Disease Surveillance in Tourists

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Centers for Disease Control and Prevention
Outline

• Travel trends
• Illness in travelers
• Disease surveillance in travelers
• Hotel based surveillance
• Surveillance in Mexico
Sources: International Trade Administration (ITA), U.S. Department of Commerce, 2008 and World Tourism Organization (WTO), 2008
U.S. Residents Traveling Abroad

*ITA, includes travel to Canada and Mexico
U.S. Resident’s Travel Destinations

17% of U.S. residents traveled outside the country

Source: HealthStyles Survey 2005
**U.S. Resident’s Purpose of Travel**

- **Leisure**: 66.6%
- **Conference**: 2.7%
- **Business**: 11.9%
- **Health Treatment**: 0.7%
- **Religion**: 0.2%
- **Study/Teach**: 0.6%
- **VFR**: 17%
- **Other**: 0.5%

Source: International Trade Administration (ITA)
Impact of Tourism

• World travel & tourism contributed $5,890 billion to global GDP in 2008
  – Mexico:
    • $157.6 billion (ranked 10th in world)
    • 6,633,000 jobs (ranked 5th in world)

Source: World Travel and Tourism Council
Travelers’ Health Risks

Of 100,000 travelers to a developing country for 1 month:

– 50,000 will develop some health problem
– 8,000 will see a physician
– 5,000 will be confined to bed
– 1,100 will be incapacitated in their work
– 300 will be admitted to hospital
– 50 will be air evacuated
– 1 will die

Steffen R et al. J Infect Dis 1987; 156:84-91
Deaths Related to International Travel

N = 2463

H1N1 in U.S. Travelers to Mexico

• Individual case counts available up to 4 June 2009: 7,572 cases identified
• 225 (3%) with recent travel to Mexico
  – Mean age: 26 years
  – 55% female
  – 7% hospitalized
  – 2 deaths
Pandemic Impact
Studies of Illness in Travelers

• Pre-travel
• During travel
• Post-travel
Pre-travel Studies: Travelers’ Health Research Centers

- Travel medicine clinics
  - focus on research
  - promote the health of travelers

- Boston Area Travel Medicine Network
  - 5 centers in Boston area

- Global Travelers Health National Research Center Consortium
  - 10 centers across U.S.
Post-travel Studies: GeoSentinel Surveillance Sites

Provider-based Surveillance
- International travelers and migrants
- Does not cover endemic diseases in local populations
- 48 travel/tropical medicine clinics globally (since 1996)
Who are GeoSentinel patients?
(as of Mar 2009)

Complete Database
(n = 100,804)

- 16% (15,957)
- 31% (31,296)
- 52% (51,921)

Visit clinic after travel
Visit clinic during travel
Immigration travel only

After Travel Visits Only
(n = 51,921)

- Tourism 60% (31,009)
- Business 14% (7,307)
- Researcher/Aid Work 13% (6,514)
- Missionary/Volunteer 13% (6,514)
- VFR 11% (5,882)
- Student 2% (906)
GeoSentinel Network

180 Network Members on all 6 continents (since 2002)
GeoSentinel Network: Case Eligibility Criteria

- Travelers, immigrants, or refugees
  - crossed international borders in the previous 1 year
  - current illness was acquired as a function of that travel

- Any unusual diagnosis
- Unusual clinical manifestation of a usual diagnosis
- Unusual geographic origin
GeoSentinel Network: Reporting Methods

- Informal e-mail to GeoSentinel
  OR
- Completion of a simple Web-based form
- Respond to brief periodic e-mail queries regarding potential outbreaks or trends in travel-related infections
GeoSentinel Network Event Form

• Network Member Information
  – Name
  – Email Address

• Patient Information
  – Patient Diagnosis: Confirmed, Probable, Suspected
  – Age
  – Country of Birth
  – Country of Residence
  – Country of likely exposure

• Brief clinical history, diagnosis and pertinent lab results
Rare Alarming Events

- Anthrax,
- Botulism
- Chagas disease, acute
- Cholera
- Death
- Dengue, DHF/DSS
- Ebola virus
- Encephalitis, acute
- Hemorrhagic fever, acute
- Influenza, Avian
- Lassa Fever
- Malaria, Cerebral
- Influenza A H1N1
- Malaria, resistant
- Malaria, severe & complicated
- Meningococcal meningitis
- Mycobacterium tuberculosis
- Rabies
- SARS
- Smallpox
- Trypanosomiasis, African
- Tularemia
- Yellow Fever
- Yersinia pestis,
Surveillance During Travel

• Not well studied in medical literature
• Most studies focus:
  – GI disease
  – Environmental conditions affecting GI disease
• Few studies on other diseases:
  – Hotel based surveillance
  – Includes GI, respiratory and injury
Surveillance Opportunities in Tourists

• Entry or exit:
  – Border crossings
  – Ports
  – Airports

• Accommodations:
  – Hotels, resorts
  – Cruise ships

• Visits to local providers:
  – Clinics catering to travelers
  – Local clinics or hospitals
Window of Opportunity

Exposure  Symptoms

Arrival  Departure

Days
Window of Opportunity

Exposure

Symptoms

Days

Arrival

Departure
Window of Opportunity

Exposure

Symptoms

Arrival

Departure

Days
Hotel Based Surveillance

- Tourists most likely to seek care in or close to accommodations

- Many large hotels have medical providers
  - on site (often a nurse)
  - on call (local doctors under contract)

- Records usually kept
Caribbean Surveillance System (CARISURV)

- CAREC serves 21 member countries
- Quality Tourism for the Caribbean (QTC)
- CARISURV has 15 components
- Hotel Based Surveillance System (HBSS)
  - In development
  - Jamaica, Barbados, Tobago
Jamaican Hotel Based Surveillance

- Funded by MoH, close ties to MoT
- Implemented at sentinel sites in 1996
- Modeled on CDC Vessel Sanitation Program (VSP)
- Program had two arms
  - Environmental health (HACCP approach)
  - Disease surveillance in workers & guests
- Initial focus on GI illness but later added other health conditions
Jamaican Hotel Based Surveillance

- Initially tested in 5 hotels, expanded to 20 hotels the next year, 38 in 2002
- Focused in tourist destinations:
  - Negril, Montego Bay, Ocho Rios, Kingston
- Properties >100 rooms required by law to report:
  - Diarrhea
  - Acute respiratory illness (ARI)
  - Injuries
Jamaican Hotel Based Surveillance

- All hotels have on-site nurse
  - Created association of hotel nurses
- Systematized data records
- Records submitted weekly
- Outbreaks reported within 24 hours
- MoH generates monthly summary reports
Jamaican Hotel Based Surveillance

- Disease rates reported as cases per guest night
- Steady decline in TD rates*
  - 1996: 23.2%
  - 2002: 4.3%

*Source: Stephanie Fletcher *etal* Description of Food Safety Systems in Hotels and How It Compares with HACCP Standards, JTM, 2009
**Weekly Surveillance Report of Select Health Conditions**

<table>
<thead>
<tr>
<th>NAME OF ESTABLISHMENT (CODE)</th>
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<tbody>
<tr>
<td>WEEK ENDING</td>
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<tr>
<td>HOTEL OCCUPANCY (Total Number Guest Stays)</td>
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<tr>
<td>STAFF</td>
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<td>GUESTS</td>
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<td>TOTAL NO. VISITS TO NURSES STATION</td>
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<td>TOTAL NO. FIRST VISITS</td>
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<tr>
<td>TOTAL NO. ACCIDENTAL INJURIES</td>
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<tr>
<td>Mechanisms</td>
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<tr>
<td>a) Falls</td>
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<td>b) Lacerations (Cut, Prick)</td>
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<tr>
<td>c) Blunt (strike, stab, kick, Hit by object)</td>
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<tr>
<td>d) Chemical Burn</td>
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<tr>
<td>e) Thermal Burn</td>
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<tr>
<td>f) Sprain/Strain</td>
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<tr>
<td>g) Chemosis/purpura</td>
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<tr>
<td>h) Cuts, Scrapes, Puncture</td>
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<tr>
<td>i) Burns/Scalds injuries</td>
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<td>j) Other</td>
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<td>TOTAL NO. VIOLENCE RELATED INJURIES</td>
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<tr>
<td>Method</td>
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<td>a) Lacerations (Cut, Prick)</td>
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<td>b) Blunt (strike, stab, kick, Hit by object)</td>
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<td>e) Other</td>
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<td>accidental events</td>
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<td>i) Urticaria</td>
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<td>j) Other</td>
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<tr>
<td>TOTAL NO. GASTROINTESTINAL CONDITIONS</td>
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<tr>
<td>TOTAL NO. DIARRHEA CAUSES</td>
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<tr>
<td>DIARRHEA with VOMITING</td>
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<td>DIARRHEA with FEVER</td>
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<td>DIARRHEA with BLOOD IN STOOL</td>
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<tr>
<td>DIARRHEA with ABDOMINAL CRAMPS</td>
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<tr>
<td>TOTAL NO. ACUTE RESPIRATORY INFECTIONS</td>
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<td>TOTAL NO. FEVER (≥38°C)</td>
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<td>TOTAL NO. FEVER (≥36.5°C) with RESPIRATORY SYMPTOMS</td>
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<tr>
<td>TOTAL OTHER ILLNESSES seen</td>
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</table>

Instructions For Use:

1. **Diarrhoea** - Includes only diarrhoea cases where the onset of symptoms occurred during the current week.

2. **Fever** - Cases where the fever was present at any point during the current week.

3. **Respiratory Infections** - Includes only cases where respiratory symptoms were present during the current week.

4. **Other Illnesses** - Includes all other illnesses not specified in the above categories.

5. If you have any questions or concerns regarding the reporting of health conditions, please contact the Public Health Department.
Weekly Reporting by Parishes

<table>
<thead>
<tr>
<th>Health Department:</th>
<th>Week #:</th>
<th>Ending:</th>
<th>Date:</th>
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</thead>
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**MINISTRY OF HEALTH, JAMAICA**

*Weekly Parish Surveillance Report for Hotels*

<table>
<thead>
<tr>
<th>Hotel Code</th>
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<td>Occupancy</td>
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<td>First Visitors</td>
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<td>Accidental Injuries</td>
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<td>Lacerations</td>
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<td>Burns</td>
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<td>Fever</td>
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<tr>
<td>Fever/Rash</td>
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<td>Fever/Respiratory</td>
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<tr>
<td>Other Illnesses</td>
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<tr>
<td>Guest, S-Staff</td>
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</tbody>
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**NAME**

**POSITION HELD**

**SIGNATURE**
PAHO Vision for Health & Tourism

• 144th session of Executive Committee
  – 22-26 June 2009

• Resolution on Health and Tourism:
  “Promote and maintain sound epidemiological surveillance mechanisms, which could include the establishment of national hotel health surveillance systems in every country in the region.”

Source: Provisional agenda for PAHO 144th Session of Executive Committee, 11 May 2009
Disease Surveillance in Mexico

• Surveillance of local population
  – Robust national system
  – High level of granularity
  – Captures illness in hotel workers

• Surveillance of tourists
  – No dedicated system in place
  – Sporadic
  – Location-specific
Suggested Ideas for Tourist Surveillance in Mexico

• Sentinel sites
• Hotel-based
  – Recruitment of hotels with on-site providers
  – Recruitment of on-call / contracted providers
• Consider inclusion of cruise industry
• Administered at national level
Suggested Ideas for Tourist Surveillance in Mexico

• National standards and protocols
• Case definitions (ARI, ILI or H1N1)
• Standardized forms
• Reporting schedules
• Effective communications (up & down)
Moving Forward

• PAHO guidance
• Regional coordination
  – Possible visit to Jamaica to review program
• CDC collaboration
  – Possible workshop to design tourist surveillance system
Acknowledgements

• Michael Williams
  – Coordinator Hotel Surveillance
  – Jamaican Ministry of Health
• Clive Brown
  – Division of Global Migration and Quarantine, CDC
Thank you

Questions?