Vaccinating the Elderly and the Immunocompromised Travellers

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Disclosure Statement

Dr Ghesquiere has received honorarium payments from the following sponsors in the past:

- Presentations for CHE from Abbott, GSK, Merck, Pfizer, Roche, Sanofi-Pasteur,
Warning

Photos that follow may be disturbing!
A 38 year old male presents with septic shock within hours
Admitted to the ICU and dies the same day due to Pneumococcal sepsis and Purpura Fulminans
Splenectomy 15-20 years earlier
Wife was not aware he needed to be vaccinated to pneumococcus
Meningococcemia
Severe Outcome of Meningococcemia

Severe Late-Stage Meningococcal Infection in a 15-Year-Old Boy

Meningitis at Autopsy
Zoster: Cranial Involvement

I ophthalmic
II maxillary
III mandibular
Being Immunocompromised is like Battling a Storm
“The future of humanity and microbes will likely evolve as...episodes of our wits versus their genes.”

Nobel Laureate
Joshua Lederberg
Science 2000 288:287-93
Travel Trends

• Despite many setbacks in the past international travel has and will continue to increase.
• The leading edge of the Baby Boomers has hit age 60 years
• They will continue to influence travel as a “demographic bubble” through to 2026
• But there is an even larger bubble which is evolving.
Developing countries are spending more on tourism in other countries.

Although almost 80 percent of the world’s expenditure on tourism in other countries originated in high-income countries in 2006, developing countries’ share has been gradually rising. Developing countries’ expenditures on tourism in other countries nearly doubled between 2000 and 2006.
New and Emerging Infectious Diseases

Global Outbreak Alert & Response Network

The Global Outbreak Alert and Response Network (GOARN) is a technical collaboration of existing institutions and networks who pool human and technical resources for the rapid identification, confirmation and response to outbreaks of international importance. The Network provides an operational framework to link this expertise and skill to keep the international community constantly alert to the threat of outbreaks and ready to respond.
“The perfect is the enemy of the good.”

- Physicians and their patients should not be held hostage—we need new antibacterial drugs

--Voltaire
New Antibiotic Development is Drying Up

DECLINING ANTIBACTERIAL APPROVALS (PAST 25 YEARS)

1983-1987
1988-1992
1993-1997
1998-2002
2003-2007
2008-2009

Total # New Antibacterial Agents

Spellberg, CID 2004, Modified
Objectives

• To review life threatening and travel related infections which are vaccine preventable.
• To update and review which vaccines to use and which ones to avoid in the selected patient population.
• Elderly
• Asplenic
• Patients with liver disease
• Patients on Biological agents
• HIV
• Cancer and chemotherapy
What type of traveller will not be reviewed

- Pediatric
- Pregnant
- Post-op patients
- Multiple medical problems ie diabetes, COPD, CHF etc
- Disabled
The Nuts and Bolts

• This will be a clinically relevant presentation on topics that you will meet in your practice
How do we fit this in over 45 minutes?
Case Presentation

- A couple visit your clinic.
- They are going on a Cruise to S. America for 18 days. Leaving in 6 weeks.
- 64 year old male, has not seen a physician or clinic >10 years, BMI 35, smokes X 30 years, had his spleen out at age 30. Dx Hep C in 1997. He cannot recall the last vaccine he has had. Takes a PPI for GERD
- 62 year old female, has RA and is on Humira, a biological agent. Has IBS.
Immunizations for Adult Travellers

• Capitalizing on opportunities!
• This might be the patients first opportunity to see a health care professional in many years.
• Update the patients vaccines for travel and non-travel reasons
Vaccines and the Elderly
Vaccinating The Elderly

- Tetanus vaccine i.e. Td or consider the TdaP (acellular pertussis)
- Influenza vaccine
- Pneumococcal vaccine i.e. Pneumovax 23, ? Prevnar 13
- Herpes Zoster Vaccine for patients >60 years (FDA has just given the OK for 50 years of age)
The first time one of them sneezes, cut the rope...
Influenza Vaccine

• The most common cause of developing secondary bacterial pneumonia in the elderly.
Herpes Zoster

- Caused by reactivation of varicella zoster virus
- Vesicular rash in dermatomal distribution

Photo provided courtesy of Dr. Kenneth Schmader, Duke University and Durham VA Medical Centers
• ~ 15% of zoster cases involve the ophthalmic division of the trigeminal nerve

• Keratitis, conjunctivitis, scleritis, iritis, anterior uveitis, retinitis

• Without antiviral therapy, 50-70% of patients with HZO develop ocular complications

• Can result in chronic ocular complications and reduced vision, blindness

May Not Be Deadly But Harmful All The Same
Zoster Vaccine
Oxman et al NEJM 2005

• Study of 35,546 aged 60 years and older
  – Randomized, double-blind placebo controlled trial of Oka/Merck zoster vaccine
  – Median 3.12 years of surveillance

• Results:
  – Reduced incidence of zoster by 51.3%
  – Reduced incidence of PHN by 66.5%
  – Reduced incidence of prolonged PHN by 72.9%
  – When zoster occurred, of shorter duration and severity
ZOSTAVAX® [Zoster Vaccine Live (Oka/Merck)] Product Profile

- Live, attenuated varicella-zoster virus vaccine
- Minimum of 19,400 PFU* per dose
- No preservative
- Lyophilized product
- Same excipients as VARIVAX® [Varicella Virus Vaccine Live (Oka/Merck)]
- Single subcutaneous dose
Overall Efficacy of the Zoster Vaccine

25% = prespecified lower bound success criterion

- **Zoster**: 51.3%
- **PHN**: 66.5%
- **BOI**: 61.1%

Vaccine Efficacy (%)
<table>
<thead>
<tr>
<th>Age at Vaccination</th>
<th>60 yr</th>
<th>65 y</th>
<th>70 yr</th>
<th>75 yr</th>
<th>80 yr</th>
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</thead>
<tbody>
<tr>
<td>Case of HZ</td>
<td>13</td>
<td>15</td>
<td>20</td>
<td>32</td>
<td>64</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Waning Rate</th>
<th>8.3% per yr</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>27</td>
</tr>
</tbody>
</table>
# The AE Monitoring Substudy

<table>
<thead>
<tr>
<th>AE</th>
<th>Zoster Vaccine (N=3345) %</th>
<th>Placebo (N=3271) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injection Site</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Erythema*</td>
<td>35.8</td>
<td>7.0</td>
</tr>
<tr>
<td>Pain / tenderness*</td>
<td>34.5</td>
<td>8.5</td>
</tr>
<tr>
<td>Swelling*</td>
<td>26.2</td>
<td>4.5</td>
</tr>
<tr>
<td>Hematoma</td>
<td>1.6</td>
<td>1.4</td>
</tr>
<tr>
<td>Pruritus</td>
<td>7.1</td>
<td>1.0</td>
</tr>
<tr>
<td>Warmth</td>
<td>1.7</td>
<td>0.3</td>
</tr>
</tbody>
</table>
Cost Effectiveness of a Vaccine to Prevent Herpes Zoster and Post-herpetic Neuralgia in Older Adults
by Hornberger and Robertus

• “Vaccination would be more cost-effective in “younger” older adults (age 60-64 years) than in “older” older adults (age ≥ 70). Longer life expectancy and a higher level of vaccine efficacy offset a lower risk for herpes zoster in the younger group.”
The “Big Three” Take Home Points About the Shingles Vaccine “50/60/70”

1. 50% (51.3%) reduction in HZ
2. 60 years of age and older to receive the vaccine
3. 70% (66.5%) reduction in PHN
Shingles Vaccine Trial

- We are participating in a clinical trial evaluating the next generation HZ vaccine
- The clinical trial is available to patients 50 years of age and older
The Older Traveller

- Yellow Fever
- Japanese Encephalitis
One Sure Way to Make Your Hair Stand on End
Geographic Distribution of Yellow Fever

Maps Courtesy of Centers for Disease Control and Prevention
Yellow Fever Vaccine
Severe Adverse Events

• Two forms of rare severe adverse events have been recently described:
  – viscerotropic and neurologic
• All cases have occurred in first-time vaccinees
• Risk is greater in those age 60 and older
• Thymus disorders and thymectomy are risk factors for viscerotropic adverse events
Yellow Fever VAEs Conclusion

• Why increasing VAE?
  – ?genetic host susceptibility
  – ?more vaccine in older travellers
  – ?vaccine strain increasing virulence
  – ?enhanced reporting

• Risk of Yf far exceeds risk of Yf vaccine for travel to endemic/epidemic countries
Risk of SAE’s to the YF Vaccine

- 1.1/100,000 doses for age >60 years
- 3.2/100,000 doses for age >70 years
- But the risk of getting YF per traveller/week in certain destinations is difficult to quantify
“On the basis of the recent reports of adverse events in older travellers, already discussed, immunization in those ≥ 60 years of age should be carried out only after an individual risk assessment.”
## Table 2: Recommendations for the Use of Yellow Fever Vaccination

<table>
<thead>
<tr>
<th>Population</th>
<th>Recommendation on Pre-travel Vaccination</th>
<th>Strength of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy adult travellers (&lt; 60 years), travelling to an area where yellow fever is considered endemic</td>
<td>Recommended</td>
<td>A II</td>
</tr>
<tr>
<td>Healthy children (&gt; 9 months) travelling to an area where yellow fever is considered endemic</td>
<td>Recommended</td>
<td>A II</td>
</tr>
<tr>
<td>Persons with a life-threatening allergy to eggs or chicken</td>
<td>Not recommended</td>
<td>E III</td>
</tr>
<tr>
<td>Children less than 6 months of age</td>
<td>Not recommended</td>
<td>E II</td>
</tr>
<tr>
<td>Children between 6 and 9 months of age</td>
<td>Generally not recommended</td>
<td>DIII</td>
</tr>
<tr>
<td>Pregnant women</td>
<td>Generally not recommended *</td>
<td>DII</td>
</tr>
<tr>
<td>Breastfeeding women</td>
<td>Generally not recommended *</td>
<td>DII</td>
</tr>
<tr>
<td>Healthy adults over 60 years of age presenting for primary vaccination</td>
<td>Generally not recommended *</td>
<td>DII</td>
</tr>
<tr>
<td>Persons with a history of thymus disease, thymoma or myasthenia gravis</td>
<td>Generally not recommended *</td>
<td>DIII</td>
</tr>
<tr>
<td>Immuno-compromised individuals (lymphoma, HIV, immunosuppressive therapies)</td>
<td>Generally not recommended *</td>
<td>DII</td>
</tr>
</tbody>
</table>

* Although vaccination is generally not recommended, consideration for vaccination must be done on a case-by-case basis. If the person is travelling to a highly endemic or epidemic area where the risk of yellow fever is high, then the risks of vaccination may be outweighed by the risks of contracting the disease.
Should We Still Vaccinate?

- YES!
- Risk of wild type YF exceeds risk of vaccine for persons travelling to rural areas in zone of endemicity, to inland towns and cities or to urban areas sustaining outbreaks
- Problem – vagaries of virus defy prediction, difficult to accurately assess risk to individual traveller
What Else Can We Do?

- Mosquito precautions!
  - Daytime biters
  - Protective clothing
  - Repellents
  - Avoid outdoor exposure
Geographic distribution of Japanese Encephalitis

Geographic map of South East Asia indicating risk areas for Japanese Encephalitis including part of Australia, Brunei, Cambodia, part of China, part of India, Indonesia, Japan, North Korea, South Korea, Laos, Malaysia, part of Nepal, part of Pakistan, Papua New Guinea, Philippines, part of Russia, Singapore, Sri Lanka, Taiwan, Timor-Leste, Vietnam, and Western Pacific Islands of Guam and Saipan.
Japanese Encephalitis Vaccine & the Older Traveller

(But this was with the Older JE Vaccine)
CATMAT 2011

• **Age approved for:** IXIARO® is only approved for use in persons 18 years or older. This age-specific approval and the unavailability of JE-VAX®* creates a substantial problem in providing vaccine-induced protection for those under 18 years of age. There is currently no satisfactory solution for protection of persons under 18 years of age against JE.
Objectives

• To review life threatening and travel related infections which are vaccine preventable.
• To update and review which vaccines to use and which ones to avoid in the selected patient population.
  • Elderly
  • Asplenic
  • Patients with liver disease
  • Patients on Biological agents
  • HIV
  • Cancer and chemotherapy
Infections in Asplenic Patients

- Postsplenectomy Sepsis – PSS
- First described in 1952 of life threatening infections in infants after splenectomy
- Overwhelming postsplenectomy sepsis (OPSI) is well documented by illness evolving to death within one day.
- Asplenic patients are 600X more likely to develop OPSI
Causes of Asplenia

- Congenital – genetic predisposition
- Splenectomy – surgical removal
  - Trauma, malignancy, hypersplenism
  - Seeding of accessory spleens
- Functional Asplenia – spleen present, non-functional
Functional asplenia

Autoimmune Disease
PBC
SLE
Sjogrens

Intestinal Disorder
Coeliac disease
Crohn’s
UC

Haematological Disease
Sickle cell
Essential thrombocytopenia

Infiltrative Disease
Amyloid
Sarcoidosis

Neoplasia
Breast Cancer
Haematological malignancy

Miscellaneous
Alcoholism
BMT
TPN
Splenic Thrombosis
Newly Dx Hepatitis C Rates by Year, 2000-2009

<table>
<thead>
<tr>
<th>Year</th>
<th>BC Hepatitis C Reports</th>
<th>BC Hepatitis C Rate</th>
<th>Canadian Hepatitis C Rate*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>4353</td>
<td>107.8</td>
<td>57.8</td>
</tr>
<tr>
<td>2001</td>
<td>4276</td>
<td>104.9</td>
<td>54.1</td>
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<tr>
<td>2002</td>
<td>4436</td>
<td>108.2</td>
<td>50.8</td>
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<tr>
<td>2003</td>
<td>3612</td>
<td>87.5</td>
<td>46.5</td>
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<tr>
<td>2004</td>
<td>3086</td>
<td>74.3</td>
<td>45.0</td>
</tr>
<tr>
<td>2005</td>
<td>2875</td>
<td>68.5</td>
<td>43.2</td>
</tr>
<tr>
<td>2006</td>
<td>2932</td>
<td>69.1</td>
<td>39.2</td>
</tr>
<tr>
<td>2007</td>
<td>2901</td>
<td>67.3</td>
<td>38.5</td>
</tr>
<tr>
<td>2008</td>
<td>2500</td>
<td>57.1</td>
<td>40.0</td>
</tr>
<tr>
<td>2009</td>
<td>2444</td>
<td>54.9</td>
<td></td>
</tr>
</tbody>
</table>
The Underlying Causes of Splenic Deficiency in 688 Episodes of PSS

- Hodgkin's disease
- Spherocytosis
- Trauma
- Thalassemia
- ITP
- Portal hypertension
- Hyposplenism
- Incidental splenectomy

Percent total cases of PSS
Why Are These Patients at Risk?

- Asplenic or functional asplenia results in decrease in the production of opsonizing antibodies hence inability to clear encapsulated organism.

Pneumococcus Capsule
The Time Interval from Splenectomy to PSS - Postsplenectomy Sepsis
Microbial Pathogens of PSS

What organism should you watch out for:
1. Streptococcus pneumonia
2. Haemophilus influenzae
3. Neisseria meningitidis
4. Capnocytophaga canimorsus
5. Salmonella species
Complications

- Lifelong risk for Overwhelming Postsplenectomy infection (OPSNI)
  - Caused by *Streptococcus pneumoniae* and gram negative bacteria
  - Initial Symptoms: fever, chills, muscle aches, headache, vomiting, diarrhea, and abdominal pain
  - Progressive symptoms: bacteremic septic shock, extremity gangrene, convulsions, and coma
  - Mortality rate of 50-80%
    - from onset of initial symptoms, 68% of those deaths occur within 24 hours and 80% occur within 48 hours
  - Prevention: routine vaccinations and prophylactic antibiotics
Pneumococcal Meningitis in an Asplenic Patient

A 45 year old male. Splenectomy in 1991 for ITP. Died in the ICU three weeks after admission Feb 2010 of ischemic infarcts to the brain due to Pneumococcal meningitis.
Pneumococcal Pneumonia

- The most common bacterial cause of pneumonia in adults
- Effectively treated with antibiotics such as Penicillin, Cefuroxime, Ceftriaxone, Clarithromycin, Moxifloxacin and Levofloxacin
Infection Risk

• Susceptibility is greatest in older patients.

<table>
<thead>
<tr>
<th>Age (Years)</th>
<th>Infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-16</td>
<td>16.5%</td>
</tr>
<tr>
<td>17-29</td>
<td>12.9%</td>
</tr>
<tr>
<td>30-49</td>
<td>20.7%</td>
</tr>
<tr>
<td>50-59</td>
<td>23.1%</td>
</tr>
<tr>
<td>60-69</td>
<td>24.0%</td>
</tr>
<tr>
<td>70+</td>
<td>22.7%</td>
</tr>
</tbody>
</table>
Immunizations

Streptococcus pneumoniae

- Pneumovax 23 – to be given 2 weeks before or two weeks after splenectomy.
- Pneumovax 23 repeat q 5 years.
- Consider Conjugated pneumococcal vaccine such as Prevnar 13.
- So far the data is unclear if and how often you need to give this vaccine to adults.
Neisseria meningitidis

Characteristics:

- Gram negative diplococcus
- 18 serogroups
- Most common: A, B, C, Y, W-135
- Carried asymptomatically in the nasopharynx.
- Mean duration of carriage is 9 – 10 months
- 1/1000 to 1/5000 colonized persons develop invasive disease
**Neisseria meningitidis**

- **Characteristics:**
  - Transmitted via secretions or person-to-person contact
  - In high-risk populations (i.e. adolescents) in highly crowded environments, carriage rates can rise to as high as 30% (prisons, pilgrims, college dormitory, military recruits, sports teams)
Clinical Spectrum of Meningococcal Disease

- Asymptomatic carriage (10-20%)
- Occult bacteremia
- Meningitis
- Septicemia
- Focal infection
  - Pneumonia, septic arthritis, conjunctivitis, peritonitis, pericarditis
Clinical Presentations

- **Meningococcemia**
  - ~5% to 20% of cases
  - Rash
  - Vascular damage
  - Disseminated intravascular coagulation
  - Multi-organ failure
  - Shock
  
  **Up to 40% fatality rate**
Clinical Presentations

- **Meningitis**
  > 50% of cases
  - Fever and headache (flu-like symptoms)
  - Stiff neck
  - Nausea
  - Altered mental status
  - Seizures
  - Hearing loss

9-12% fatality rate
Meningococcal Disease (invasive) Rates by Age Group and Sex, 2009
NACI Statement April 2009: “High Risk” Indications for Meningitis Vaccination

• Anatomic or functional asplenia
• Complement & Primary antibody deficiencies
• Travellers, including pilgrims to the Hajj in Mecca
• Travellers to the meningitis belt in East Africa
• Work exposure to *N. meningitidis*
• Military recruits
• College/University Students
Current Meningococcal Vaccines

- **Menomune** is a polysaccharide vaccine covering: A, C, Y and W-135
  - Suitable for travel, high-risk populations, outbreaks
  - Not used for routine childhood immunization in Canada (not<2, poor <5 yrs)
  - For patients over 55 yrs. of age

- Conjugate vaccines currently used in routine childhood vaccine programs cover serogroup C disease
  - Menjugate (MenC conjugate vaccine)
  - Meningitec (MenC conjugate vaccine)
  - NeisVac-C (MenC conjugate vaccine)

- **Menactra** or **Menveo** are conjugate quadrivalent vaccines covering:
  - A, C, Y and W-135
  - Health Canada recommendation 2-55yrs for Menactra,
  - 10-55years for Menveo
Haemophilus influenzae type b (Hib), invasive Rates by Year, 2000-2009
Immunization Summary for Asplenic Patients

- Streptococcus pneumoniae q 5 years
- Haemophilus influenzae – Hib
- Neisseria meningitidis
- TdaP vaccine (Tetanus, diptheria and acellular pertusis)
- Influenzae
- Others: Hep A & B vaccine, HPV vaccine, Shingles vaccine
- There is no evidence that live virus vaccines cannot be given to these patients.
Special Cases

• Dog Bites
• Fever in asplenic children
• Parasitic infections
Case Presentation

• A 39 yo male presents to the ER with feeling unwell for 24 hours
• He presents with confusion and SOB
• He is mottled, hypotensive and in shock
• Wound on the lower leg due to a dog bite 5 days earlier. He had the wound cleaned and was given a tetanus shot in a clinic
• Otherwise was healthy.
Case Continued

- On exam LUQ abdominal scar.
- Partner states the patients spleen removed at age 12
- Patient dies 6 hours late of septic shock
- Blood cultures + for Capnocytophaga canimorsus
Asplenic and Dog Bites

- Isolated from saliva of dogs and cats
- Asplenic patients are at a very high risk of septic shock and death from dog bites
- Patients warrant antibiotic prophylaxis i.e. amoxil, Pen V, Doxycycline, Clindamycin, the same day as injury
- Asplenic patients should be informed to seek medical care STAT
Splenectomy & Other Infections

- Malaria
- Babesiosis
- Ehlichiosisis
- Bartonella
Summary

- Risk of post splenectomy sepsis low but carries high risk of death (50-80%)
- If patients are educated to seek attention immediately may be reduced to about 10%
- More than 50% who die do so within 48 hours of admission

Objectives

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• Asplenic
• Elderly
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• Patients on Biological agents
• HIV
• Cancer and chemotherapy
HIV Infected Patients and Vaccines

Inactivated Vaccines
- Td every 10 years
- Pneumococcal vaccine q 5 years
- Seasonal Influenza vaccine
- Hepatitis A and B
- Meningococcal
- **HPV** vaccine has not been recommended yet but it makes good clinical sense to consider this vaccine for this very high risk group.
HIV Rates by Year, 2000-2009

<table>
<thead>
<tr>
<th>Year</th>
<th>BC HIV Reports</th>
<th>BC HIV Rate</th>
<th>Canadian HIV Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>400</td>
<td>9.9</td>
<td>6.9</td>
</tr>
<tr>
<td>2001</td>
<td>420</td>
<td>10.3</td>
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<tr>
<td>2002</td>
<td>418</td>
<td>10.2</td>
<td>7.9</td>
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<tr>
<td>2003</td>
<td>408</td>
<td>9.9</td>
<td>7.8</td>
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<tr>
<td>2004</td>
<td>441</td>
<td>10.6</td>
<td>7.9</td>
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<tr>
<td>2005</td>
<td>400</td>
<td>9.5</td>
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<tr>
<td>2006</td>
<td>361</td>
<td>8.5</td>
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<tr>
<td>2007</td>
<td>391</td>
<td>9.1</td>
<td>7.8</td>
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<tr>
<td>2008</td>
<td>346</td>
<td>7.9</td>
<td>7.4</td>
</tr>
<tr>
<td>2009</td>
<td>338</td>
<td>7.6</td>
<td>7.9</td>
</tr>
</tbody>
</table>
HIV Infected Patients and Live Virus Vaccines

- You need to know the absolute CD4 lymphocyte count. If the CD4 < 200, then live virus vaccines are not recommended.
- MMR can be considered if CD4 > 200
- Varicella can be considered if CD4 > 200
- Zoster can be considered if the CD4 > 200
- Yellow Fever if the CD4 > 200
- BCG is not recommended at any time.
Objectives

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• Patients with liver disease
• **Patients on Biological agents**
• HIV
• Cancer and chemotherapy
Patients on Biological Immunosuppressive Agents

Infectious Risks:

- TB reactivation
- Hepatitis B and C, especially reactivation
- Fungal infections ie Cryptococcus, Histoplasmosis
- Bacterial skin and bone/joint infections with pathogens such as Staph aureus
- Parasitic infections ie toxoplasmosis, strongyloides, Chagas disease
- Herpes simplex and Shingles
- PML: progressive multifocal leukoencephalopathy
Pulmonary TB
Timing of Infections

• The greatest risk of infections is in the **first 90 days** after initiation of therapy

• Risk of TB is 95 cases per 100,000 for Remicade and 11 per 100,000 for Embrel vs standard risk of 5 per 100,000
Biological Therapy and Vaccines

• Before starting treatment this may be the “Last Call” for initiation of vaccines especially the live virus vaccines.
Before You Start Biological Agents

- **Routine Vaccines**
  - Td every 10 years
  - Influenza yearly is safe
  - Hepatitis A and B
  - Pneumococcal pneumonia 23, repeat dose 5 years later.
  - Meningococcal conjugated vaccine is safe.

- **Live Virus Vaccines “Last call”**
  - These vaccines should be started at least 4 weeks before initiation of treatment with biological agents. These vaccines include:
    - MMR
    - Zoster
    - Varicella
What do you do if a patient is already on a biological agent and wants to be vaccinated for Zoster or Yellow Fever?

Protocol:

1. Withhold the biological agent for at least 4 weeks.
2. Give the live virus vaccine and monitor patient closely.
3. Continue to hold the biological agent for another 4 weeks after administration of the live virus vaccine before resuming the biological agent.
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### Vaccines that might be indicated for adults, based on medical and other indications - 2010

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetanus, diphtheria, pertussis (Td/Tdap)</td>
<td>Substitute one-time dose of Tdap for Td booster; then boost with Td every 10 years</td>
</tr>
<tr>
<td>Human papillomavirus (HPV)*,Δ</td>
<td>3 doses for females through age 26 years</td>
</tr>
<tr>
<td>Varicella*,◇</td>
<td>Contraindicated</td>
</tr>
<tr>
<td>Zoster§</td>
<td>Contraindicated</td>
</tr>
<tr>
<td>Measles, mumps, rubella (MMR)*,γ</td>
<td>Contraindicated</td>
</tr>
<tr>
<td>Influenza*,†</td>
<td>1 dose TIV annually</td>
</tr>
<tr>
<td>Pneumococcal (polysaccharide)†,*,**</td>
<td>1 or 2 doses</td>
</tr>
<tr>
<td>Hepatitis A*,,**</td>
<td>2 doses</td>
</tr>
<tr>
<td>Hepatitis B*,ΔΔ</td>
<td>3 doses</td>
</tr>
<tr>
<td>Meningococcal *,◇◇</td>
<td>1 or more doses</td>
</tr>
</tbody>
</table>

- **For all persons in this category who meet the age requirements and who lack evidence of immunity (e.g., lack documentation of vaccination or have no evidence of prior infection)**
- **Recommended if some other risk factor is present (e.g., based on medical, occupational, lifestyle, or other indications)**
- **No recommendation**
# Immunocompromised Travellers

<table>
<thead>
<tr>
<th>YES</th>
<th>NOT!</th>
</tr>
</thead>
<tbody>
<tr>
<td>• DTaP</td>
<td>• OPV</td>
</tr>
<tr>
<td>• Inactivated Polio</td>
<td>• MMR, Varivax or Zostavax Oral Vivotif Berna (typhoid)</td>
</tr>
<tr>
<td>• IM typhoid (Typhim Vi)</td>
<td>• Yellow fever?</td>
</tr>
<tr>
<td>• Pneumovax</td>
<td>• Hib</td>
</tr>
<tr>
<td>• Rabies (RabAvert)</td>
<td>• Influenza (inactivated)</td>
</tr>
<tr>
<td>• Japanese B encephalitis</td>
<td>• Cholera, Tourista ETEC (Dukoral)</td>
</tr>
<tr>
<td>• Meningococcal (both)</td>
<td>• Live cholera (Mutachol)</td>
</tr>
<tr>
<td>• Hib</td>
<td></td>
</tr>
</tbody>
</table>
Barriers to Vaccine Acceptance

Patient

- Cost
- Vaccine priorities
- Needle phobia
- Myths about vaccines
- Safety and side effects
- Negative media stories
- Not funded by government
Key Take Home Points

1. Identify Asplenic patients and keep their vaccines up-to-date especially the Pneumococcal vaccine i.e. q 5 years
2. Update the adult/older travellers standard vaccines
3. Elderly and the Zoster vaccine “50/60/70” rule
4. Live virus vaccines can be given to HIV infected patients only if their absolute CD4 Lymphocyte counts >200

5. Travellers >60 yr be cautious of the YF vaccine, traveller may need a waiver

6. Update all vaccines on a patient about to start Biological agent therapy or chemotherapy
Our Role is to Give Guidance
“The world is a book, and those who do not travel read only a page.”

Saint Augustine
On arrival to the hospital

“Moribund” (on the verge of death)

After 14 days of penicillin

 Totally fine... to this day
Resuscitation Movie Line #1

Ha ha! You fool! You fell victim to one of the classic blunders! The most famous is never get involved in a land war in Asia, but only slightly less well-known is this: never go in against a Sicilian when death is on the line! Ha ha ha ha ha ha ha! Ha ha ha ha ha ha ha!