Objectives

At the end of this presentation, the participant will be able to:
1. Identify which travellers will benefit from post-travel screening
2. Obtain a relevant post-travel history and physical exam
3. Choose appropriate routine and individualized post-travel screening tests

Why

- To determine who is at risk of asymptomatic travel-related infections with potentially significant health impact
- No clear evidence for cost/benefit

Who should have post-travel screening?

1. All travellers to tropical destinations
2. All travellers who become ill during international travel
3. All adventure travellers
4. All travellers who have spent 3 or more months in a low/middle income country

WHO recommendations for post-travel assessment, 2012

- Return with a fever from a malaria-endemic country
- Have a chronic disease, such as cardiovascular disease, diabetes mellitus, or chronic respiratory disease or have been taking anticoagulants
- Experience illness in the weeks following their return home, particularly if fever, persistent diarrhoea, vomiting, jaundice, urinary disorders, skin disease or genital infection occurs
- Received treatment for malaria while travelling
- May have been exposed to a serious infectious disease while travelling;
- Have spent more than 3 months in a developing country

http://www.who.int/ith/precautions/medical_examination/en/
Those at increased potential risk of exposure to travel-related infectious diseases
- Demographic/personal factors
- Travel characteristics

Groups of travellers
- Asymptomatic short-term traveler
- Asymptomatic long-term traveler or expatriate
- Asymptomatic adventurous traveller
- Travellers presenting with self-identified risk factors and/or disease symptoms during travel

Asymptomatic short-term traveler
- Professional corporate travellers – post-travel assessment may be mandatory
- Consider for short term travelers with a chronic health condition whose symptoms can be confused with those of a travel-related illness

Asymptomatic long-term traveler or expatriate
- Assess the magnitude and impact of the risk
- Increased risk of exposure to
  - Air-borne diseases
  - Arthropod-borne diseases
  - Water-borne infections
  - Soil transmitted helminth infections
  - Food-borne parasites
  - STIs

Asymptomatic “adventurous” travellers
- More likely to adopt a local lifestyle
- Local eating habits
  - Exotic foods, unusual ingredients
  - Raw/undercooked meat and fish
  - Unpurified water
  - Unpasteurized dairy products
- Additional exposures
  - Fresh water contact
  - Bat-infested caves
  - Game parks with tsetse flies
  - Equatorial forests
  - Marine environments

Travellers presenting with self-identified risk factors and or disease symptoms during travel
- Concern for long term impact
- Confirmation of diagnosis
- Concern for risk during later travel
- Concern for transmission of infection to others
  - Airborne
  - Fecal-oral transmission
  - STIs
When is the best time for post-travel screening?

1. 1-2 weeks post-travel
2. One month post-travel
3. Three months post-travel
4. Six months post-travel

Not clear evidence for the best timing of post-travel screening

Must understand the pre-patent period: time from infection to laboratory diagnosis

Consider (second) assessment about 3 months post-travel

Opportunity to advise regarding
  - Possible future symptoms
  - Need for assessment if febrile or ill

Where

- Depends on travel itinerary
- Assessment by a knowledgeable health care provider (specialist centre) who understands
  - Destination and exposure specific risks
  - Pre-patent and incubation periods
  - Sensitivity and specificity of lab tests

Which infection can occur after eating “drunken crabs?”

1. Anisakiasis
2. Paragonimiasis
3. Gnathostomiasis
4. Clonorchiasis

Drunken crabs

“This dish, made by marinating the hairy crab in yellow rice wine, stands out with aroma of the wine and tastiness of the crab setting off each other... Owing to the cold nature of the hairy crab, ginger tea is usually needed to warm the stomach after one eats the crab. Attention should also be paid to the order of eating different parts of a crab... Eating the shell first might compromise deliciousness of the meat from crab claws. Accordingly, the best should go the last.”

http://www.cultural-china.com/ch/whtimeline/Kaleidoscope279/lye5315.htm
What is the most important component of post-travel screening?

1. A thorough physical exam
2. A good travel history
3. Serology for parasitic infections
4. CBC with eosinophil count

How

- Medical (travel) history is most important
  - Assess potential exposures to travel-related infections (micro-epidemiology) and the magnitude and impact of risk
  - Can consider obtaining some information by questionnaire
- Physical exam
  - May be non-contributory
  - May be asymptomatic lymphadenopathy, hepatosplenomegaly (HSM), rashes, or undiagnosed hypertension, cardiac or pulmonary disorders

Post-travel screening questions – 1

<table>
<thead>
<tr>
<th>Personal characteristics</th>
<th>Age, gender, occupation, pre-existing health issues, personal risk profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic medical information</td>
<td>Weight change, tobacco, alcohol and drug use, medications, chronic diseases</td>
</tr>
<tr>
<td>Pre-travel preparation and adherence</td>
<td>Where and from whom advice sought, adherence</td>
</tr>
<tr>
<td>Vaccinations</td>
<td>TDP, hepatitis A and B, yellow fever, typhoid fever, meningococcus, Japanese encephalitis, other (rabies, tick-borne encephalitis)</td>
</tr>
<tr>
<td>Malaria precautions</td>
<td>Personal protective measures (PPM), drugs, dosage, duration, adherence</td>
</tr>
<tr>
<td>Reason for travel</td>
<td>Holiday, work, VFR, adventure sports, education, medical tourism</td>
</tr>
</tbody>
</table>

Post-travel screening questions – 2

| Travel details | Destination(s), itinerary, duration of stay, date of return, season, transport means, travel route, type of accommodation, altitude, safety risks |
| Environment exposures | Freshwater contact, caves, marine environment, forests, game parks/safari, soil contact |
| Food and water exposures | Raw/undercooked meat and fish, unusual ingredients, unpurified water, unpasteurized dairy products |
| Vector and animal exposures | PPM, bites or skin wounds during travel |
| STI and blood exposures | Sexual activities (protective measures, higher risk contacts), VDU, health care exposures (needles, trauma, transfusion) |
| Airborne risks | Contact with TB |

Specific exposure risks for tropical infectious diseases

<table>
<thead>
<tr>
<th>Exposure</th>
<th>Disease risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban environment</td>
<td>Dengue²³, leptospirosis</td>
</tr>
<tr>
<td>Freshwater contact</td>
<td>Schistosomiasis, leptospirosis</td>
</tr>
<tr>
<td>Estuaries, rivers (borders)</td>
<td>Soil-transmitted helminths, onchocerciasis, leishmaniasis, cutaneous lepra, visceral leprosy, West African trypanosomiasis¹</td>
</tr>
<tr>
<td>Tropical forests</td>
<td>Filariasis (blood), viral hemorrhagic fevers</td>
</tr>
<tr>
<td>Caves</td>
<td>Histoplasmosis, rabies</td>
</tr>
<tr>
<td>African game parks (tsetse flies)</td>
<td>East African trypanosomiasis¹</td>
</tr>
<tr>
<td>Tropical grass land (walking safaris)</td>
<td>Tick bite fever³, tsutsugamushi fever⁴</td>
</tr>
</tbody>
</table>

¹ Africa, ² Central and South America, ³ East Asia, ⁴ Mediterranean, ⁵ South America, ⁶ Mediterranean, ⁷ South America, ⁸ Mediterranean, ⁹ South America.
What tests should be included for all post-travel screening assessments?

1. CBC with eosinophil count
2. Chest x-ray
3. Targeted serologies
4. 1 and 3
5. 1, 2, and 3

What - specific screening

- Tuberculosis
  - Increased risk in long-term travellers and expats
    - 2.8 per 1000 person-months
  - Tuberculin skin test ± CXR if TST positive
- STIs
  - HIV, syphilis, gonorrhea, chlamydia, genital herpes, condylomata

- Blood exposures
  - HIV, syphilis, hepatitis B and C, American trypanosomiasis (for those at risk)
- Viral hepatitis
  - Hepatitis A
  - Hepatitis B
  - Hepatitis C

- Parasitic diseases
  - Schistosomiasis
  - Strongyloidiasis
  - Invasive amebiasis
  - Trypanosomiasis
  - Other intestinal parasites

Infection | Incubation Period | Diagnostic Procedure | Use of Test | Time since after (test for asymptomatic infection (no test in early phase))
---|---|---|---|---
Amebiasis | 1–6 days | Stool microscopy, stool antigen test | Serum antibody test | 2–4 years
Malaise (A. duodenale) | 1–3 days | Stool film, antigen test, serum antibody test | N/A | N/A
Malaise (E. histolytica) | 10–30 days | Stool film, (culture test) serum antibody test | Serum antibody test | 6 months
Typhoid | 1–4 days | Blood culture | Serum antibody test (Widal) | 1 month
Tuberculosis | >30 days | Tuberculin test | Asymptomatic infection | N/A
Schistosomiasis | 21–60 days | Serum antibody test, stool microscopy, urine, serum antibody test, urine | Serum antibody test, stool microscopy, urine, serum antibody test, urine | 1 year
Intestinal helminths | 3–60 days | Stool microscopy | N/A | 2 months
Filariasis (bancroftian) | ?–1 year | Serum antibody test | Serum antigen test | Up to 2 years

Modified from Field V. Travel Medicine, 2013.
Schistosomiasis

- Fresh water exposure

Causes
- Hematuria and urogenital disease
- Intestinal and liver fibrosis
- Growth and cognitive delays

Treatment: praziquantel

Global distribution of schistosomiasis

[Image of Schistosomiasis map]

Infection Incubation Period Diagnostic Procedure Use of Test Time Lapse After Which Asymptomatic Infection Becomes Very Unlikely

<table>
<thead>
<tr>
<th>Disease</th>
<th>Incubation Period</th>
<th>Diagnostic Procedure</th>
<th>Use of Test</th>
<th>Time Lapse After Which Asymptomatic Infection Becomes Very Unlikely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filariasis (Conclusion)</td>
<td>3–&gt;15 months</td>
<td>Serum antibody tests</td>
<td>a Cutaneous, ocular microfilaria</td>
<td>Active infection: screening</td>
</tr>
<tr>
<td>Active infection</td>
<td></td>
<td></td>
<td>a Exposure, active infection</td>
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<tr>
<td>Active infection</td>
<td></td>
<td></td>
<td>a 1–2 years</td>
<td></td>
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<tr>
<td>Filariasis (Loiasis)</td>
<td>&gt;12 months</td>
<td>Serum antibody tests</td>
<td>Microfilaremia</td>
<td>Active infection: confirmation</td>
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<tr>
<td>Active infection</td>
<td></td>
<td></td>
<td>a Exposure, active infection</td>
<td></td>
</tr>
<tr>
<td>Active infection</td>
<td></td>
<td></td>
<td>a 1–2 years</td>
<td></td>
</tr>
<tr>
<td>Strongyloidias</td>
<td>7–&gt;21 days</td>
<td>Serum antibody tests</td>
<td>a Stool microscopy</td>
<td>Active infection: screening</td>
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<tr>
<td>Active infection</td>
<td></td>
<td></td>
<td>a Exposure, active infection</td>
<td></td>
</tr>
<tr>
<td>Active infection</td>
<td></td>
<td></td>
<td>a 1 month*</td>
<td></td>
</tr>
<tr>
<td>HIV</td>
<td>14–&gt;90 days</td>
<td>Serum antigen/antibody</td>
<td>HIV-ELISA</td>
<td>Active infection: screening</td>
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<tr>
<td>Active infection</td>
<td></td>
<td>test</td>
<td>a HIV-WB</td>
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<tr>
<td>Active infection</td>
<td></td>
<td></td>
<td>a Active infection/disease</td>
<td></td>
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<tr>
<td>Syphilis</td>
<td>9–&gt;90 days</td>
<td>RPR and VDRL</td>
<td>TPHA, FTA</td>
<td>Active infection: screening</td>
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<td>Active infection</td>
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<td>a Active infection/disease</td>
<td></td>
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<tr>
<td>Active infection</td>
<td></td>
<td></td>
<td>a Confirmation: post-exposure, post-treatment</td>
<td></td>
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<tr>
<td>Hepatitis B</td>
<td>1 – 6 months</td>
<td>Serum antibody tests</td>
<td>a Active or latent infection/disease</td>
<td>Active infection: screening</td>
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<tr>
<td>Hepatitis C</td>
<td>2 weeks – 6 months</td>
<td>Serum antibody tests</td>
<td>a Active or latent infection/disease</td>
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<tr>
<td>Trypanosoma gambiaense</td>
<td>&gt;14 days</td>
<td>Serum antibody tests</td>
<td>Active infection</td>
<td>Active infection: screening</td>
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<td>a Exposure, active infection</td>
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<td>Active infection</td>
<td></td>
<td></td>
<td>a Chronically infected</td>
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<tr>
<td>Active infection</td>
<td></td>
<td></td>
<td>a To be followed until 6 months after possible exposure</td>
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<tr>
<td>Trypanosoma cruzi (Chagas’ disease)</td>
<td>&gt;14 days</td>
<td>Serum antibody tests</td>
<td>a Active or latent infection/disease</td>
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<tr>
<td>Visceral leishmaniasis</td>
<td>2 – 6 months</td>
<td>Serum antibody tests</td>
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Strongyloides

- Roundworm found in the tropics, subtropics and warm temperate regions
  - ~3-100 million infected
  - Among immigrants in the USA, up to 46% infected

Risks for acquisition
- Walking barefoot
- Contact with human waste
- Exposure to contaminated soil (farming, coal mining)

Clinical presentation
- Subclinical
- Acute infection
- Chronic infection
- Hyperinfection/disseminated
Key points

- A thorough travel medical history is the most important part of post-travel screening.
- Not all travellers need a post-travel examination.
- Travellers who are at increased risk of occult travel-related infections such as long-term travellers, expatriates and “adventurous” travellers should have post-travel screening.
- Only a few screening lab tests are required by all at-risk travellers with the remainder being individualized based on risk of exposures.

References