HOT TOPICS from CISTM16
June 5-9th, 2019
Arrivals by world region

The first visualisation shows how tourist arrivals have increased since shortly after the Second World War in 1950. The United Nations World Tourism Organization (UNWTO) estimates that internationally there were just 25 million tourist arrivals in 1950. 68 years later this number has increased to 1.4 billion international arrivals per year. This is a 56-fold increase.
Climate change

- Voluntary migrations
- Forced displacements
- Tourism & Travel
- Migrants more at risk of communicable and non-communicable diseases
- Migration ≠ driver of communicable disease outbreaks
Air pollution

Incorporate consideration of air quality, especially if underlying comorbidity
C. Sanford ‘Every breath you take’

A problem in both low- and high-income nations.

- Over 90% of deaths related to air pollution occur in low-income nations.

India, China

- India and China account for over 50% of deaths due to air pollution.
- Of the 25 cities with the worst air pollution, 20 are in India.

Increasingly, travelers are visiting regions with significant air pollution.

- 2017: 1.32 billion tourist arrivals globally

<table>
<thead>
<tr>
<th>International Tourist Arrivals</th>
<th>1990</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>435 million</td>
<td>1.186 billion</td>
</tr>
<tr>
<td>Advanced economies</td>
<td>299 million</td>
<td>653 million</td>
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<tr>
<td>Emerging economies</td>
<td>136 million (31%)</td>
<td>533 million (45%)</td>
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</tbody>
</table>

--UNWTO 2016
Health effects of air pollution

- Stroke
- Sudden death
- Heart disease
- COPD
- Asthma
- Lung cancers and other cancers
Prevention?

Masks? No recommendation

Awareness

Apps exist to adjust activities
D. LaBeaud ‘Climate change and the ecology of vector-borne diseases’

“Warmer is sicker”

RISK OF MALARIA TRANSMISSION will have risen in many parts of the world by 2020 (relative to the average risk in the years 1961 to 1990), according to projections assuming a temperature increase of about two degrees Fahrenheit. The analysis was based solely on temperature threshold and did not assess other factors that could influence malaria’s spread.

Epstein 20C
Climate change will shift burden of malaria
Reproductive Number Curves for Malaria and Dengue Virus

Climate change may drive a shift from *malaria* to *dengue* in Africa.

Will climate change shift disease burden across the world?

Transmission rate vs Temperature (°C)

- WNV / Cx. tarsalis
- RVFV / Cx. pipiens
- WNV / Cx. tarsalis
- SLEV / Cx. tarsalis
- WNV / Cx. quinque
- WNV / Cx. pipiens
- Malaria Anopheles
- DENV / Ae. aegypti
- DENV / Cx. quinque
- ZIKV / Ae. aegypti

Challenges FOR the world

- Non-immune populations
- Widespread competent mosquito vectors
- No rapid local testing currently
- Limited physician knowledge and clinical suspicion
- Poor diagnostics
- No treatments or vaccines

Japanese Encephalitis (JE): to vaccinate or not?
Usual rule in Travel Medicine

General traveler risk = 1/1-10 000 000
Propose vaccine only if travel >30 days in rural areas in at risk-season

Lancet Neurology 2015
Expansion of JE areas

< climate change
< economic development
< agricultural change
< urbanisation of rural areas
< increased migration to cities
leading to ...

→ Blurring of boundaries of rural areas where natural enzootic cycle exists
→ Expanding of urban areas
JE in travelers 1992-2013 (N=14)
JE vaccine
Pros and Cons

• Tolerance and safety
• Convenience
• Efficacy, effectiveness
• No accurate data about risk for travelers
• Risk for death/sequelae
• Most effective way of prevention

• No accurate data about risk for travelers
• Lots of asymptomatic forms
• Price
Why *not* immunize?

The Decision to Recommend *ANY* Travel Vaccine

What factors should be considered when deciding *not* to immunize?

- Risk of disease is low
- Vaccine is too risky
- Vaccine is too costly (not the same as "cost effective")
- Vaccine is of limited effectiveness
- Vaccine effectiveness relies on inconvenient dosing
- Competition with other pre-travel vaccine recommendations
World Health Organization (WHO) states:

- Even if the number of JE-confirmed cases is low, vaccination should be considered when the environment is suitable for JE virus transmission, and that there is little evidence to support JE reduction disease burden from interventions other than human vaccination.
World Health Organization

At least inform the traveler and propose vaccination!
Examination of the evidence

Use of compression socks to prevent DVT: NO

Doxy wkly for prevention of leptospirosis: YES

Hygiene to reduce TD occurrence: NO

Use of insect repellents to reduce the risk of malaria: YES

Screening for latent TB in traveler: NO
Older travelers

• 5-30% travelers >60 years old
• Different profiles of vaccine response and vaccine AE
• Risk of health pb during travel:
  ↓ if higher education, travelling with partner
  ↑ if longer duration, travel experience
• Documented increased risk for Influenza, pneumonia, Zoster
Reduced antibody responses to all antigens

Young cells die and memory cells survive →
difficulty to respond to a new vaccine

< decreased response to Ag
< decreased neutros function
< increased damage
< increased time to recover
Lack of studies especially for travel vaccines in the elderly

- Hep A vaccine: response vaccine delayed and decreased in older adults (65%-97%) \(\Rightarrow\) 2 doses before travel
- YFever, Imojev\(^\circledR\) and rabies: excellent immunogenicity
- Ixiaro\(^\circledR\): \(>65\) y \(\Rightarrow\) 65% efficacy
- Hepatitis B 65% > 65y after 3 doses (98% à 20 ans)
- Measles: benefit of age but lose Ab quicker if immunized later
- Typhoid: CRF 36%- no data >55 y

- Think *S. pneumoniae* vaccine if RF, mass gathering
- Think Pertussis if >10 years
Can we improve response to vaccines?

- Quality of antigen
  - Improvements are possible (conjugate versus pure polysaccharides), but some antigens are just better than others.

- Quantity of antigen
  - Larger doses of antigen, but not more frequent administration, may be beneficial

- Uptake of antigen
  - Adjuvants appear to increase immune response and may be beneficial
Thank you for your attention!