Vaccinations: The Three “Rs”

• **Routine**
  – National vaccination schedule
    • Childhood
    • Adult
      – Boosters
      – Funded influenza, pneumococcal, meningococcal

• **Required**
  – Yellow Fever
  – Meningococcal (Haj)
  – {Polio(Haj) and since 2014 to exit certain countries}

• **Recommended** for travel
The pre-travel consultation and Routine vaccines

- The pre travel consultation is an opportunity to ensure that the traveller is up to date for all routine vaccinations.
- **Update** these if any doubt regarding status
Not just vaccinating for this trip

- Many people make multiple trips over a lifetime
- The division between “travel vaccines” and “non-travel vaccines” is artificial
- The pre-travel consultation is also an opportunity to vaccinate for life
Scenario 1

• 30 year old (born 1986) travelling to Thailand for 10 days
• NZ-BKK-Phuket (3 days Phuket, 7 days Koh Samui)-BKK-NZ
Scenario 1

• What vaccine preventable diseases will he potentially be exposed to?
• What would you recommend he get cover for?
• What vaccines?
• How would you schedule them?
What vaccine preventable diseases will he potentially be exposed to?

• Routine: Those on National immunisation schedule
  – Possibly only had one measles/missed MMR
  – Should have had Hep B pre-school
  – Last scheduled tetanus > 10 years ago
• Nil Required
• In addition
  – Influenza
  – Hepatitis A
  – Typhoid
  – Japanese encephalitis
  – Rabies
  – Cholera
  – Travellers diarrhoea
  – Varicella (ask about previous disease)
  – Meningococcal
What would you recommend he get cover for & Which Vaccines?

- Measles and Mumps (*MMR*)
- Tetanus (*ADT, TDaP*)
- Influenza (*What ever brand I have in the fridge, Quadrivalent*)
- Hepatitis A (*Havrix, Avaxim*)
Scenario 1

<table>
<thead>
<tr>
<th></th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaxigrip 0.5ml sc</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boostrix 0.5ml im</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avaxim 0.5ml im</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMR 0.5ml sc</td>
<td>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In addition:
- Discuss rabies risk and rabies post-exposure prophylaxis
- Discuss risk of Japanese encephalitis & importance of avoiding mosquito bites
Rabies, countries or areas at risk

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: WHO Control of Neglected Tropical Diseases (NTD)
Map Production: Health Statistics and Information Systems (HSI)
World Health Organization

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Who needs rabies pre exposure vaccination?

• All travellers to rabies endemic countries should be “rabies aware”

• Vaccinate:
  – Long term travellers
  – Remote areas
  – Those at increased risk of mammal bites e.g. cyclist
  – Occupational risk
  – Anyone who wants to pay for it
Rabies Pre Exposure Vaccination (PreP)

- Verorab 0.5ml im
  - 3 doses
    - Day 0, 7, 21-28
  - Licensed in NZ in 2011
  - Can be given intraderamally (off licence) same schedule. But should only be doing this if:
    - Experienced in ID admin
    - Can use up reconstituted vial
    - Follow up with serology?
    - Informed consent
Advantages of Rabies Pre exposure vaccination

- **Need for RIG eliminated** (Human RIG often unavailable in destinations where needed most)
- **Post exposure vaccine reduced** to 2 (vs 5)
- **Treatment period reduced** from 28 days to 3 days (ie avoid all the difficulties arranging travel around 0,3,7,14,28 days)
- **Increases the chance of protection if PEP delayed**
- **Possible protection against unnoticed or unreported exposure**
- **If treatment becomes necessary then overall cost reduced** ($1000 vs $4000)
- **Decreases or eliminates chance of post exposure treatment failure due to mistakes.**
- **Reduces travellers’ (who usually can afford pre-exposure vaccination) reliance on RIG, leaving this scarce resource available for those who have less opportunity for pre-exposure vaccination.**
Rabies Post Exposure Prophylaxis (PEP)

• If no pre exposure vaccination
  – 4-5 doses of rabies vaccine on days 0, 3, 7, 14 +/- 28 AND
  – Rabies immunoglobulin 20 IU/kg as much as possible infiltrated in/around the bite.

• If had pre exposure vaccination, then requires only 2 doses vaccine on day 0 and 3.
Japanese encephalitis

- Mosquito borne flavivirus
- Four genotypes, genotype 3 most widely spread
- Vector: *Culex* mosquitoes (mainly *C. tritaeniorhynchus*). Rural dwelling & night biting
- Distribution: South/South east Asia and Asia/Pacific rim
- Seasonal variance, highest rates during/after wet season
Japanese encephalitis: Life Cycle

Mosquito bites a bird & picks up the JE virus

Infected mosquito bites animals & passes the JE virus

Virus multiplies inside body cells

Infected mosquito bites a bird & passes on the virus

Mosquito bites infected animal & pick up the JE virus

Infected mosquito bites humans & non-host animals who are unable to pass on the virus
Risk for JE by country

• See Table 3-07 in CDC chapter

• Overall risk to travellers is low
  – Often “one in a million” quoted
  – But potentially high consequence
Japanese encephalitis: the disease

- Likely the bulk of infection (99%) asymptomatic or mild
- In endemic countries predominantly a disease of children
- Of those that present with acute disease, it is often quoted that approximately 30% die, 30% survive and 30% left with permanent neurological disease
- Burden of disease is primarily in neurological sequelae
Guidelines for pre-travel JE vaccination*

- **Advise** all travellers to endemic regions of risk
- **Recommend** vaccination for
  - All expatriates
  - Repeat travellers
  - Any prolonged duration of stay
  - Any rural travel
  - Those wanting max. protection
- **Consider** vaccination for
  - Those with greater outdoor exposure
  - >50yrs and <10yrs
  - Chronic conditions
    - Solid organ transplant
    - Cochlear implants, CNS shunts, CSF leakage
    - Hypertension
    - Diabetes
    - Renal disease
    - Anti-TNF therapy
    - CCR5Delta32 deficiency

*Burchard et al. Expert Opinion on Vaccination of Travelers Against JE. JTM 2009;16:204-216*
Japanese encephalitis vaccines for travellers

- Jespect® in Australia & NZ (Ixiaro® in rest of world)
  - New vaccine, verocell, well tolerated
  - Licensed in NZ in 2013
  - 2 dose 28 days apart, 0.5ml im
  - 18 yrs + in Australia and NZ
- Expensive: Jespect® retails around $300/dose
Jespect®: Use in Children

• Based on data from Filipino and Indian children and fact that it is licensed for use in children from 2m of age in Europe and the USA

• We are using in children in NZ off license with informed consent
  – 2m-3y half dose
  – 3yr+ adult dose
Jespect®: Boosters after primary series of Jespect®?

- NZ Medsafe datasheet “silent”
- USA: A single booster dose can be given 12 months after completion of primary series
- Recent data suggests at least further 6 years cover after 1st booster
  - But no-one licencing as such yet
Jespect®: Recent updates

- Can Jespect® be used to boost a primary series of the old JeVax®?
  - Yes
  - But off licence
Japanese encephalitis vaccine: On the horizon

- New Vaccine: Imojev®
  - Live attenuated
  - Single 0.5ml sc dose
  - 12 months and older
  - Licensed in Australia
  - Seroconversion data at least equivalent to JE-Vax
  - Awaiting outcomes of long-term immunogenicity trials.
  - Unlikely to be available in NZ any time soon as it is classified as a genetically modified organism but currently filing for exemption
Scenario 2

- A 32 year old female (born 1984) planning 6m backpacking South East Asia, India and Nepal
  - Loose itinerary
What vaccine preventable diseases will she potentially be exposed to?

- Those on National immunisation schedule
  - Possibly only had one measles/missed MMR
  - Should have had Hep B as part of school based catch-up
  - Last scheduled tetanus > 10 years ago
- Nil Required
- In addition
  - Influenza
  - Hepatitis A
  - Typhoid
  - Japanese encephalitis
  - Rabies
  - Cholera
  - Travellers diarrhoea
  - Varicella ((ask about previous disease))
  - Meningococcal
What would you recommend she get cover for & Which Vaccines?

- Measles and Mumps (MMR)
- Tetanus (ADT, TDaP)
- Influenza (What ever brand I have in the fridge, Quadrivalent)
- Hepatitis A (Havrix, Avaxim, Vivaxim, Hepatyrix)
- Typhoid (Typhim Vi, Typherix, Vivaxim, Hepatyrix)
- Rabies pre-exposure (Verorab)
Scenario 2

<table>
<thead>
<tr>
<th></th>
<th>V1 D0</th>
<th>V2 D7</th>
<th>V3 D21-28</th>
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<tr>
<td>Boostrix 0.5ml im</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Vivaxim 1.0ml im</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMR 0.5ml sc</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verorab 0.5ml im</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

In addition:
Would encourage Japanese Encephalitis vaccine, but ≈ $600
## Scenario 2

<table>
<thead>
<tr>
<th></th>
<th>V1 D0</th>
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<th>V3 D 28</th>
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<tr>
<td>Jespect 0.5ml im</td>
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</tr>
</tbody>
</table>
Scenario 3

• Couple, both 40 years old (born 1976) travelling to South America

• NZ-Santiago-Lima-Cusco (Inca Trail)-Puerto Maldonado-Cusco-Lake Titicaca-Puno-La Paz-Santiago-NZ
What vaccine preventable diseases will they potentially be exposed to?

• Those on National immunisation schedule
  – Almost certainly had only one measles at 15m, nil mumps
  – Possibly had Hep B as part of school based catch-up in late 80s
  – Last scheduled tetanus > 10 years ago
• Required: Yellow Fever
• In addition
  – Influenza
  – Hepatitis A
  – Typhoid
  – Rabies
  – Cholera
  – Travellers diarrhoea
  – Varicella (ask about previous disease)
  – Meningococcal
  – Yellow Fever
What would you recommend they get cover for & Which Vaccines?

- Measles and Mumps (*MMR*)
- Tetanus (*ADT, TDaP*)
- Influenza (*What ever brand I have in the fridge, Quadrivalent*)
- Hepatitis A (*Havrix, Avaxim, Vivaxim, Hepatyrix*)
- Hepatitis B (*HBVax*)
- Typhoid (*Typhim Vi, Typherix, Vivaxim, Hepatyrix*)
- Rabies pre-exposure (*Verorab*)
- Yellow Fever (*Stamaril*)
<table>
<thead>
<tr>
<th>V1 D0</th>
<th>V2 D7</th>
<th>V3 D21-28</th>
</tr>
</thead>
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<td>Vaxigrip 0.5ml sc</td>
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<tr>
<td>Boostrix 0.5ml im</td>
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<td>*</td>
</tr>
<tr>
<td>Vivaxim 1.0ml im</td>
<td>*</td>
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</tr>
<tr>
<td>MMR 0.5ml sc</td>
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</tr>
<tr>
<td>HBVax 1.0ml im</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>
Yellow Fever Vaccination Recommendations in Africa, 2015

Vaccination generally not recommended*
Vaccination recommended
Vaccination not recommended

*Yellow Fever (YF) vaccination is generally not recommended in areas where there is low potential for YF virus exposure. However, vaccination might be considered for a small subset of travelers to these areas who are at increased risk for exposure to YF virus because of prolonged travel, heavy exposure to mosquitoes, or inability to avoid mosquito bites. Consideration for vaccination of any traveler must take into account the traveler’s risk of being infected with YF virus, country entry requirements, and individual risk factors for serious vaccine-associated adverse events (e.g. age, immune status).
Yellow Fever Vaccination Recommendations in the Americas, 2013

Venezuela (Bolivarian Republic of)
Trinidad and Tobago
Guyana
Suriname
French Guyana
Panama
Colombia
Ecuador
Bolivia (Plurinominal State of)
Peru
Paraguay
Brazil
Argentina
Uruguay
Chile

Vaccine
- Vaccination recommended
- Vaccination generally not recommended*
- Vaccination not recommended

* Yellow Fever (YF) is generally not recommended in areas where there is low potential for YF exposure. However, vaccination might be considered for a small subset of travelers to these areas who are at increased risk for exposure to YF virus because of prolonged travel, heavy exposure to mosquitoes, or inability to avoid mosquito bites. Consideration for vaccination of any traveler must take into account the traveler’s risk of being infected with YF virus, country entry requirements, and individual risk factors for serious vaccine-associated adverse events (e.g., age, immune status).
Yellow fever Requirements

• **Required** by a number of countries for entry
  – Usually only if coming from a country that has areas with risk of YF transmission
    • Some require it for **all** in-coming travellers
  – Lower age limit/cut off varies
    • Some 12 m
    • Some 9 m
  – These and other variations might be printed on the WHO “country list”. See [http://www.who.int/ith/2015-ith-county-list.pdf?ua=1](http://www.who.int/ith/2015-ith-county-list.pdf?ua=1)
<table>
<thead>
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<th>Yellow fever</th>
<th>Country requirement</th>
<th>Yellow fever vaccine recommendation</th>
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</thead>
<tbody>
<tr>
<td><strong>ANGOLA</strong></td>
<td><strong>(2015)</strong></td>
<td>Required</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>MALARIA</strong></td>
<td><strong>(2015)</strong></td>
<td>Malaria risk</td>
<td>C</td>
</tr>
<tr>
<td><strong>ANGUILLA</strong></td>
<td><strong>(2015)</strong></td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>ANTIGUA AND BARBUDA</strong></td>
<td><strong>(2014)</strong></td>
<td>Country requirement: a yellow fever vaccination certificate is required for travellers over 1 year of age arriving from countries with risk of yellow fever transmission.</td>
<td>No</td>
</tr>
<tr>
<td><strong>ARGENTINA</strong></td>
<td><strong>(2015)</strong></td>
<td>No</td>
<td>Yes recommended for all travellers aged 9 months or over going to Corrientes and Misiones Provinces. Generally not recommended for travellers going to Formosa Province and designated areas of Chaco, Jujuy and Salta Provinces. Not recommended for travellers whose itineraries are limited to areas and provinces not listed above.</td>
</tr>
</tbody>
</table>
## ANNEX 1 – UPDATE – AS OF 4 FEBRUARY 2016

### Countries with risk of yellow fever transmission and countries requiring yellow fever vaccination

<table>
<thead>
<tr>
<th>Country</th>
<th>Country with risk of yellow fever transmission</th>
<th>Country requiring yellow fever vaccination for travellers&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Country statement on period of validity for yellow fever vaccination certificate&lt;sup&gt;3&lt;/sup&gt;</th>
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</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>Yes</td>
<td></td>
<td>Not communicated</td>
</tr>
<tr>
<td>Albania</td>
<td>Yes (≥ 1 year)</td>
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<td>Not communicated</td>
</tr>
<tr>
<td>Algeria</td>
<td>Yes (≥ 1 year)</td>
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<td>Life</td>
</tr>
<tr>
<td>Angola</td>
<td>Yes</td>
<td>Yes (≥ 9 months)</td>
<td>Life</td>
</tr>
<tr>
<td>Antigua and Barbuda</td>
<td>Yes (≥ 1 year)</td>
<td></td>
<td>Not communicated</td>
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<tr>
<td>Argentina</td>
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<td>Australia</td>
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<td>Bahamas</td>
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<td>Life</td>
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<tr>
<td>Bahrain</td>
<td>Yes (≥ 9 months)</td>
<td></td>
<td>Life</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>Yes (≥ 1 year)</td>
<td></td>
<td>Not communicated</td>
</tr>
</tbody>
</table>
Duration of protection?

• International Health Regulations (IHR) have long stated that YF certificate valid for maximum 10 years

• In 2013 the WHO SAGE group recommended that a single YF vaccine be considered to confer lifelong immunity & that for the purposes of country requirements a certificate should be deemed to be valid for life

• This change in the IHR comes into effect 11th July 2016
Yellow Fever vaccine: Weighing up the Risks and Benefits

Disease Protection

Adverse Events
New Zealand Yellow Fever Policy 2010

• Two step process
  – YF Vaccinator approval
  – YF Vaccination Center approval

• See:
Yellow Fever Approved Vaccinators

- International Health Regulations set international requirements
- In NZ IHR designated authority is DG Health
- Only designated **yellow fever vaccinators** are able to prescribe yellow fever vaccine AND only designated **yellow fever vaccination centres** can order/receive yellow fever vaccine.
- Designated vaccinators cannot transfer this to other medical practitioners or other sites.
- Only medical doctors are able to become designated vaccinators (prescribers).
  - PG qualification in Travel Medicine
  - Vocationally registered (GP, PH, Micro or ID)
  - Current pilot nurse prescribing
- See the NZ Ministry of Health website for more details.