Vaccine Preventable Diseases & Travel

General Principles

Pharmac  Travel Medicine
Briar K. Campbell
8th July 2016
Pre-Travel Consultation

- **Vaccinations**
  - Fitness to Fly Issues
  - Preventing travellers diarrhoea and food and water-borne illnesses.
  - Prevention of Vector-borne Diseases
    - Malaria
    - Dengue
    - Chikungunya
  - Sexual & Reproductive Health

- **Other Infectious Diseases**
  - Schistosomiasis
  - Activity specific advice
    - Altitude
    - Trekking
    - Scuba diving
  - Management of ongoing medical conditions
  - Psychological preparedness
  - Safety & Security Issues
  - Medical Kit
  - Post Travel visit
Travel Medicine & Vaccination

YOU WERE RIGHT...
People don't land on their feet...
Rationalising Travel Vaccines: Why is it such a challenge?

- **Quantifying the risk**
  - Traveller specific data often sketchy
    - The actual risk
      - Data outdated
      - Ethical constraints
    - The *effectiveness* of the intervention

- **Communicating the risk**

- **Risk perception and acceptable thresholds**
  - The authorities setting guidelines
  - The prescriber
  - The traveller

- **Cost**
  - A need to constantly balance *cost: benefit*

- **Guidelines**
  - Expert opinion/consensus
  - Need to reflect individual risk assessment
    - Need to be flexible
    - Often interpreted as vague
    - Become very generic
  - No magical list!
Rationalising Travel Vaccines

- **Host factors**
  - Demographics
  - Travelling hx
  - Medical hx
    - Ongoing medical conditions
    - Recent illness/hospitalisation
    - Medications
    - Vaccination hx
    - Allergies
    - DVT hx
    - Pregnancy/contraception
  - Frequency of travel
  - Financial considerations
  - Perception of risk

- **Environmental factors**
  - Destination (Macro & Micro)
    - Urban or Rural
    - Infrastructure, Political Stability
    - Medical Facilities
  - Reason & length of travel
    - VFR, Business, Holiday
    - Healthcare/Aid worker
  - Type of travel
    - Independent or organised
  - Planned activities
    - SCUBA, Trekking......
  - Seasonal Patterns
    - Monsoons, flood irrigation
  - Recent/Current disease activity
    - Measles, YF, Ross River, Zika

- **Departure date**
Rationalising Travel Vaccines

- **Consider:**
  - What vaccine preventable diseases will they be exposed to?
  - Which ones justify vaccination?
  - What are we trying to prevent
    - Death?
    - Symptomatic illness?
    - Asymptomatic infection?

- **Prioritise:**
  - Highly Recommend
    - must haves
  - Recommend
    - less important
Remember...

“Just because there is a vaccine available does not mean we have to give it”

Beware of over prescribing
WHO: Vaccinations- the three Rs

- **Routine**
  - National Immunisation Schedule
    - Childhood
    - Adult boosters
    - Influenza

- **Recommended**
  - Travel

- **Required**
  - Yellow Fever
  - Meningococcal
  - Polio
WHO Vaccination Guidelines – Routine

- Diphtheria
- Tetanus
- Pertussis
- Poliomyelitis
- Measles
- Mumps
- Rubella
- Varicella
- Haemophilus influenza type b
- Pneumococcal disease
- Hepatitis B
- Human papillomavirus
- Rotavirus
- Influenza
- Tuberculosis (BCG)*
## The National Immunisation Schedule

<table>
<thead>
<tr>
<th>Age</th>
<th>Disease to protect against</th>
<th>Vaccine</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 Weeks</td>
<td>Rotavirus (start first dose before 15 weeks)</td>
<td>RotaTeq* (oral)</td>
</tr>
<tr>
<td></td>
<td>Diphtheria + tetanus + whooping cough (pertussis) + polio + hepatitis B + Haemophilus influenzae type b (Hib)</td>
<td>INFANRIX* hexa</td>
</tr>
<tr>
<td></td>
<td>Pneumococcal disease</td>
<td>PREVENAR 13*</td>
</tr>
<tr>
<td>3 Months</td>
<td>Rotavirus</td>
<td>RotaTeq* (oral)</td>
</tr>
<tr>
<td></td>
<td>Diphtheria + tetanus + whooping cough + polio + hepatitis B + Haemophilus influenzae type b (Hib)</td>
<td>INFANRIX* hexa</td>
</tr>
<tr>
<td></td>
<td>Pneumococcal disease</td>
<td>PREVENAR 13*</td>
</tr>
<tr>
<td>5 Months</td>
<td>Rotavirus</td>
<td>RotaTeq* (oral)</td>
</tr>
<tr>
<td></td>
<td>Diphtheria + tetanus + whooping cough + polio + hepatitis B + Haemophilus influenzae type b (Hib)</td>
<td>INFANRIX* hexa</td>
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<tr>
<td></td>
<td>Pneumococcal disease</td>
<td>PREVENAR 13*</td>
</tr>
<tr>
<td>15 Months</td>
<td>Haemophilus influenzae type b (Hib)</td>
<td>Act-HIB*</td>
</tr>
<tr>
<td></td>
<td>Measles + mumps + rubella</td>
<td>M-M-R* II</td>
</tr>
<tr>
<td></td>
<td>Pneumococcal disease</td>
<td>PREVENAR 13*</td>
</tr>
<tr>
<td>4 Years</td>
<td>Diphtheria + tetanus + whooping cough + polio</td>
<td>INFANRIX* IPV</td>
</tr>
<tr>
<td></td>
<td>Measles + mumps + rubella</td>
<td>M-M-R* II</td>
</tr>
<tr>
<td>11 Years</td>
<td>Tetanus + diphtheria + whooping cough</td>
<td>BOOSTRIX*</td>
</tr>
<tr>
<td>12 Years</td>
<td>Human papillomavirus (HPV) (girls-only)</td>
<td>GARDASIL* (3 doses over 6 months)</td>
</tr>
<tr>
<td>45 Years</td>
<td>Tetanus + diphtheria</td>
<td>ADT® Booster</td>
</tr>
<tr>
<td>65 Years</td>
<td>Tetanus + diphtheria</td>
<td>ADT® Booster</td>
</tr>
<tr>
<td></td>
<td>Influenza</td>
<td>Given annually. Supplier varies</td>
</tr>
</tbody>
</table>
Need to be familiar with........

• National Immunisation Schedule

• Overseas schedules
  • Europe: [http://vaccineschedule.ecdc.europa.eu/Pages/Scheduler.aspx](http://vaccineschedule.ecdc.europa.eu/Pages/Scheduler.aspx)
  • USA: [http://www.cdc.gov/vaccines/schedules/easy-to-read/child.html](http://www.cdc.gov/vaccines/schedules/easy-to-read/child.html)

• Catch-up funded vaccines
  • Children up to 18th b’day
  • Adults (18+yrs), NZ resident or refugee

• Criteria for funded vaccines for at risk populations
  • Pre/Post Splenectomy & functional asplenia
    • Hib, Pnuemococcal & Meningococcal
  • MMR – recent outbreak

• IMAC/MOH recommendations for use of non-funded vaccines
  • 2014 Immunisation Handbook
WHO Vaccination Guidelines – Recommended

- Hepatitis A
- Typhoid Fever
- Cholera
- Japanese Encephalitis
- Meningococcal
- Rabies
- Tick-borne Encephalitis
- Yellow fever (personal protection)
WHO Vaccination Guidelines – Required

• International Health Regulations 2005
• Yellow fever (Public Health)
• Polio (near-cessation 2012-2013)
  • May 2014 public health emergency of international concern (PHEIC)
    • Pakistan, Afghanistan, Syrian Arab Republic, Iraq, Cameroon, Equatorial Guinea.....
  • Polio Eradication Initiative
    • http://www.polioeradication.org/Home.aspx
• Meningococcal Disease
The pre-travel consultation: Assessing Risk

Hazard + Exposure + Susceptibility

Individualised Risk Assessment

Risk Management/Health Promotion
Rationalising Travel Vaccines:
- The DJV Approach

- **STEP 1:** Identify the HAZARD: What vaccine preventable diseases will they be exposed to?
- **STEP 2:** What is their level of exposure? Which ones are a high enough risk to justify vaccination? **Susceptibility**? Does this person have a condition that increases the odds of infection/ severe disease?
- **STEP 3:** Make some **recommendations**
- **STEP 4:** **Negotiate** with the traveller
- **STEP 5:** Which vaccine (including brand) and when?
Selecting Appropriate Vaccination

• Opportunity to update/catch up any **routine** vaccinations relevant to NZ (life style & work)

• Risk assessment – **recommendation** should be based on epidemiology and specific risk of illness. What is the risk of exposure to vaccine preventable disease?

• Negotiation – costs, perception of risk considerations and travellers needs

• DJV approach ‘must haves’ versus ‘less important’

• Scheduling Challenges
Current estimates on vaccine-preventable disease incidence among Western travellers to tropical and subtropical destinations—absolute risk of disease/month of travel

Best value for money?

- What is the most commonly caught vaccine preventable disease of international travellers?

- Influenza*

Travel Vaccines: Practical points

• Prescription guidelines
  • CDC & WHO - NZ Interpretation

• Prescribing off license/label
  • Verorab© (ID)
  • Vivaxim© > 16 years
    • Avaxim© & Typhim Vi©
  • Jespect© > 18 years

• Check points
  • ‘Section 29’ – Q Fever, TBE
  • Hepatitis A & B
    • Twinrix© booster?
  • Hepatitis B (Engerix© HB-Vax©)
    • Accelerated schedules
    • Revaccination? Serology? (MMR)
YEAH / NAH
Hepatitis B

- Hep B – serology?
  - Cellular immunity persists even when anti-Hb levels drop below detectable levels. Specific immune memory > 20+ years
  - Not generally indicated for travellers

- Hep B - sero-conversion
  - Standard Schedule 96%
  - Rapid Schedule 65% - 76%
    - post booster @ 1 year 98%

- Hep B – boosters
  - Not generally recommended
  - Immunocompromised – serological monitoring if @ ongoing risk

- Hep B – hx of partial or non scheduled series
  - Avoid restarting course, instead complete the primary series
Hepatitis B vaccination in NZ

• 1988: Introduced for all new born (with catch-up programme for all pre-schoolers i.e. born after 1983)
• 1990: Extended to all school aged children
MMR vaccination in NZ

- 1970: **Rubella** all 4yr olds
  - 1979 girls only at age 11........
  - until MMR introduced 1990
- 1969: **Measles** vaccine at age 10m with catch-up for < 5yr
- 1990: **MMR** 12-15m (with second dose for 11yr from 1992)
- 2016: **MMR**
  - 15m & 4yr
MMR & Hepatitis B in 2016

• **Hepatitis B**
  - Age up to 28: 3 x Hep B vaccinations, so immune
  - Age 28 – 32: prob (pre-school catch-up programme)
  - Age 32 – 41: poss (catch up programme extended <16 yr)
  - Age 41+: likely non immune

• **MMR**
  - Age up to 28: 2 x MMR, so immune
  - Age 28 - 38*: prob 1 x MMR only so vaccinate
  - Age 38 - 47: prob 1 x measles only so vaccinate
  - Age 47+: prob naturally acquired immunity so immune

*♂ 28 - 38 may have missed out on rubella
Appendix 1: The history of immunisation in New Zealand

This appendix details the history of immunisation in New Zealand. Section A1.1 is a brief summary of when each vaccine was introduced to the National Immunisation Schedule (the Schedule). This summary includes vaccines which were initially introduced as targeted programmes for a defined population and were then added to the Schedule, and those vaccines which were introduced to the Schedule and then changed to targeted programmes. Section A1.2 shows the historical immunisation schedules for New Zealand. Section A1.3 provides detailed information about the history of the Schedule – this information was previously contained within the disease chapters of earlier editions of the Handbook.

A1.1 History of the schedule – summary tables

Table A1.1: Summary of when each vaccine was introduced to New Zealand

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Year the vaccine was introduced, plus comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diphtheria</td>
<td>1926 Becomes available in New Zealand for selected schools and orphanages.</td>
</tr>
<tr>
<td></td>
<td>1941 Offered routinely to children aged under 7 years. See DTwP for more information.</td>
</tr>
</tbody>
</table>
Prescribing, Scheduling & Administration

HEALTH ADVISORY: MEASLES

Measles spreads easily and can cause serious illness.

If you get fever and a rash in the next 3 weeks...

Call a doctor. Tell the doctor that you traveled.

For more information:
- Call 800-CDC-INFO (232-4636)
- Visit www.cdc.gov/travel

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention
Prescribing Vaccines for Travel

- Vaccines are prescription medications
- Need to follow best practice
- Need to fulfil legal requirements
- In NZ registered nurses who are authorised vaccinators can only independently prescribe & administer vaccines per the National Immunisation Schedule
  - Unless
    - Local Medical Officer of Health has approved other vaccines as part of a Local Immunisation Programme
  - Standing orders
Safe practice — vaccines are prescription medicines

Registered nurses place their nursing practice at risk each time they administer a vaccine without a prescription or standing order unless the registered nurse is an authorised vaccinator and is administering a specifically stated vaccine or vaccines for the purpose of an approved immunisation programme, for example the National Immunisation Schedule or a local immunisation programme approved by the Medical Officer of Health.

Registered nurses are required to administer medications within legislation, codes and scope of practice; and according to authorised prescription, established policy and guidelines.

- When a registered nurse IS NOT an authorised vaccinator
  - Every vaccine dose must be prescribed individually or with a standing order from a registered medical practitioner, nurse practitioner with prescribing rights or registered midwife

- When a registered nurse IS an authorised vaccinator
  - An authorised vaccinator can administer the specific vaccines covered by their authority without a prescription or standing order
  - Any other vaccine has to be prescribed individually or with standing order

A patient’s doctor may write "Needs hepatitis A and hepatitis B vaccines for travel" in the clinical notes. A registered nurse cannot use this clinical note to administer either a course of Twinrix® or a course of Havrix® and Engerix-B® vaccines, without a prescription. A prescription in the clinical notes needs to include the vaccine name, strength (where appropriate), dose, and frequency of dose administration.

Standing Order Guidelines have been developed by the Ministry of Health to assist issuers comply with regulatory requirements when developing and/or reviewing a standing order, and to assist people administering and/or supplying under standing orders. A copy of the Guidelines can be downloaded from the Ministry of Health website.

Non-Schedule vaccines that may be covered by a local immunisation programme approved by the Medical Officer of Health include influenza vaccine for healthy individuals aged under 65 years, vaccines to reduce occupational risk of acquiring disease, vaccines to protect travellers, and tetanus/diphtheria/pertussis vaccine for household contacts of new babies.
Prescribing, Scheduling & Administering Vaccines

- Electronic or Hard File
- 5 R’s
  - Right Drug (vaccine)
  - Right Dose
  - Right Route
  - Right Person
  - Right Date
    - For first and subsequent doses of multi-dose primary series of one vaccine
    - For doses of different vaccines
    - For boosters
Administration of Vaccines

• The maximum number of vaccines that can be given at one visit is:
  • One
  • Two
  • Four
  • Six
  • No limit
Administering Vaccines

• The preferred site of IM injections in adolescents/ adults is?
  Deltoid

• The preferred site of IM injections in infants <15m is?
  Vastus lateralis

• The preferred site of IM injections in infant >15m and children is?
  Vastus lateralis or Deltoid (immunisers assessment)
Administration of Vaccines

• The maximum number of injections that can be given into one muscle is:
  • One
  • Two
  • Four
  • Depends
Administering Vaccines

• Minimum 2cm apart
  • Ideal maximum 2 per side per visit
    • But may need to compromise in last minute traveller
  • Length of needle?
    • Ensure it gets into the muscle
• Angle of Injection to skin?
  • At 90 degrees Intramuscular
  • At 45 degrees for subcutaneous
• Need to aspirate?
  • No
• Ref: Immunisation Handbook 2014 Chapter 2
Administering Vaccines

- Skin preparation necessary?
  - No
  - If do use alcohol swab must wait 2 min before vaccinating

Ref: Immunisation Handbook 2014 Chapter 2
Administering Vaccines

• Interrupted primary series?
  • Complete remainder of primary series with minimum recommended time between subsequent doses
    • No need to re-start primary series
    • No problem if the time between doses is extended, but can affect vaccine effectiveness if shortened
Live Vaccinations

- Yellow Fever (Stamaril©)
- Measles, Mumps & Rubella (MMR©)
- Varicella (Varilax© or Varivax©)
- Bacille Calmette-Guerin (BCG©)
- Typhoid (Vivotif ©)*
- Rotovirus (Rotarix©)*

* Oral vaccines
Live vaccines

- Either on same day or 4 weeks apart
  - For parenteral and intra-nasal live vaccines
  - Not oral vaccines
    - Can commence oral typhoid capsules and Yellow Fever injection on same day
Scenario
Simon’s Same, Same but Different South East Asian adventure

• 34 year old
• 6/12 backpacking in SEA, China, India and Nepal
  • 1/12 organised tour 5/12 independent travel
Vaccination? Your Approach

- **Routine**
  - Always
    - Routine (NIS)
    - ?Required (YFV, Polio)

- **Recommended**
  - Nearly always
    - Tetanus & Diphtheria & Pertussis
    - Influenza
    - Hepatitis A

- **Often**
  - Typhoid
  - Hepatitis B

- **Sometimes**
  - Yellow fever
  - Meningitis
  - Rabies
  - Cholera
  - Japanese encephalitis
  - Pneumococcal
  - Polio
Same, same but different
Simon’s South East Asian adventure

• 34 year old ♂
• 6/12 backpacking in SEA, China, India and Nepal

• MMR
• Polio ???
• Tetanus, Diphtheria, Pertussis
• Hepatitis A
• Hepatitis B (catch up programme?)
• Influenza
• Typhoid
• Rabies
• Meningitis ACYW-135
• Japanese Encephalitis Vaccine

Will he want all of these?
What is your plan of attack?
Vaccines for Simon?

- **Routine:**
  - Did he get his childhood vaccines?
    - ADT scheduled booster at 45 years
  - Has he had chicken-pox/Varicella (the disease)?

- **Required:**
  - Nil

- **Recommended:**
  - AdTap (if > 10 years)
  - Influenza
  - Hepatitis A & Typhoid
  - MMR
  - Rabies

- **Discuss**
  - Polio
  - Hepatitis B (?prior vaccination)
  - ETEC (Dukoral®)
  - Meningococcal
Vaccines for Simon?

He agrees to:

- AdTaP
- Influenza
- Hepatitis A
- Hepatitis B
- MMR
- Rabies
- Typhoid
Vaccine scheduling

- Simon says yes to the following vaccines

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Visit 1</th>
<th>Visit 2</th>
<th>Visit 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMR 0.5 ml/SC</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>ADT/Boostrix/Polio 0.5 ml/IM</td>
<td>x</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Vaxigrip 0.5 ml/SC</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vivaxim 1.0 ml/IM</td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Engerix 1.0 ml/IM</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Verorab 0.5 ml/IM</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
### Vaccine scheduling

- Simon says yes to the following vaccines

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<td>ADT/Boostrix/Polio 0.5 ml/IM</td>
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<td>Vaxigrip 0.5 ml/SC</td>
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<td></td>
</tr>
<tr>
<td>Vivaxim 1.0 ml/IM</td>
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<td></td>
<td>X</td>
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<tr>
<td>Engerix 1.0 ml/IM</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Verorab 0.5 ml/IM</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Mencevax ACYW-135 0.5ml/SC</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Jespect 0.5ml/IM</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
International tamper proof seal
It’s a Wrap

Many vaccine preventable diseases, few absolute guidelines

Most vaccine preventable diseases are NOT destination specific

Strike the right balance. Just because there is a vaccine does not mean every traveller should get it

Requires individual risk assessment and then advise/prioritise which vaccinations will be beneficial for each specific traveller

Travel related vaccinations often prescribed off licence

Travel vaccines are NOT cheap, the cost to the traveller (or employer/aid agency) rapidly adds up