Travel Acquired Infections

Why should we care . . .
And what we should do.
A word on travel

CURIOSITY

Some places remain unknown because no one has ventured forth. Others remain so because no one has ever come back.
Background

• 1 Billion international arrivals per annum
  – 503 M to Europe
  – 216 M to Asia/pacific
  – 100 M to North America
  – 56 M to rest of Americas
  – 105 M to Africa/middle east
• 4% growth per annum

Tourism direct contribution in selected economies*

<table>
<thead>
<tr>
<th>Countries</th>
<th>GDP(%)</th>
<th>Employment(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>2.6</td>
<td>4.5</td>
</tr>
<tr>
<td>Brazil</td>
<td>3.6</td>
<td>6.2</td>
</tr>
<tr>
<td>Canada</td>
<td>1.9</td>
<td>3.6</td>
</tr>
<tr>
<td>China</td>
<td>4.2</td>
<td>2.3</td>
</tr>
<tr>
<td>Germany</td>
<td>3.2</td>
<td>4.7</td>
</tr>
<tr>
<td>India</td>
<td>2.8</td>
<td>4.6</td>
</tr>
<tr>
<td>Indonesia</td>
<td>2.5</td>
<td>3.5</td>
</tr>
<tr>
<td>Japan</td>
<td>1.9</td>
<td>2.9</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>1.5</td>
<td>2.0</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>2.9</td>
<td>6.6</td>
</tr>
<tr>
<td>South Africa</td>
<td>3.0</td>
<td>4.3</td>
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<tr>
<td>Spain</td>
<td>6.4</td>
<td>5.1</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>3.8</td>
<td>14.2</td>
</tr>
<tr>
<td>United States of America</td>
<td>2.7</td>
<td>3.7</td>
</tr>
</tbody>
</table>

*Source: UNWTO
Types of Tourism
And then . . .
But don’t forget to ask about...
Even the honest ones:

OVER 150 PRETTY LADIES...
AND 2 UGLY ONES!
Infectious Health Risks

- Diarrhoeal disease
- Respiratory tract disease
- Childhood infections
- Vaccine preventable
- Malaria
- Typhoid
- Hepatitis
- STIs/HIV
- Leishmania

- Arboviruses
- TB
- Rickettsia
- Anthrax
- Leptospirosis
- Plague
- MDROs
Other infectious travel health risks

- Tick borne encephalitis
- Yellow fever
- Japanese encephalitis
- Dengue and friends
- Meningitis
- Avian influenza
- Rabies
- Brucella
- Hemorrhagic fevers
- More...
Illness abroad

• Around 35-45% of travellers will experience illness
  – 25-35% confined to bed
  – 14-20% consult MD
  – 1% require hospitalization
• Diarrhea, RTI and Fever most common
• Death rare:
  – MVA
  – Drowning
  – Suicide
  – Underlying medical condition (MI, CVA . . .)
• Affected by age, type of travel, duration

Occupational Medicine 2011;61:6–18
Regarding our more adventurous travelers

BRAVERY

Every Man Dies. But Not Every Man Truly Lives
Only to Die of Sheer Stupidity.
Risk of Death

- People <55 yrs - double risk of dying
  - Motor vehicle accidents
  - Drowning
  - Homocide/Suicide . . .
- People aged >55
  - Cardiovascular accidents
- Mostly in people RESIDENT abroad

Table 1.1 Reported Deaths of U.S. Citizens Abroad by Cause of Death

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle-related accidents</td>
<td>569</td>
</tr>
<tr>
<td>Homicide</td>
<td>287</td>
</tr>
<tr>
<td>Drowning</td>
<td>213</td>
</tr>
<tr>
<td>Other accidents</td>
<td>207</td>
</tr>
<tr>
<td>Suicide</td>
<td>204</td>
</tr>
<tr>
<td>Air accident</td>
<td>74</td>
</tr>
<tr>
<td>Drug-related</td>
<td>60</td>
</tr>
<tr>
<td>Natural disaster</td>
<td>42</td>
</tr>
<tr>
<td>Terrorist action</td>
<td>51</td>
</tr>
<tr>
<td>Train accident</td>
<td>11</td>
</tr>
<tr>
<td>Maritime accident</td>
<td>10</td>
</tr>
<tr>
<td>Under investigation</td>
<td>1</td>
</tr>
<tr>
<td>Unknown</td>
<td>1</td>
</tr>
</tbody>
</table>

*From October 1, 2002 to December 31, 2004*
Why we care

• Diarrhea
  • ETEC/EHEC
  • Salmonella
  • Viruses (noro, rota)
  • Parasites (giardia . . .)

• RTI
  • Influenza
  • S. Pneumo
  • TB

• STD
  • Gonorrhea/chamydia
  • Syphilis
  • HIV
Why we care

- Diarrhea
- RTI
- STD
- Other

• ETEC/EHEC
  • Salmonella
  • Viruses (noro, rota)
  • Parasties (giardia . . .)

• Influenza
• S. Pneumo
• TB

• Gonorrhea/chamydia
• Syphilis
• HIV

• MDR Organisms

Red indicates illnesses with IC implications
• MDR organisms:
  – Carbapenemases
  – Acinetobacter
  – S. pneumonia
  – S. typhi
  – Tuberculosis
  – Gonorrhea
  – Malaria
  – Hemorrhagic fever

Organisms in red will be discussed extensively
Planning
Always be a step higher than others
But first: MDR threats without IC implications

- Malaria
- Typhoid
- Gonococcus
MDR Malaria

- No IC implications
- 500,000 deaths /yr
- Mostly children
- Hard to test
- Combination therapy
- R to ACT present
- Poor quality
- Partial therapy
• Most common:
  – Travellers to Indian Subcontinent 45-50%
  – Travellers Visiting Friends and Relatives (VFRs) 40%
• Vaccine available
• MDR S. typhi 0→35% (1965-1997)
• MDR S. paratyphi 9→25% (1999-2000)
• New quinolone resistance
• No IC implications,
• public health for food handlers
MDR Gonorrhea

- 1940s R to sulfonamide
- 1980s R to tetracycline
- 1997 R to quinolones
- 2012 increasing R to 3rd Gen cephalosporins
- 1 class for Rx

n engl j med 366;6
Infection control concerns

- Acinetobacter
- Carbapenemases
- Tuberculosis
- Hemorrhagic fever
MDR Acinetobacter

- Global attention during Gulf War II
- Multiple infections from injured soldiers
- Traced to field hospitals in Iraq
- Found in intermediate hospital Germany
- Resistant to most antibiotics
- Resulting infections:
  - Ventilator associated pneumonia
  - Complicated skin and soft tissue infections (wounds)
  - Urinary tract infections
  - Bacteremia
Acinetobacter isolates resistant to carbapenems

Carbapenemases (credit to M. Mulvey)

- Multiple different “flavours”
  - NDM-1 ➔ Indian subcontinent
  - KPC ➔ eastern USA, Israel, Greece
  - OXA-48 ➔ Mediterranean, Europe
- Laboratory detection difficult
- Treatment not clear, can be pan-resistant
- Outbreaks can occur “under the radar”
Global Spread of KPCs

Nordmann et al. 2011. EID 17:1791-1798
Global spread of NDM-1

NDM-1 as a part of the environment

Lancet 11 (May 2011)
Screening for MDR GNRs - recommendations

INDECISION

THE MARK OF THE LEADER IS THE ABILITY TO MAKE DECISIONS.
THE MARK OF THE SURVIVOR IS KNOWING WHEN NOT TO.
Screening for MDR-GNRs - VCH policy

• Anybody admitted to a foreign hospital (6 months)
• Anybody at the discretion of IC
• Screen peri-rectal, wounds, (urine, sputum)*
• [Would also be screened for MRSA, VRE]
• Ventilated patients on droplet† & contact until neg
• Non-ventilated on contact until neg
• Isolation cleans
• Limit movement as much as possible

• ?Can we ever remove flag

*= if instrumented, †= at VGH airborne for administrative reasons
Plus ça change . . .

Public Health Poster from the 1920s
MDR TB

- 440,000 new cases of multidrug-resistant tuberculosis (MDR-TB) emerge annually, causing at least 150,000 deaths (WHO data)
The New Challenge

Fig. 1. Prevalence of multidrug-resistant tuberculosis (MDR-TB) in the ten countries or areas where it is most prevalent

Source: http://www.who.int/bulletin/volumes/85/5/06-035345/en/index.html
Mortality of ~40%
PROBLEMS

No matter how great and destructive your problems may seem now, remember, you’ve probably only seen the tip of them.
To the Editor—Three years after extensively drug-resistant (XDR) tuberculosis was first described in 2006, Velayati et al. [1] drew attention to the emergence of totally drug-resistant (TDR) tuberculosis in a cohort of 15 patients from Iran, unresponsive to all first- and second-line drugs. These first cases of XDR tuberculosis were reported from the P. D. Hinduja National Hospital and Medical Centre [2], physicians here have dealt with increasingly resistant strains. We describe the first patient with TDR tuberculosis.

Drug susceptibility testing (DST) was performed at the laboratory of the跳出 hospital, the National Institute for the Control of Pharmaceutical and Biological Products (NIBP), and accredited by the World Health Organization. The patient had been treated for 3 months with a combination of clofazimine, rifampicin, and ethambutol, with no improvement. DST revealed resistance to all first-line and second-line drugs, including aminoglycosides, fluoroquinolones, and injectable agents. The patient was started on a regimen of isoniazid, pyrazinamide, and ethionamide, with a marked improvement in clinical symptoms within 2 weeks.

We discuss the importance of early detection and appropriate treatment of TDR tuberculosis to prevent the spread of drug-resistant strains. Continued surveillance and research are necessary to address this emerging public health challenge.


Recognizing resistant TB

- Bottom line: Lab testing -- >6 wks*
- Risk factors:
  - Travel to area with high risk
  - Contact with somebody with known MDR-TB
  - Previous treatment (especially non-standard)
- Increases need to isolate immediately!
- Remain aware of world epidemiology

* = newer technologies may improve this
Africa's most wanted

[Image of a wanted poster with a text box containing the number 187-73377-247]
Hemorrhagic fevers (viral)

- Multiple flavours
- Arboviruses:
  - Dengue
  - Yellow Fever
  - CCHF
  - RVF
- Vectors (not arthropods)
  - Hantavirus (and similar)
- Non-vector borne
  - Ebola
  - Marburg
  - Lassa
The most feared...

ANATIDAEPHOBIA
The fear that somewhere, somehow, a duck is watching you.
IC approach

Immediately:
- Airborne, contact, droplet
- Secured room
- Record HCP who enter
- Notify PH

Later:
- Identify risk factors
- Identify likely diagnosis
- Confirm diagnosis
- Assess IC measures based on diagnosis
Differences in IC Here vs. There

Here
- Full level 3 garb
- N95 mask
- Visor
- Or PAPR

There
- Head covering
- goggles
- Re-usable mask
- Gloves
- Rubber boots
- Rubber Apron
- Surgical gown
<table>
<thead>
<tr>
<th>Dengue, Yellow Fever</th>
<th>Lassa, CCHF, RVF, Hantavirus</th>
<th>Ebola, Marburg</th>
</tr>
</thead>
<tbody>
<tr>
<td>None required, care with needles and specimens for lab</td>
<td>Contact, droplet, avoid needle sticks, clinical specimens to be handled in hood</td>
<td>Contact, droplet, double gloves, leg/shoe coverings, impermeable gowns, avoid needle sticks, clinical specimens to be handled in hood</td>
</tr>
</tbody>
</table>
Do you think she’ll get bird flu?

• Not going to talk about Influenza . . .

• Worth a couple of hours on its own

• Isolate anybody with respiratory symptoms . . .

• Assume the worst
What are your priorities?

PRIORITIES

Hundreds of years from now, it will not matter what my bank account was, the sort of house I lived in, or the kind of car I drove... but the world may be different because I did something so bafflingly crazy that my ruins become a tourist attraction.
Priorities

- Identify what is LIKELY
- Identify what would have a high IMPACT
- Involve your FRONT LINE
- Pay attention to THE WORLD:
  - ProMED mail
  - Gideon
  - Other services.
I will not ask dumb questions
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