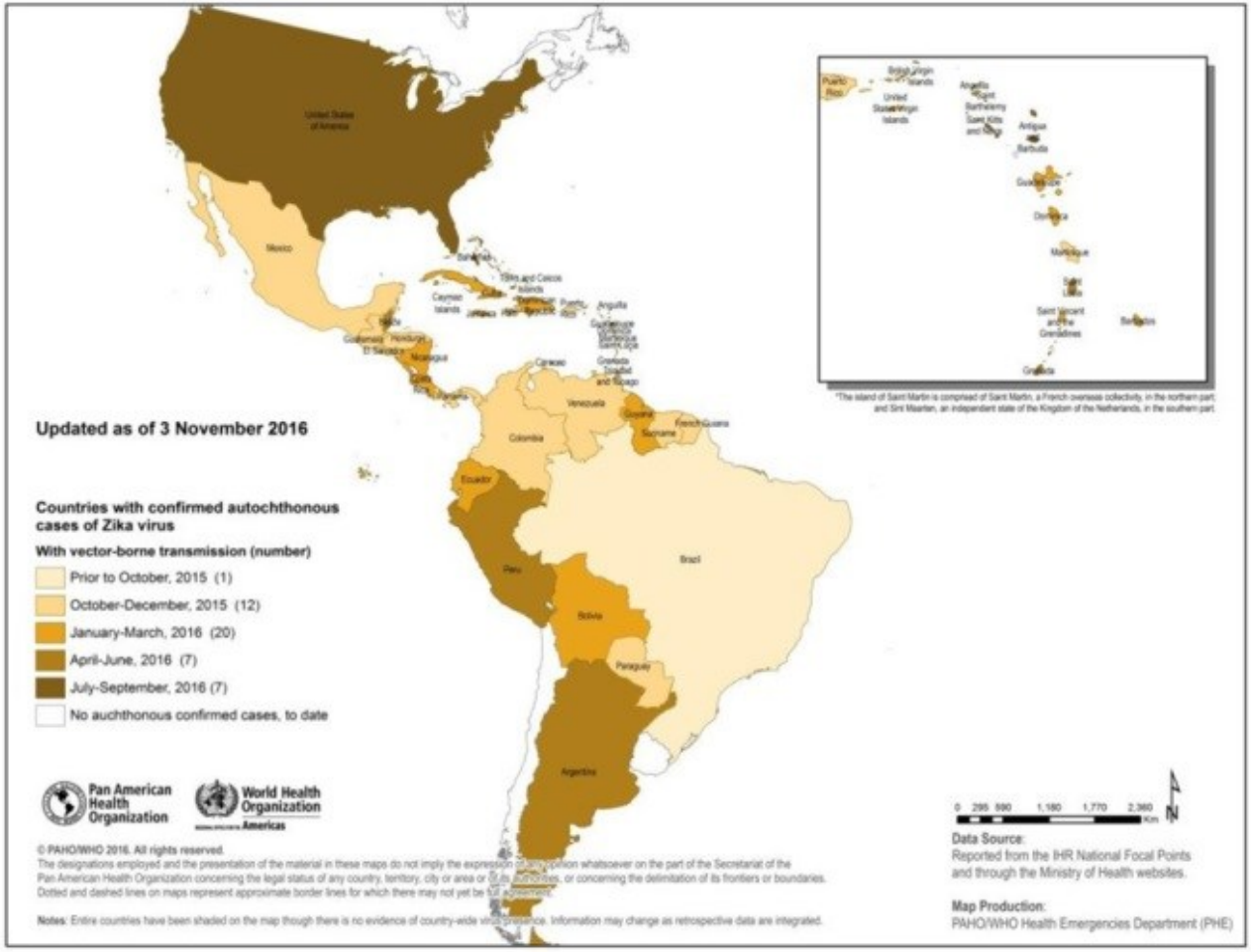
Potential vectors

- *Aedes albopictus*: **17** found in Windsor-Essex (all tested negative for ZIKV)

Countries, territories and areas showing the distribution of Zika virus, 2013 - 2016



Countries and territories in the Americas with confirmed autochthonous (vector-borne) Zika virus cases, 2015-2016 (updated: 3 Nov 2016)



ZIKV: Clinical Disease

- Incubation period: 3-12 days

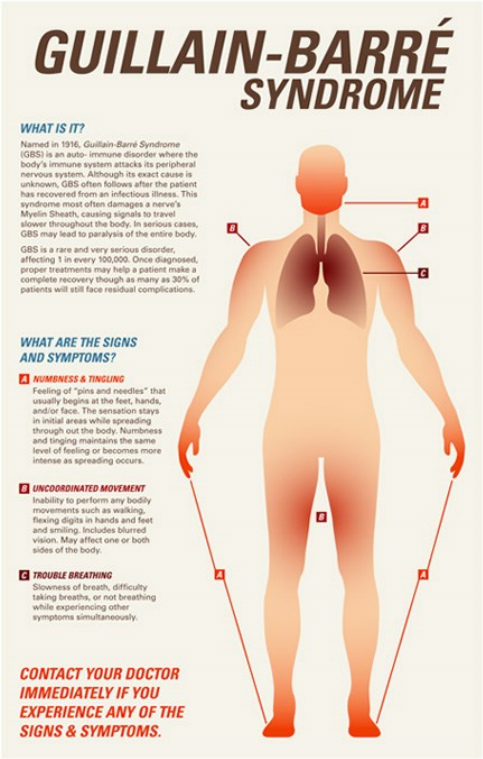
- Most infections are asymptomatic
  - Only 20-25% symptomatic

- Predominant symptoms:
  - Low-grade fever (< 38.5^0 C)
  - Maculopapular rash (often spreading face
  - to body)
  - Arthralgia/arthritis (mostly hands, feet,
  - knees)
  - Conjunctivitis (non-purulent)/conjunctival hyperemia
  - Retro-orbital pain
- Other symptoms: myalgia, asthenia, headaches, GI symptoms, pruritus
- Symptoms last ~ 2-7 days; most recover fully

- Clinical presentation is not specific and easily mimics Dengue or ChikV

ZIKV – Neurological Complications

- **Guillain-Barré syndrome** (GBS)
  - ✓ 13 countries and territories worldwide have reported an increased incidence of GBS associated with ZIKV outbreaks and/or laboratory confirmation of a ZIKV infection among GBS cases
  - ✓ ~ 1 GBS case per 4,000 ZIKV infections
  - ✓ Compared to
    - ❑ 1 - 2.6 /4,000 *Campylobacter jejuni*
    - ❑ 2.4 - 8.8 /4,000 Cytomegalovirus



- Other neurological sequelae:
  - ✓ Acute myelitis (see MRI)
  - ✓ Meningoencephalitis
  - ✓ Acute disseminated encephalomyelitis

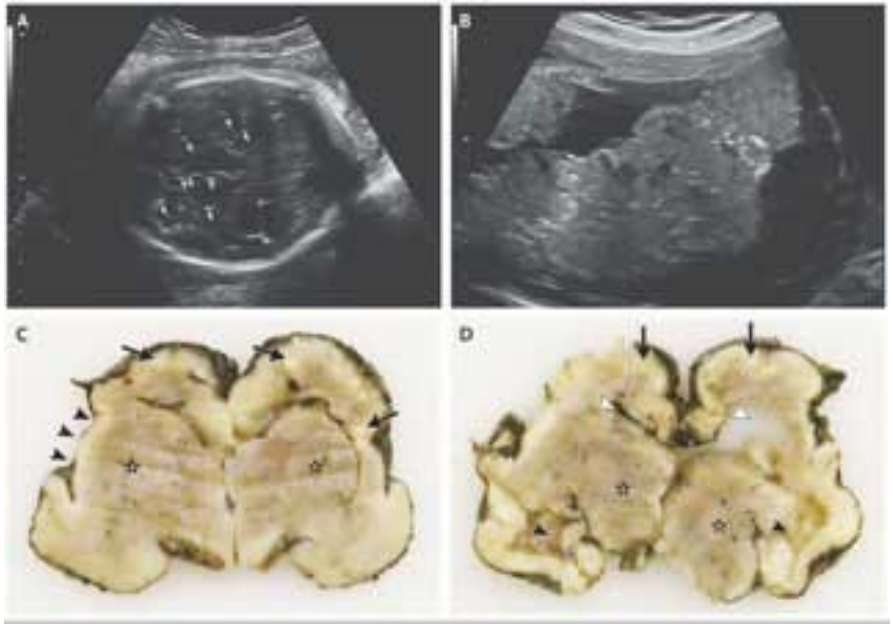
(Lancet, 3 March 2016)

Figure: Magnetic resonance imaging (MRI) showing myelitis in Zika virus infection
(A) T2 sequences showing hypersignal in the thoracic cord T5–T8 (arrow) and enlargement of the cervical spinal cord.
(B) Sagittal short time inversion recovery (STIR) sequences showing hypersignal in the cervical spinal cord C4–C7 (arrow).

Zika Virus (ZIKV) – Fetal Congenital Anomalies

- Causal relationship between ZIKV and microcephaly and/or CNS malformation
  - 12 countries reporting; Brazil= 1581, Columbia= 7, El Salvador=1, Martinique= 4, Panama=5…
- Other anomalies +/- microcephaly :
  - Ocular dysplasia, cerebral calcification, hydrocephalus, arthrogryposis, hydrops fetalis, hearing deficits; full spectrum not yet fully described
  - Also results in fetal death, placental insufficiency, fetal growth restriction
- Likelihood that prenatal ZIKV infection will result in fetal harm is uncertain
  - **French Polynesia**: congenital abnormalities occurred ~ 1% of the time in mothers infected during the first trimester
  - **Bahia, Brazil**: strong association between risk of microcephaly and first trimester infection; estimated risk ranged from 0.88 to 13.2%, depending on infection rate

Some events…supporting data



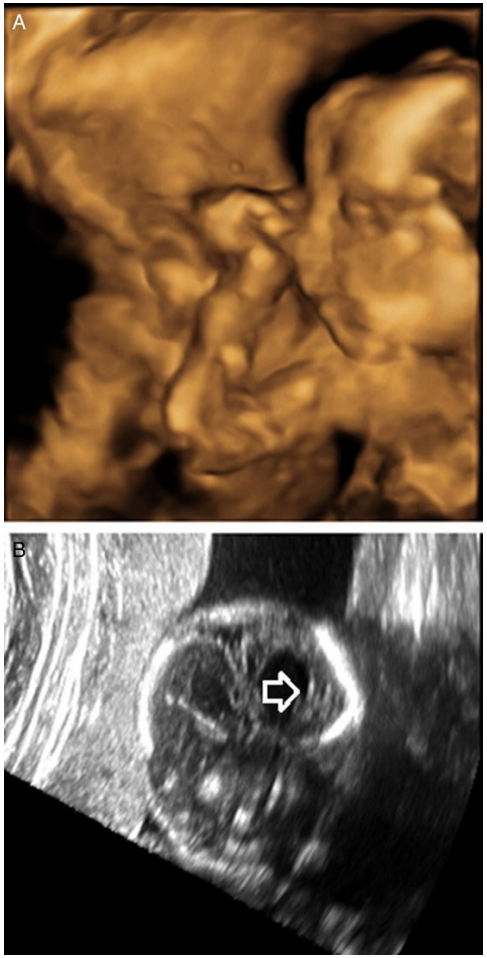
10 February 2016

A case report describes severe fetal brain injury associated with Zika virus infection in a woman who became pregnant in Brazil in February 2015. No virus or pathological changes were found in any other organs, suggesting that the virus is strongly **neurotropic**, which means it preferentially attacks the nervous system.

Read the report

Honduras reports at least 37 Guillain–Barré syndrome cases in 2016. The report brings the number of countries detecting an increase in GBS associated with Zika virus circulation to 8: French Polynesia, Brazil, El Salvador, the French territory of Martinique, Colombia, Suriname, Venezuela, and Honduras.

Fetal ultrasounds at 20 weeks' gestation

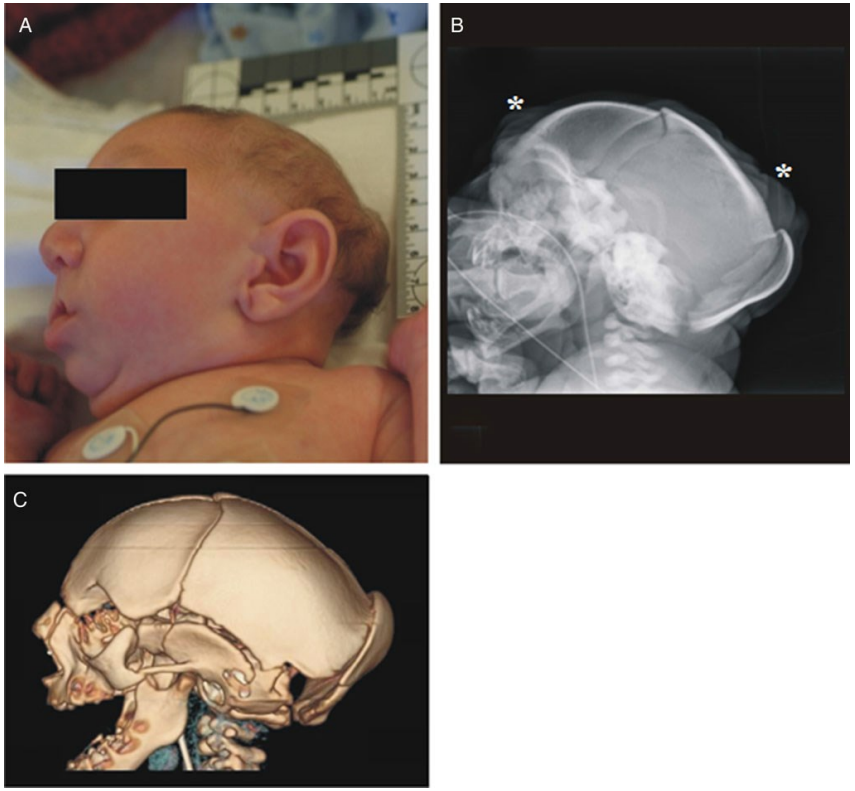


A) 3D reconstruction. Note the borderline microcephalic appearance, with normal-appearing facies and normal appearing forehead.

B) Note the **asymmetric lateral ventriculomegaly**, scattered parenchymal echogenic foci with no acoustic shadowing, and normal extra-axial spaces.

Source: 806 • CID 2016:63 (15 September) • EMERGING INFECTIONS

Microcephaly – Photograph of the side head



(A) shows severe microcephaly with occipital keel-like prominence, and normally developed face

(B) Craniogram

(C) 3D computed tomography volumetric reformat of the calvarium - also show collapse of the calvarium with extensive overlap of the calvarial bones.

Note the skin rugae (*) on the craniogram.

Zika Virus (ZIKV) – Laboratory Diagnosis

- **Detection of the following**:
  - Viral RNA via PCR during acute illness (viremia typically 3-5 days, longer in urine)
  - Viral antibody against Zika virus, including IgM antibody (non-specific) and neutralizing antibodies specific for ZikV
- **Samples include**: serum, plasma, urine, CSF, amniotic fluid, tissues
- **Cross-reactivity** can be an issue; previously infected with a related Flavivirus, such as dengue.

Zika Virus (ZIKV) – Treatment & Management

- Treatment may be directed toward symptom relief, such as:
  - Rest
  - Fluids
  - Antipyretics
  - Analgesics (avoid acetylsalicylic acid and nonsteroidal anti-inflammatory drugs until **dengue infection** has been ruled out)

- No vaccine available (no specific antiviral therapy for Tx)

- The best form of prevention is <u>protection against mosquito bites</u>

Travel Health Notice - Travel.gc.ca

The **state of Florida** in the United States has reported cases of Zika virus infection transmitted locally by mosquitoes in areas of Florida.

- Pregnant women and those planning a pregnancy should avoid travel to the affected areas of Florida
- There is potential transmission of Zika virus in and around areas with reported locally transmitted cases, even if cases are not yet reported
- Pregnant women and those planning a pregnancy should consider postponing travel to other areas in Florida.

All travellers should protect themselves from mosquito bites.

For additional recommendations please see consult: Travel.gc.ca

Lessons learned- Personal reflections
Take Home Messages

- Strategic thinking around vector-borne disease
  - Something new is just around the corner
  - As the planet warms, many bacteria, viruses, fungi and parasites can survive in areas where they haven't been found before

- Response protocols for emerging diseases
  - Be aware of changing patterns and types of diseases encountered in clinical practice
  - Risk assessment (low-medium-high)
  - Surveillance vs Research
  - Defining the interdisciplinary health team

- Active early engagement of health professionals
  - Leverage existing networks and systems (Experiential Learning)
  - Physicians can make a difference at the political, professional and person levels

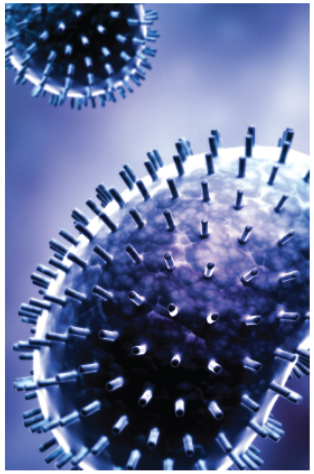
« Physicians will be among the front-line responders to the dire effects of climate change, from malnutrition, to increases in vector-borne disease, to respiratory illness and the after-math of traumatic weather events. »
(Barbara Sibbald, CMAJ, 185(3), p. 195, 2013)

PHAC CCDR – Source of current information in Canada

January 7, 2016 • Volume 42-1

CCDR
CANADA COMMUNICABLE DISEASE REPORT

EMERGING INFECTIOUS DISEASES



Research

Advice

Links

Public Health Agency of Canada / Agence de la santé publique du Canada

Canada

October 6, 2016 • Volume 42-10

CCDR
CANADA COMMUNICABLE DISEASE REPORT

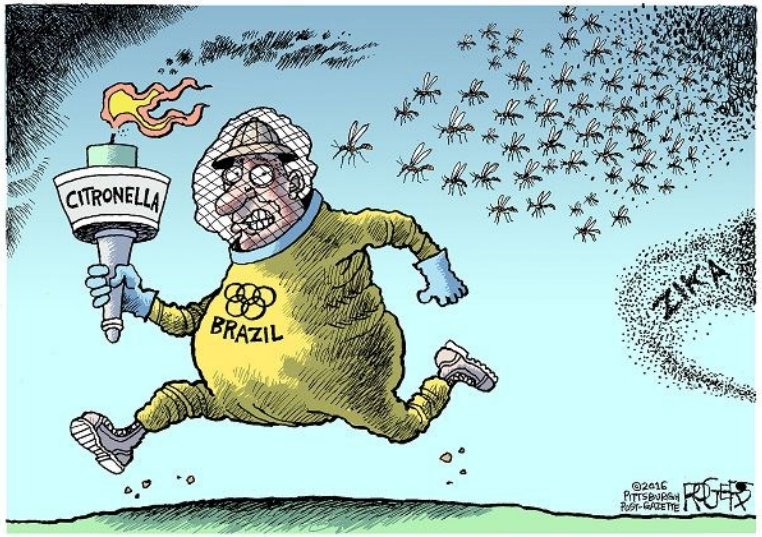
EMERGING CHALLENGES OF VECTOR-BORNE DISEASES AND CITIES

Proceedings

Guest editor: Mohamed Karmali

Public Health Agency of Canada / Agence de la santé publique du Canada

Canada


CITRONELLA
BRAZIL
ZIKA
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MALARIA, WEST NILE, AND NOW THIS?
NO WONDER I NEVER GET INVITED TO PARTIES.
ZIKA VIRUS

QUESTIONS?


YOU EXPECT ME TO CARE ABOUT MOSQUITOES NOW?
USA
MOSQUITO-BORNE ZIKA VIRUS SPREADING QUICKLY
EMERGING EPIDEMIC IN LATIN AMERICA
GLOBAL OUTBREAK FROM RIO SUMMER OLYMPICS!

THANK YOU - MERCI

Dr. Michel Deilgat, CD, BA, MD, MPA, MEd (C), CCPE
Centre for Food-borne, Environmental, Zoonotic Infectious Diseases
Infectious Diseases Prevention and Control Branch
Public Health Agency of Canada
Ottawa, Ontario
michel.deilgat@phac-aspc.gc.ca