GeoSentinel
The Global Surveillance Network of the ISTM and CDC
A worldwide communications and data collection network of travel/tropical medicine clinics
www.geosentinel.org
Conflict of Interest Statement

• Faculty: Pierre Plourde M.D. FRCPC

• Relationships with commercial interests:
  • Grants/Research Support: “I wish”
  • Speakers Bureau/Honoraria: “I wish”
  • Consulting Fees: “I wish”
  • Other (s.a. major shareholder): “I wish”

April 2017
Not all travelers are the same.
What is GeoSentinel?

- Provider-based Surveillance of international travelers and migrants.
- Does not cover endemic diseases in local populations
  - 64 travel/tropical medicine clinics globally (since 1996)
  - Over 200 Affiliate Members on 6 continents (since 2002)
GeoSentinel Affiliate Members

Affiliate Members are ISTM provider clinics that informally provide leads and contacts when they encounter any patients having a pre-defined alarming diagnosis or unusual event. Affiliate Members also participate in brief e-mail queries for enhanced surveillance and response in potential outbreak situations. This program allows large numbers of individual members in many countries to be rapidly linked together to share clinical observations and facilitates direct interaction with health authorities.

GeoSentinel Surveillance Sites

Surveillance Sites participate in surveillance and monitoring of all travel related illnesses seen in their clinics. Aggregation of this data across the network of 64 globally dispersed medicine clinics on all continents (17 in the United States, 9 in Canada, and 38 in other countries) allows linking of final diagnoses in migrating populations with similar geographic exposures. In addition to formal surveillance, GeoSentinel sites also participate in enhanced surveillance and networking with public health partners.
Principles of GeoSentinel

- Provider-based surveillance
  1. Diagnosis
  2. Place of Exposure
  3. Chronology of Exposure
- Only basic demographics
- Not a complete clinical record
Why GeoSentinel?

- 1992 IOM Report and all subsequent analyses
  - Travelers are key element in spread of emerging ID
- Travel & migration continue to increase
- Travelers are sentinels visiting all countries
  - Can be sampled upon return at relatively few points
  - Detect pathogens at point of entry to domestic populations
- Value of aggregating global data centrally
Provider-based Sentinel Surveillance
The 3 Functions of GeoSentinel

1. Surveillance – Response
   – Alarming sentinel events

2. Surveillance – ongoing trends

3. Analysis of morbidity and estimating risk
   – Diagnosing the ill-returnee; the clinician perspective
   – Advising the Prospective Traveler; the traveler perspective
   – Defining associations between patient characteristics and disease
GeoSentinel Response Capabilities

• Rapid Query-Response loop
  • 64 GeoSentinel Sites
  • Over 200 GeoSentinel Affiliate Members
  • ISTM members
  • Partners
    (ProMed, IDSA, TropMed, Healthmap, CDC, etc)

• Outgoing Alerts/Advisories
  – Broadcast radius is situation dependent

• Collaboration with public health partners
Alarming Events Strategy

• Fixed list of flagged diagnoses
  – Any such record entered into the central database triggers an immediate alarm
  – Immediate notification of a Project Director for decision on response

• Temporary flagged diagnoses added based on situations arising
Rare Alarming Events

- Anthrax, pulmonary/cutaneous
- Botulism
- Chagas disease, acute
- Cholera (toxigenic V. cholera)
- Death
- Dengue (complicated)
- Diphtheria
- Ebola virus
- Encephalitis, acute or viral
- Encephalitis, acute, no proven viral etiology
- Enterohemorrhagic escherichia coli (EHEC)
- Hemolytic uremic syndrome (Shiga toxin associated)
- Hemorrhagic fever syndrome, acute
- Influenza, Avian
- Lassa Fever
- Malaria – drug resistant, Quinine RES-P.f., malarone resistant, mefloquine resistant
- Meningococcal meningitis
- Mers Co-V
- Mycobacterium tuberculosis (MDR or XDR)
- Polio
- Rabies
- Rickettsia prowazeki (epidemic typhus, louse borne)
- SARS
- Smallpox (variola major)
- Trypanosomiasis, African
- Tularemia
- Yellow Fever
- Yersinia pestis, plague & pneumonic
- Zika Virus
How does GeoSentinel work?

Patients with travel-related condition → GeoSentinel Site or GeoSentinel Network → Surveillance Data → Central Database → Data analysis by Sites → Reports → Rapid Query Response Loop → GeoSentinel Site or GeoSentinel Network

TravelMed +/-
ISTM Membership +/-
Partners (TropNet, ProMed, Healthmap, and IDSA, etc) +/-
Who are GeoSentinel Patients? (as of September 2015)

Complete Database
- Visit Clinic After Travel: 54%
- Visit Clinic During Travel: 31%
- Immigration Travel Only: 15%

After Travel Visits Only
- Tourists: 58%
- Business: 14%
- VFR: 12%
- Missionary Volunteer, Research: 13%
- Medical Tourism: 3%
- Military: 1%
GeoSentinel Contribution by Site as of September 2015

- Europe: 36%
- Nepal: 17%
- US: 15%
- Canada: 11%
- Asia: 12%
- S. America & Africa: 3%
- Israel: 3%
- Aus & NZ: 3%
Rich Database of Travel Morbidity

• Benefits
  – Guide diagnostic approach
  – Guide empiric therapy
  – Prioritize pre-travel prevention strategies
Enrolment Inclusion

• Patients who have crossed international border within 10 years
  – Presenting with travel-related illness
  – Attending one of sentinel clinics

• Patients experiencing adverse events to pre-travel health care (e.g., Yf vaccine reaction)
Enrolment Exclusions

• Patients presenting for pre-travel health care only
• Routine post-travel periodic health care in asymptomatic person (unless travel-related disease is discovered)
Participating Partners Winnipeg

- **WRHA PPH Surveillance**
  - Debbie Nowicki, Mandy Whitlock (Epidemiologist)
- **WRHA Tropical Medicine Clinic**
  - Pierre Plourde (Site Director), Jacquie Shackel (Site Co-Director), Philippe Lagacé-Wiens, Paul VanCaeseele
- **HSC Pediatric Infectious Diseases Clinic**
  - Maryanne Crockett, Sergio Fanella, Jared Bullard
- **BridgeCare Refugee Clinic**
  - Cynthia Sawatzky, Afsaneh Oliver
- **SBH Infectious Diseases Clinic**
  - Terry Wuerz
POST-TRAVEL QUESTIONNAIRE

1. Departure Date from Canada: ____________________________

2. Date of arrival in the Tropics: ____________________________

   Countries of Stay From (d/m/yr) To (d/m/yr)

   ____________________________  ____________________________
   ____________________________  ____________________________
   ____________________________  ____________________________
   ____________________________  ____________________________
   ____________________________  ____________________________

3. Departure Date from Tropics: ____________________________

4. Arrival Date in Canada: ____________________________

5. Were you visiting friends and relatives on this trip? Yes ☐ No ☐

6. Past Travel (prior to recent travel):

   Countries Year Duration of Stay

   ____________________________  ____________________________  ____________________________
   ____________________________  ____________________________  ____________________________
   ____________________________  ____________________________  ____________________________
   ____________________________  ____________________________  ____________________________
   ____________________________  ____________________________  ____________________________
**Data Entry Form**

### GeoSentinel Questionnaire – SITE NAME

**Patient ID:** WPG-

1. **General Information**
   - **Gender:** [ ] Male [ ] Female
   - **Age:** ______
   - **Today’s Date:** [ ] Clinic Visit Date (Month/Day/Year)
   - **Primary Country of Residence Before Age 16:** 
   - **Country of Birth:** 
   - **Country of Citizenship:** 

2. **History of Recent Travel**
   - **Trip Start Date Month/Day/Year:** 
   - **Trip End Date Month/Day/Year:** 
   - **Country:** 
   - **Ship:** 

3. **History of Previous Travel**
   - **Years Visited:** 
   - **Months Visited:**

4. **Exposure Details**
   - **Countries Visited:**
   - **Dates Visited:**
   - **Mode of Travel:**
   - **Exposure Details:**
     - **Type of Exposure:**
     - **Country of Exposure:**
     - **Reason for Exposure:**
     - **Date of Exposure:**
     - **Antibiotic(s):**

5. **Pre-existing Conditions**
   - **Present Prior to Onset of Current Travel-related Illness:**
     - [ ] HIV Infection
     - [ ] Hepatitis
     - [ ] Renal Disease
     - [ ] Malignancy
     - [ ] Immunosuppression

6. **Diagnoses**
   - **Primary Diagnosis:**
     - **Method of Diagnosis:**
     - **Antibiotics:**
     - **Other:**

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1. **Main Previous Symptoms or Reasons for Referral:**
   - **Gastrointestinal:**
   - **Genitourinary:**
   - **Musculoskeletal:**
   - **Neurologic:**
   - **Gastrointestinal:**
   - **Respiratory:**
   - **Skin:**
   - **Cardiac:**
   - **Other:**

2. **Diagnosis:**
   - **Method of Diagnosis:**
   - **Antibiotics:**
   - **Other:**

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**Note:** All items are required fields for submitted data entry. Note: Sections I & II may be difficult to fill in applicable.
Canadian GeoSentinel Site Data

• Data collected from 8 Canadian clinics in 7 cities (Montreal, Ottawa, Toronto, Winnipeg, Calgary, Vancouver, Victoria) between October 2015 and September 2016 (12 months)

• 41 of 1118 ill travelers diagnosed with Zika (4%)
  – 1 sexual transmission
  – 3 pregnant – 2 congenital transmissions
  – 2 GBS (5%) – 1 with meningitis

Boggild et al. CMAJ 2017 March 6;189:E334-340
GeoSentinel is a worldwide communication and data collection network for the surveillance of travel-related morbidity. It was initiated in 1995 by the International Society of Travel Medicine (ISTM) with support from the US Centers for Disease Control (CDC) as a network of ISTM member travel/tropical medicine clinics. GeoSentinel is based on the concept that these clinics are ideally situated to effectively detect geographic and temporal trends in morbidity among travelers, immigrants, and refugees.

Current activities include:

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