Statement of Intent

These guidelines are meant to be a guide for clinical practice, based on the best available evidence at the time of development. Adherence to these guidelines may not necessarily ensure the best outcome in every case. Every health care provider is responsible for the management of his/her unique patient based on the clinical picture presented by the patient and the management options available locally.

Review of the Guidelines

These guidelines were issued in December 2003 and will be reviewed in December 2005 or sooner if new evidence becomes available.

CPG Secretariat

c/o Health Technology Assessment Unit
Medical Development Division
Ministry of Health Malaysia
21st Floor, Bangunan PERKIM
Jalan Ipoh
51200 Kuala Lumpur.

Available on the following website:
- http://www.acadmed.org.my
CLINICAL PRACTICE GUIDELINES ON ADULT VACCINATION

EXPERT PANEL

Name
Victor Lim (Chairperson)
Infectious Diseases Research Centre, JIR
Chang Kian Meng,
Hospital Kuala Lumpur
Cheong Soon Kang
Hospital Universiti Kebangsaan Malaysia
Cun Gin Gin
University of Malaya Medical Centre
Bina Isahak
Hospital Universiti Kebangsaan Malaysia
Ismail Merican
Deputy Director General, Ministry of Health
Jayaram Manon
Queen Elizabeth Hospital, Kota Kinabalu
Christopher Lee
Hospital Kuala Lumpur
Leong Choong Fun
Hospital Universiti Kebangsaan Malaysia
Nordah Awang Jali
Hospital Universiti Kebangsaan Malaysia
Nadzis Ariff
University of Malaya Medical Centre
Narashanghda K. Khanilah
Infectious Diseases Research Centre, JIR
Shamsuddin Begg Mohamed Shafie
Vaccination Research Centre
Yasmin Marik
Hospital Universiti Kebangsaan Malaysia

Contributions
Rationale for adult vaccinations; Anthrax,
Cholera, Plague, Travelers
Immunocompromised
Immunocompromised
Influenza, Japanese encephalitis,
Measles, Rubella, Mumps, Varicella
Hepatitis A, Hepatitis B
Typhoid, Diptheria, Tetanus, Chronic
Ulcers
Adults who have missed or failed to
complete childhood vaccinations,
Health Care Workers
Immunocompromised
Meningococcal, Pneumococcal,
Tuberculosis
Elderly, Other groups. Passive
immunisation
Hepatitis A, Hepatitis B
Veterinarians and Animal Handlers
General advice, Poliomyelitis, Rabies,
Smallpox, Yellow Fever

OTHER GROUPS

Category
Hepatitis B
Hepatitis A and B
Hepatitis A and B
Hepatitis A and B
Hepatitis A and B

Vaccines Recommended
Influenza
Tetanus
Diphtheria
Pertussis
Hepatitis A
Hepatitis B

Timing
Pre-departure
Pre-departure
Pre-departure
Pre-departure
Pre-departure
Pre-departure

Comments
Non-scheduled vaccination for normal
population
Pre-departure
Pre-departure
Pre-departure
Pre-departure
Pre-departure

References:
1. MMWR 2002;51(RR-16):1-49
2. Goldstein ST, Reed RF, Miller MR, Meherkar M, succinct,infection.
### Table of Contents

**SECTION A - GENERAL**

1. Introduction ............................................. 4
2. Levels of evidence ....................................... 5
3. General advice on vaccination ............................. 6

**SECTION B - VACCINES**

1. Anthrax .................................................. 11
2. BCG .................................................... 12
3. Cholera .................................................. 13
4. Hepatitis A .............................................. 17
5. Hepatitis B .............................................. 20
6. Influenza ................................................. 24
7. Japanese encephalitis .................................... 27
8. Measles .................................................. 29
9. Meningococcus .......................................... 31
10. Mumps .................................................. 34
11. Plague ................................................... 36
12. Poliomyelitis ............................................ 38
13. Pneumococcus ......................................... 41
14. Rabies .................................................. 44
15. Rubella .................................................. 47
16. Smallpox ............................................... 49
17. Tetanus .................................................. 51
18. Tuberculosis ........................................... 55
19. Typhoid ................................................ 58
20. Yellow Fever ........................................... 61
21. Vaccella ............................................... 63
22. Passive Immunisation .................................. 65

**SECTION C - RISK GROUPS**

1. Elderly and patients with chronic illnesses .............. 70
2. Health Care Workers .................................... 71
3. Immunocompromised patients ............................ 75
4. Travelers ............................................... 85
5. Veterinarians and Animal Handlers ....................... 86
6. Other groups ............................................ 87
# TRAVELLERS

<table>
<thead>
<tr>
<th>Category</th>
<th>Vaccine</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandatory vaccination</td>
<td>Yellow fever for all travelers traveling to or from yellow-fever endemic countries</td>
<td>These vaccines are legal requirements for travel. Failure to obtain vaccines could result in non-entry/quarantine in destination as well as home country</td>
</tr>
<tr>
<td></td>
<td>Meningococcal vaccine (23-valent) for all Haj and Umrah pilgrims</td>
<td></td>
</tr>
<tr>
<td>Routine vaccination</td>
<td>Diphtheria/tetanus/pertussis</td>
<td>Although not mandatory all travelers are generally advised to ensure that they have these necessary vaccination and boosters (Level B)</td>
</tr>
<tr>
<td></td>
<td>Hepatitis B</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Measles-Rubella-Mumps</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poliomyelitis</td>
<td></td>
</tr>
<tr>
<td>Selective use for travelers</td>
<td>Cholera</td>
<td>Recommendations for these vaccines depend on the countries of destination, the current outbreak situation at the time of travel, the purpose for travel, the intended length of stay and the health status of the traveler. As recommendations will change from time to time, it is prudent to access the latest advances from the following sites maintained by the CDC and WHO</td>
</tr>
<tr>
<td></td>
<td>Influenza</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hepatitis A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Japanese encephalitis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lyme disease</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meningococcal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rabies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tick-borne encephalitis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sepsis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Typhoid</td>
<td></td>
</tr>
</tbody>
</table>

References
1. WHO. International travel and health. (Website: www.who.int/healthtopics/travel)
2. Centers for Disease Control (Website: www.cdc.gov/travel)
VACCINATION SCHEDULE FOR ADULTS AWAITING SOLID ORGAN TRANSPLANTATION AND SOLID ORGAN TRANSPLANT RECIPIENTS (Level 9)

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Fully Immunised Defined</th>
<th>Catch-up Schedule (if needed)</th>
<th>Routine Schedule Once Fully Immunised</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Visit 1</td>
<td>Visit 2 1-2 mth later</td>
<td>Visit 3 6 mth after visit 2</td>
<td></td>
</tr>
<tr>
<td>Inactivated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diptheria toxus</td>
<td></td>
<td>TD-1</td>
<td>TD-2</td>
<td>TD-3</td>
</tr>
<tr>
<td>Haemophilus influenza</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type B conjugate</td>
<td></td>
<td>Not routinely recommended</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis B (level I)</td>
<td>3 doses</td>
<td>Hep B-1</td>
<td>Hep B-2</td>
<td>Booster if &lt;10mIU/ml</td>
</tr>
<tr>
<td>Pneumococcal</td>
<td>2 doses of PPV23</td>
<td>PPV23-1</td>
<td>---</td>
<td>Complete 2 doses, second dose 5 years after first dose</td>
</tr>
<tr>
<td>Hepatitis A (level I)</td>
<td>2 doses, at risk patients only</td>
<td>Hep A-1</td>
<td>---</td>
<td>Hep A-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>At risk includes those waiting for liver transplant, all with chronic liver disease and those with risk of exposure to hepatitis A</td>
</tr>
<tr>
<td>Influenza</td>
<td></td>
<td>Use if indicated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inactivated polio vaccine</td>
<td>3 doses + 1 booster at risk patients only</td>
<td>IPV-1</td>
<td>IPV-2</td>
<td>IPV-3</td>
</tr>
<tr>
<td>Meningococcal vaccine</td>
<td>1-2 doses, at risk patients only</td>
<td>Mening-1</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

---


SECTION A - GENERAL

INTRODUCTION

Immunisation against infectious diseases is primarily directed towards infants, children and adolescents and has become a routine practice in paediatrics. However it is not commonplace in adult practice. There is a lack of awareness about the benefits of immunization in adults even though there is considerable morbidity and mortality due to vaccine-preventable diseases. In the United States influenza alone is responsible for 20,000 - 40,000 deaths annually. In epidemic years the mortality rises to 50,000 and this is accompanied by 500,000 excess hospitalisations at a cost of one billion dollars. Pneumococcal disease and hepatitis B infection are other examples of vaccine-preventable diseases that cause significant mortality and morbidity.

The primary objective for developing clinical practice guidelines on adult immunisation is to assist doctors and the public in making decisions on the appropriate use of vaccines in the adult population (defined as ≥ 18 years). These recommendations on adult vaccination are evidenced based, appropriate to the Malaysian context and reflect current best practices. Groups of adults who are at a higher risk of contracting specific infections by virtue of their age, underlying diseases or occupation are identified and recommendations made for the appropriate vaccines.

It is hoped that the judicious use of vaccines will provide a cost-effective way of reducing the burden of morbidity and mortality due to infectious diseases among adults in Malaysia.

References.

VACCINATION SCHEDULE FOR BLOOD AND MARROW TRANSPLANTATION (ALLOGENEIC AND AUTOLOGOUS) [4,5,6,7](Level 9)

<table>
<thead>
<tr>
<th>Time after Transplantation</th>
<th>Vaccine or toxoid</th>
<th>12 months</th>
<th>14 months</th>
<th>24 months</th>
<th>Chronic GVHD</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inactivated vaccine or toxoid</td>
<td>Diptheria-tetanus, Pertussis for Children aged &gt; 7 yrs</td>
<td>DTP or DT</td>
<td>DTP or DT</td>
<td>yes</td>
<td>DT should be used if there is any contraindication for pertussis vaccination</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diptheria-tetanus toxoid-pertussis vaccine (DTP) or Diptheria toxoid-tetanus toxoid (DT)</td>
<td>DTP or DT</td>
<td>DTP or DT</td>
<td>yes</td>
<td>DT should be used if there is any contraindication for pertussis vaccination</td>
<td></td>
</tr>
<tr>
<td>Children aged &gt; 7 yrs</td>
<td>Tetanus-diptheria toxoid (TD)</td>
<td>TD</td>
<td>TD</td>
<td>yes</td>
<td>Booster every 10 years</td>
<td></td>
</tr>
<tr>
<td>Adults</td>
<td>Hib conjugate</td>
<td>Hib conjugate</td>
<td>Hib conjugate</td>
<td>yes</td>
<td>Booster every 15 years</td>
<td></td>
</tr>
<tr>
<td>Hemophilus influenzae type b (level 5)</td>
<td>PPV23</td>
<td>—</td>
<td>PPV23</td>
<td>yes</td>
<td>Recommended that adjunctive antibiotics prophylaxis for patients with chronic GVHD</td>
<td></td>
</tr>
<tr>
<td>Pneumococci (level 5)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>yes</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Influenza</td>
<td>Use if indicated</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Hepatitis B (HepB)</td>
<td>Hep B</td>
<td>Hep B</td>
<td>Hep B</td>
<td>yes</td>
<td>Recommended in all patients with risk factors to Hepatitis B infection</td>
<td></td>
</tr>
<tr>
<td>Inactivated polio (IPV)</td>
<td>IPV</td>
<td>IPV</td>
<td>IPV</td>
<td>yes</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Meningococcal</td>
<td>Use if indicated</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Subgroup at Risk</td>
<td>Immunoglobulin</td>
<td>Recommendation</td>
<td>Comment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>----------------</td>
<td>---------------</td>
<td>---------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIV-infected persons</td>
<td>Trough Immune Globulin (TIG) 400 U</td>
<td>2500 U over 4-6 weeks</td>
<td>For HIV-infected men, women and children, immediate post-exposure prophylaxis is given as soon as possible and then within 24-48 hours.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adolescents</td>
<td>Trough Immune Globulin (TIG) 400 U</td>
<td>2500 U over 4-6 weeks</td>
<td>For HIV-infected men, women and children, immediate post-exposure prophylaxis is given as soon as possible and then within 24-48 hours.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adults</td>
<td>Trough Immune Globulin (TIG) 400 U</td>
<td>2500 U over 4-6 weeks</td>
<td>For HIV-infected men, women and children, immediate post-exposure prophylaxis is given as soon as possible and then within 24-48 hours.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**REFERENCES**


**GENERAL ADVICE ON VACCINATION**

1. **Contraindications**
   1.1. Immunization should be postponed if the subject is suffering from any acute illness.
   1.2. Live vaccines should not be administered to pregnant women because of the theoretical possibility of harm to the fetus.
   1.3. Live vaccines should not be given to the following:
      - 1.3.1. Patients on high-dose corticosteroids or immunosuppressive treatment including radiation.
      - 1.3.2. Those suffering from malignant conditions such as lymphoma, leukaemia, or other tumours of the reticuloendothelial system.
      - 1.3.3. Patients with impaired immunological mechanism like hypogammaglobulinaemia.
   1.4. Individuals with immunosuppression from disease or chemotherapy, should not receive live virus vaccines until at least six months after chemotherapy has finished.
   1.5. For those on high-dose systemic corticosteroids (for adults: daily doses in excess of 20mg for more than two weeks or 60mg of prednisolone), live vaccines should be postponed until at least three months after treatment has stopped.
   1.6. Live virus vaccines, with the exception of yellow fever vaccine, should not be given during the three months following injection of immunoglobulin because the immune response may be inhibited.

2. The following are **NOT** contraindications to vaccinations:
   2.1. Minor infections in the absence of fever or systemic upset
   2.2. Asthma, eczema, or hay fever
   2.3. Treatment with antibiotics or locally-acting (eg topical or inhaled) steroids
   2.4. Contact with an infectious disease
   2.5. Homoeopathy
   2.6. History of allergy is NOT a contraindication. Hypersensitivity to eggs contraindicates influenza vaccine; previous anaphylactic reaction to egg contraindicates measles, mumps, rubella, influenza and yellow fever vaccines.
<table>
<thead>
<tr>
<th>Subheader (if any)</th>
<th>Information or Instructions</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variability in Microclimatic Conditions</td>
<td>Variability in Microclimatic Conditions (VMMC)</td>
<td>- Microclimate zone adjustment needed in areas with high variability</td>
</tr>
<tr>
<td>Variability in Nutrient Regimen</td>
<td>Variability in Nutrient Regimen (VNR)</td>
<td>- Nutrient needs vary depending on soil type and climate</td>
</tr>
<tr>
<td>Variability in Water Regimen</td>
<td>Variability in Water Regimen (VWR)</td>
<td>- Water requirements may differ significantly between different plant species</td>
</tr>
</tbody>
</table>

**Comment:**

- Microclimate zone adjustment needed in areas with high variability.
- Nutrient needs vary depending on soil type and climate.
- Water requirements may differ significantly between different plant species.
### Passive Immunization for Immunocompromised Person

<table>
<thead>
<tr>
<th>Antibody Type</th>
<th>Timing/Recommendation</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immune Globulin (IG)</td>
<td>0.45 mL/kg IV every 4 weeks</td>
<td></td>
</tr>
<tr>
<td>Immune Globulin (MIG)</td>
<td>0.45 mL/kg IV every 4 weeks</td>
<td></td>
</tr>
</tbody>
</table>

**Specific conditions:**

- IMMUNE COMPROMISED PERSONS

**Recommended dose:**

- Immune Globulin (MIG) 0.45 mL/kg IV every 4 weeks
- Immune Globulin (IG) 0.45 mL/kg IV every 4 weeks

### 5. Anaphylaxis

Recipients of vaccine should remain under observation until they have been seen to recover from the procedure.

Any individual carrying out immunization procedures must be able to distinguish between anaphylaxis, convulsions and fainting. The last is relatively common after immunisation of adults.

#### 5.1 Symptoms of anaphylaxis include:

- **5.1.1** Pallor, limpness and apnoea
- **5.1.2** Upper airway obstruction: hoarseness and stridor as a result of angioedema
- **5.1.3** Lower airway obstruction: subjective feelings of retrosternal tightness and dyspnoea with audible expiratory wheeze from bronchospasm
- **5.1.4** Cardiovascular: sinus tachycardia, profound hypotension in association with tachycardia; severe bradycardia
- **5.1.5** Skin: rapid development of urticarial lesions – circumscripted, intensely itchy weals with erythematous raised edges and pale blanched centres

#### 5.2 Management of anaphylaxis

- **5.2.1** Lie patient in a left lateral position. If unconscious, insert airway
- **5.2.2** Give 1/1000 adrenaline by deep intramuscular injection unless there is a strong central pulse and the patient’s condition is good
- **5.2.3** In adults, the dosage is 0.5 to 1.0 mL repeated as necessary up to a maximum of three doses. The lower dose should be used for the elderly or those of slight build
- **5.2.4** If oxygen is available, give it by face mask
- **5.2.5** Never leave the patient alone
- **5.2.6** If appropriate, begin cardio-pulmonary resuscitation (CPR)
- **5.2.7** Chlorpheniramine maleate (pirton) 2.5 to 5.0 mg may be given intravenously. Hydrocortisone 100 mg intravenously may also be given to prevent further deterioration in severely affected cases
- **5.2.8** If there is no improvement in the patient’s condition in 10 minutes, repeat the dose of adrenaline up to a maximum of three doses
- **5.2.9** All cases should be admitted to hospital for observation
Note: Vaccination for pneumococcal and Haemophilus influenzae type b (Hib) disease should be carried out in accordance with the Australian Immunisation Handbook. 

2. Aflatoxin B1 levels in foodstuff should be maintained below 250 mg/kg. 

3. The use of antibiotics in the treatment of pneumonia should be guided by local epidemiological data and the recommendations of the Antibiotic Guidelines for South Australia. 

References: 
3. Australian Medicated Products Guide. 

Appendix: 
- List of Vaccines and Immune Globulin Products in Australia. 
- List of Food Additives. 
- List of Medicinal Products. 
- List of Medical Devices.
7.3.6 DPT + oral polio + yellow fever + measles
7.3.7 DPT + BCG + yellow fever + measles
7.3.8 Measles + mumps + rubella

7.4 Not encouraged:
7.4.1 DT + typhoid + oral polio
7.4.2 Cholera + yellow fever

8. References
1. Immunisation against Infectious Diseases. 1990. Department of Health
Welsh Office, Scottish Home and Health Department, UK.
## IMMUNOCOMPROMISED PATIENTS

### VACCINATION FOR INDIVIDUALS WITH SPLENECTOMY OR FUNCTIONAL/ANATOMICAL ASPLENA

<table>
<thead>
<tr>
<th>Vaccines</th>
<th>Recommendation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumococcus, Meningococcus, Hib</td>
<td>To be given at least 2 weeks before splenectomy or soon after surgery</td>
<td>Booster doses recommended every 5 years for pneumococcus and 3 years for meningococcus</td>
</tr>
</tbody>
</table>

*Use if indicated: BCG, Hepatitis A, Influenza, MMR, Inactivated polo vaccine, Rabies, Td, Typhoid, Varicella and Yellow fever.*

### VACCINATION FOR INDIVIDUALS WITH SUPPRESSED IMMUNITY DUE TO DISEASE OR TREATMENT

<table>
<thead>
<tr>
<th>Vaccines</th>
<th>HIV</th>
<th>Immunosuppression</th>
<th>Renal failure</th>
<th>Diabetes</th>
<th>Alcoholism</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCG</td>
<td>C</td>
<td>C</td>
<td>Ul</td>
<td>Ul</td>
<td>Ul</td>
</tr>
<tr>
<td>Hep A</td>
<td>Ul</td>
<td>Ul</td>
<td>Ul</td>
<td>Ul</td>
<td>Ul</td>
</tr>
<tr>
<td>Hep B (Dose #1)</td>
<td>Ul</td>
<td>Ul</td>
<td>Ul</td>
<td>Ul</td>
<td>Ul</td>
</tr>
<tr>
<td>MMR</td>
<td>R</td>
<td>R</td>
<td>Ul</td>
<td>Ul</td>
<td>Ul</td>
</tr>
<tr>
<td>Polio (IPV)</td>
<td>Ul</td>
<td>Ul</td>
<td>Ul</td>
<td>Ul</td>
<td>Ul</td>
</tr>
<tr>
<td>Pneumococcus</td>
<td>R</td>
<td>R</td>
<td>Ul</td>
<td>Ul</td>
<td>Ul</td>
</tr>
<tr>
<td>Rabies</td>
<td>Ul</td>
<td>Ul</td>
<td>Ul</td>
<td>Ul</td>
<td>Ul</td>
</tr>
<tr>
<td>Typhoid inactivated</td>
<td>Ul</td>
<td>Ul</td>
<td>Ul</td>
<td>Ul</td>
<td>Ul</td>
</tr>
<tr>
<td>Varicella</td>
<td>C</td>
<td>C</td>
<td>Ul</td>
<td>Ul</td>
<td>Ul</td>
</tr>
</tbody>
</table>

*C – contraindicated; R – recommended; Ul – use if indicated.*

---

75
The following vaccines are **recommended as for the general adult population**:

- Tetanus
- Diphtheria
- Pneumococcal polysaccharide vaccine

**References**:

ANTHRAX

Introduction

Anthrax is an infection caused by Bacillus anthracis. It is primarily a disease of animals, particularly herbivorous animals, such as cattle, sheep, horses, mules, and goats. Humans become infected accidentally when brought into contact with diseased animals. More recently, Bacillus anthracis has been used as a bioterrorist weapon. Malaysia is free from anthrax although the disease is endemic in Thailand and Indonesia. No human cases have ever been recorded in Malaysia and the last case in an animal occurred in 1976.

Vaccines available

A non-encapsulated toxigenic strain is used in animals. The Sterne Strain of Bacillus anthracis produces sublethal amounts of the toxin that induces formation of protective antibody. The animal vaccine should not be used in man. The anthrax vaccine for humans, which is used in the U.S., is a preparation of the protective antigen from culture filtrate of an avirulent, non-encapsulated strain of Bacillus anthracis. This vaccine is manufactured and distributed by BioPort Corporation, Lansing, Michigan for the Department of Defense of the U.S.

Mode of administration and dosing regimen

Three subcutaneous injections given two weeks apart followed by three additional subcutaneous injections given at 6, 12, and 18 months. Annual booster injections of the vaccine are required to maintain a protective level of immunity.

Contraindications and adverse reactions

The vaccine should only be administered to healthy individuals from 18 to 65 years of age. Pregnant women should not be vaccinated. Mild local reactions occur in 30% of recipients and consist of slight tenderness and redness at the injection site. Severe local reactions are infrequent and consist of extensive swelling of the forearm in addition to the local reaction. Systemic reactions occur in fewer than 0.2% of recipients.

Vaccines available in Malaysia

No anthrax vaccines are currently available in Malaysia.
HEALTH CARE WORKERS (HCW) *

* The category of healthcare workers (HCWs) include persons who provide healthcare to patients or work in institutions that provide patient care e.g., doctors, nurses, emergency medical personnel, dental professionals, and students, medical and nursing students, laboratory technicians, hospital volunteers and support staff providing patient care in healthcare institutions.

On the basis of documented nosocomial transmission, HCWs are considered to be at significant risk for acquiring and transmitting the following vaccine-preventable infections.

The following vaccinations (listed in the table) are strongly recommended among HCWs.

<table>
<thead>
<tr>
<th>Category of HCW</th>
<th>Vaccines recommended</th>
<th>Timing</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>All healthcare workers</td>
<td>• Hepatitis B (1) &lt;br&gt; (Level 1) &lt;br&gt; 1st vaccination should be given at onset of career. &lt;br&gt; Booster does not necessary. (2, 3, 4)</td>
<td>Pre vaccination serology screening recommended before vaccination &lt;br&gt; Post vaccination serologic testing for antibodies recommended. (5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Measles, mumps and rubella (5-10) &lt;br&gt; (Level 4)</td>
<td>1st vaccination (2 doses) before onset of career. &lt;br&gt; MMR vaccine preferred. &lt;br&gt; Booster does not necessary. (5, 6)</td>
<td>Indicated for HCWs who do not have documented vaccination, physician-documented infection or serologic evidence of immunity. Not indicated in pregnant women (5, 8)</td>
</tr>
<tr>
<td>Healthcare workers who have contact with patients at high-risk of influenza or its complications; HCWs who work in chronic care facilities</td>
<td>• Influenza (12-16) &lt;br&gt; (Level 4)</td>
<td>Annual vaccination (IM)</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Vaccines recommended</td>
<td>Comments</td>
<td></td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------------------------------------------------</td>
<td>----------</td>
<td></td>
</tr>
<tr>
<td>Elderly (&gt;65 year old) and other chronic co-morbidities</td>
<td>Vaccination can be given throughout the year.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vaccination may be repeated if the interval is &gt;6 months.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Persons who have not received vaccination within the last 10 years may be vaccinated at any time.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CHOLERA**

**Introduction**

Cholera is a disease characterized by severe watery diarrhea and is caused by two serotypes of *Vibrio cholerae* namely O1 and O139 (Bengal strain). There is a global resurgence of cholera and it is becoming an increasingly important public health challenge in a number of countries. Cholera is endemic in Malaysia and between 500 to 2000 cases are reported annually.

**Vaccines available**

Two types of vaccines are available. The parenteral killed whole cell vaccines have been used widely since the 1960s when large scale trials were conducted in Bangladesh, India and the Philippines. These vaccines are killed whole cell preparations of *V. cholerae* 01 cells containing a mixture of biotypes and serotypes. In the 1980s research into oral vaccines was started. There are two main types of oral vaccines. The first comprised oral killed whole cell vaccines containing a mixture of biotypes and serotypes, with or without added B subunit of cholera toxin. The second are live recombinant vaccines consisting of live attenuated strains of *V. cholerae*.

**Mode of administration and dosing regimen**

The parenteral vaccines are normally administered intramuscularly or subcutaneously in two doses given 7 to 28 days apart. The oral killed whole cell vaccine requires 2 or 3 doses given at 6 weeks interval. The oral live vaccine is administered as a single dose.

**Contraindications and adverse reactions**

Vaccination should be avoided during episodes of high fever, intercurrent illnesses and in pregnancy. The vaccine is also contraindicated in individuals with a known allergic reaction to a previous dose. Tenderness and induration may occur at the injection site. Fever and malaise following vaccination are infrequent and serious reactions are rare.

**Vaccines available in Malaysia**

- Berna Swiss Serum killed whole cell parenteral vaccine
### CHOLERA

**Introduction**

Cholera is a disease characterized by severe watery diarrhea and is caused by two serotypes of *Vibrio cholerae* namely 01 and 0139 (Bengal strain). There is a global resurgence of cholera and it is becoming an increasingly important public health challenge in a number of countries. Cholera is endemic in Malaysia and between 500 to 2000 cases are reported annually.

**Vaccines available**

Two types of vaccines are available. The parenteral killed whole cell vaccines have been used widely since the 1960s when large scale trials were conducted in Bangladesh, India and the Philippines. These vaccines are killed whole cell preparations of *V. cholerae* 01 cells containing a mixture of biotypes and serotypes. In the 1980s research into oral vaccines was started. There are two main types of oral vaccines. The first comprised oral killed whole cell vaccines containing a mixture of biotypes and serotypes, with or without added B subunit of cholera toxin. The second are live recombinant vaccines consisting of live attenuated strains of *V. cholerae*.

**Mode of administration and dosing regimen**

The parenteral vaccines are normally administered intramuscularly or subcutaneously in two doses given 7 to 28 days apart. The oral killed whole cell vaccine requires 2 or 3 doses given at 6 weeks interval. The oral live vaccine is administered as a single dose.

**Contraindications and adverse reactions**

Vaccination should be avoided during episodes of high fever, intercurrent illnesses and in pregnancy. The vaccine is also contraindicated in individuals with a known allergic reaction to a previous dose. Tenderness and induration may occur at the injection site. Fever and malaise following vaccination are infrequent and serious reactions are rare.

**Vaccines available in Malaysia**

- Bena Swiss Serum killed whole cell parenteral vaccine
<table>
<thead>
<tr>
<th>Vaccines and toxoids recommended for adults, by age groups.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age group</strong></td>
<td><strong>Vaccines and toxoids</strong></td>
</tr>
<tr>
<td>≥65d</td>
<td>P</td>
</tr>
<tr>
<td>2-64d</td>
<td>X</td>
</tr>
</tbody>
</table>

**Legend**
- P: Pneumococcal
- D: Diphtheria
- E: Tetanus
- F: Hemophilus influenzae
- G: Hepatitis A
- H: Hepatitis B
- I: Influenza
- J: Meningococcal
- K: Mumps
- L: Rubella
- M: Measles
- N: Varicella
- X: Recommended
- O: Not recommended
- Y: Exempt

**Notes**
- Pneumococcal vaccines are recommended for all ages.
- Hepatitis A and B vaccines are recommended for all ages.
- Influenza vaccine is recommended for all ages, with special emphasis on those at high risk of complications.
- Meningococcal vaccine is recommended for those at high risk of meningococcal disease.
- Mumps and Rubella vaccines are recommended for children and adolescents and for those at risk of exposure.
- Varicella vaccine is recommended for children and adolescents who have not had varicella.

**References**

**Footnotes**
- ...
**DIPHTHERIA**

**Introduction**

Diphtheria is an acute, communicable, respiratory infection caused by Corynebacterium diphtheriae. The causative organism produces a toxin which results in local tissue destruction and membrane formation. The toxin may then undergo haematogenous dissemination resulting in myocarditis, neuritis, thrombocytopenia, and proteinuria. Humans are the only known reservoir of C. diphtheriae. Carriers are important in disease transmission as natural or vaccine-induced immunity does not prevent carriage. Diphtheria occurs primarily among unvaccinated or inadequately vaccinated individuals. In Malaysia, the incidence of the disease has declined dramatically with the introduction of routine childhood immunisation and improved living standards. Small outbreaks may still occur in unvaccinated communities. In 1995 only 1 case of diphtheria was reported while in 2001, 3 cases with 2 deaths were reported. Limited serosurveys done in the USA since 1977 indicate that 22%-62% of adults 18-39 years of age and 41%-84% of those greater than or equal to 60 years of age lack protective levels of circulating antitoxin against diphtheria.

**Vaccines available**

The vaccine is a toxoid derived from the toxin by treatment with formaldehyde. It is then adsorbed onto an aluminium salt, usually aluminium phosphate, and preserved with thimerosal. The combined preparation Td is recommended for use among adults because a large proportion of them lack protective levels of circulating antibody against tetanus. Further, Td contains much less diphtheria toxoid than other diphtheria toxoid-containing products, and as a result, reactions to the diphtheria component are less likely. Vaccination with any diphtheria toxoid does not, however, prevent or eliminate carriage of Corynebacterium diphtheriae.

**Mode of administration and dosing regimen**

The dose is 0.5ml given by deep intramuscular route. A primary series for adults is three doses of preparations containing diphtheria and tetanus toxoids, with the first two doses given at least 4 weeks apart and the third dose given 6-12 months after the second.

**Contraindications and adverse effects**

Neurologic or anaphylactic sensitivity to a previous dose of tetanus-diphtheria vaccine is the only contraindication. Pain, tenderness, localised erythema and oedema at the injection site have been reported. Fever and other systemic symptoms such as headache or malaise are rare.

**Vaccines available in Malaysia and local sources**

At time of printing Td is not yet available in Malaysia.
IG administration may interfere transiently with the subsequent immune response to MMR vaccines. Please refer to the table below for recommended interval between the administration of IG and these vaccines. IG should not be given to persons with isolated IgG deficiency or with a known allergy to the preservative thimerosal, a mercury derivative. Pregnancy is not a contraindication to the use of IG or other immune globulin.

Reactions at site of injection include tenderness, erythema and stiffness of local muscles. Mild fever or malaise may occasionally occur. Less common side effects include flushing, headache and arthralgia.

**Intravenous Immune Globulin (IVIG)**

Intravenous immune globulin (IGIV) is a preparation that contains 50g/L (5%) protein with maltose, sucrose or glycine as a stabilizing agent. It is used for replacement therapy in patients with congenital agammaglobulinaemia, treatment of idiopathic thrombocytopenic purpura and Kawasaki syndrome, and for the prophylaxis of infection following bone marrow transplantation. The details of IVIG usage is beyond the scope of these guidelines.

**Hyperimmune Globulin (specific)**

These are special preparations obtained from blood plasma from donor pools pre-selected for a high antibody content against a specific antigen. Examples of specific immune globulin are Hepatitis B immune globulin, varicella-zoster immune globulin, rabies immune globulin, tetanus immune globulin, cytomegalovirus immune globulin, respiratory syncytial virus immune globulin and botulism immune globulin.

Specific immune globulin which are available in Malaysia are:

1. Hepatitis B immune globulin
2. Tetanus immune globulin
3. Rabies immune globulin

1. **Hepatitis B immune globulin**

   The indications for use are for percutaneous or mucosal exposure to blood containing hepatitis B virus or sexual contact with an acute case of hepatitis B. It should be given within 7 days after exposure (preferably within 72 hours).

   - Hepman Bema Injection (1ml vial)
     Dose: 4ml (IM)
   - Hepalig Injection (1ml vial)
     Dose: 1000-2000 IU (IM)

**HEPATITIS A**

**Introduction**

The term infectious hepatitis was coined in 1912 to describe outbreaks of jaundice, which have been reported over many centuries. In 1973, WHO adopted the term 'hepatitis type A' to describe this type of hepatitis the same year. Hepatitis A virus (HAV) is classified in the genus enterovirus of the family picornaviridae based on its biophysical and biochemical characteristics. HAV is transmitted by faecal-oral route. Person-person spread is the most common method of transmission in developed countries. Infections occur readily under conditions of poor sanitation, hygiene and overcrowding. Subclinical infection is common in children and severity tends to increase with age. Occasional cases of fulminant hepatitis may occur but there is no chronicity and little likelihood of liver disease. Hepatitis A occurs endemically in all parts of the world with frequent reports of minor and major outbreaks. The exact incidence is difficult to estimate because of the high proportions of subclinical infection and infections without jaundice, difference in surveillance and differing patterns of disease. The degree of underreporting is very high.

Hepatitis A has been a reportable disease in Malaysia since 1988. The overall incidence of hepatitis A has decreased tremendously from 11.65 in 1988 to 9.16 in 1991, 4.73 in 1997 per 100,000 populations. On the other hand, the seroprevalence rate has also decreased from 67% in 1986 to 54.9% in 1993 and 48.6% in 1997. In terms of age related seroprevalence of HAV infection, Malaysia portrays a pattern typical of declining endemicity i.e. from intermediate to low endemicity. The proportion of seroconverted children and adolescents have decreased in line with socioeconomic development. However, a relatively high seroprevalence still occurs in older adults (age group 41-60 years; 76.1 %) although this is expected to decline as younger adults replace the current cohort.

There is an obvious shifts of the seroprevalence curve in Malaysia, to the right and downwards from 1996 to year 2000 similar to the one shown by developed countries like Singapore and the United States.

**Vaccines available**

Hepatitis A vaccine is a formaldehyde-inactivated vaccine prepared from either the GMB or the HM 175 strain or CR329F strain of HAV grown in human diploid cells. It is supplied as a suspension in prefilled syringes.

**Mode of administration and dosing regimen**

The vaccine should be given intramuscularly in the deltoid region. It should not be given into the gluteal region because vaccine efficacy may be reduced, nor should it be administrated intravenously, or intradermally and should not be
HEPATITIS B

Introduction

Hepatitis B was referred to originally as 'serum hepatitis. It is the most common cause of the parenterally transmitted viral hepatitis, and an important cause of acute and chronic infection of the liver. More than a third of the world's population has been infected with the hepatitis B virus (HBV), and WHO estimates that it results in 1.2 million deaths annually. The clinical features of acute infection resemble those of the other viral hepatitis. The virus persists in 5-10% of immunocompetent adults and in as many as 30% of infants infected perinatally. Persistent carriage of HBV is defined by the presence of hepatitis B surface antigen (HBsAg) in the serum and occurs in more than 350 million individuals worldwide, although not all these individuals are infectious. Long-term continuing virus replication may lead to chronic liver disease, cirrhosis and hepatocellular carcinoma. Primary liver cancer is one of the 10 most common cancers worldwide and about 80% of these are ascribed to persistent infection with HBV.

About 1.1 million Malaysians are thought to be chronically infected with HBV. This data is based on the seroprevalence data obtained from voluntary testing which indicated that about 5.24% of 17,048 sera screened were positive for HBsAg (Malaysian Liver Foundation 1998). Another study conducted by the same group on 2,115 convenience samples from all over Malaysia reported the prevalence of HBsAg and hepatitis B's antibody (HBeAg) of 6.5% and 51%, respectively (Malaysian Liver Foundation). Taking into consideration that the documented seropositivity among blood donors is about 2.5%, the estimated prevalence in Malaysia is HBsAg and most likely the rate of chronically infected individuals is approximately 4.7% of the population.

Vaccines available

Hepatitis B vaccine contains HBsAg adsorbed on aluminum hydroxide adjuvant. It is currently prepared from yeast cells using recombinant DNA technology. The plasma derived vaccine is no longer marketed in Malaysia.

Mode of administration and dosing regimen

The basic immunization regime consists of 3 doses of vaccine, with the first dose at the elected date, the second dose one month later and the third dose at six months after the first dose.

An accelerated schedule has also been used where more rapid immunization is required, for example for travelers or following exposure to the virus, when the third dose may be given at two months after the dose with a booster at 12
Kuala Lumpur, and seven other designated government centres in the country (details to obtained from IMR Tel : 03 2698 6003).

Special storage precautions

The vaccine should be stored at 2-8°C and protected from light. The diluent supplied for use with the vaccine should be stored below 15°C but not frozen. The vaccine should be given within one hour of reconstitution.

Target groups

- Persons travelling or living in areas in which yellow fever infections occur. Vaccination is mandatory for all persons travelling from or to countries endemic for yellow fever
- Laboratory personnel who may be exposed to the virulent virus.

Evidence for effectiveness

Close to 100% seroconversion rates have been shown with yellow fever vaccines. Studies reported indicate that the thermostable 17-D yellow fever vaccine is comparable in immunogenicity and reactogenicity to its thermostable counterpart. (Level 3)

References


months. This dosing schedule for the rapid acquisition of immunity can be used to prevent perinatal transmission if given to neonates born to HBsAg mothers.

The vaccine should be given intramuscularly. The injection should be given in the deltoid region, though anterolateral thigh is preferred site for infants. The buttock must never be used as it may cause reduced vaccine efficacy.

The subcutaneous or intradermal route may be used for haemophiliacs. The response may be poor in those who are immunosuppressed and further doses may be required.

An antibody level of 100mIU/ml is classified as non-response to the vaccine whilst an antibody level of 1000mIU/ml is considered to be protective. Antibody levels>1000mIU/ml persist in some individuals much longer than 5 years. There is some evidence that protective immunity is still present even though levels have fallen below 100mIU/ml. Those with antibodies below 10mIU/ml 2-4 months after completing the primary course will require hepatitis B immunoglobulin (H-BIG) for protection if exposed. Poor responders (anti-HBs of 10-100mIU/ml) should receive a booster dose. Non-responders should be considered for a repeat course.

Contraindications and adverse reactions

Immunization should be postponed in individuals suffering severe febrile illness.

Hepatitis B infection in pregnant women may result in severe disease for the mother and chronic infection of the newborn. Immunization should never be withheld from a pregnant woman if she is in the high-risk category. Information available on the outcome in those in those immunized during pregnancy does not reveal any cause for concern.

Hepatitis B vaccine is generally well tolerated. The most common adverse reactions are soreness at the injection site. Injection intradermally may produce a persisting nodule at the site of the injection, sometimes with local pigmentation. Other reactions include fever, rash, malaise and influenza-like syndrome, arthritis, arthralgia, myalgia.

Vaccines available in Malaysia

- Encovax-B (Hepatitis B)
- HB Vax 11
- Euvarx-B
- Korea Green Cross Hepatitis B vaccine
YELLOW FEVER VACCINE
rashes, injection site reaction, herpetic zoster, pharyngitis, cellulitis, hepatitis, pneumonia, erythema multiforme and Stevens-Johnson syndrome, arthropathy, thrombocytopenia, anaphylaxis, vasculitis, aplastic anemia, neuropathies.

**Vaccines available in Malaysia**

- Varilrix
- Varivax
- Okavax

**Target groups**

All susceptible individuals, regardless of age, who are at risk for varicella exposure.

**Evidence for effectiveness**

Pre-licensure, controlled, clinical trials demonstrated varicella vaccine to be 70-91% effective for preventing varicella and >95% effective for preventing severe varicella. In adults, effectiveness is shown by one nonrandomized controlled trial and two prospective cohort studies with maximum duration of follow-up of six years. Further evidence is provided by one RCT providing combined data from both arms of a two dose adult trial. All but one adult study calculated effectiveness based on self-reporting of disease. Adult and child vaccinees experiencing close contact with varicella are also protected.1,4 (Level 4-5)

**Special storage procedures**

Varivax requires special storage issues because of its sensitivity to temperature. Shipment and storage in a frozen state is essential to maintain potency.

**References**


**Combination vaccine for hepatitis A and B (Twinrix)**

This is a combined vaccine formulated by pooling bulk preparations of purified inactivated hepatitis A (HA) and purified hepatitis B surface antigen (HBsAg), separately adsorbed onto aluminium hydroxide and aluminium phosphate. The HA virus is propagated in MRC-5 human diploid cells. HBsAg is produced by culture in a selective medium, of genetically engineered yeast cells

The standard primary course consists of three doses, the first administered at the elected date, the second one month later and the third six months after the first dose. In exceptional circumstances in adults when travel is anticipated within one month or more after initiating the course but insufficient time is available to follow the standard 0,1,6 months schedule, a schedule of three intramuscular injections given at 0,7 and 21 days may be used with a fourth dose recommended 12 months after the first.

This vaccine is targeted primarily for travelers.

**Evidence for effectiveness**

In a pivotal study of an accelerated schedule, two groups with comparable demographic data were recruited from travel clinics in Germany and the United Kingdom and given Twinrix and monovalent Hepatitis A or Hepatitis B respectively. It was found that one week after the third dose, 100% of subjects in the Twinrix group were seropositive for hepatitis A virus antibodies compared to 99% in the group given monovalent hepatitis A or Hepatitis B vaccine (Nortrup HD, Dietrich M, Zuckerman JN et al. Vaccine 2002;20: 1157-62) (Level 2)
Influenza

Influenza is a contagious viral respiratory illness that is caused by the influenza virus. There are three types of influenza viruses: A, B, and C. Each type has subtypes that can cause illness in humans. Influenza is highly contagious and can spread quickly through the air when an infected person coughs or sneezes. The virus can live on surfaces for up to 24 hours, allowing it to be spread to others who come into contact with the surface. Influenza can cause mild to severe illness, and in some cases, can lead to death. The best way to prevent influenza is through vaccination. Additionally, good hygiene practices such as frequent handwashing, covering coughs and sneezes, and avoiding close contact with sick people can help prevent the spread of the virus.
References


Contraindications and adverse reactions

Inactivated influenza vaccine should not be given to persons known to have anaphylactic hypersensitivity to eggs or to other components of the influenza vaccine. Persons who have documented immunoglobulin E (IgE)-mediated hypersensitivity to eggs including those who have occupational asthma or other allergic response to egg protein might also be at risk for allergic reaction to influenza vaccine. Persons with acute febrile illness usually should not be vaccinated until their symptoms have abated.

Soreness at the vaccination site is the most frequent side effect. Systemic reactions include fever, malaise, myalgia. These reactions begin 6-12 hours after vaccination and can persist for 1-2 days. Immediate, presumably allergic reactions, rarely occur after influenza vaccination.

Vaccines available in Malaysia

Vaxigrip

Target groups

- Residents of institutions for the elderly or the disabled
- Elderly non-institutionalized individuals with ≥1 of the following chronic conditions: chronic cardiovascular, pulmonary, metabolic or renal disease, or who are immunocompromised
- Other individuals in the community who have chronic cardiovascular, pulmonary, metabolic or renal disease, or who are immunocompromised
- Those with regular, frequent contact with high-risk persons such as health care workers and household contacts
- Large groups of pilgrims gathering in the same area for several weeks

Evidence for effectiveness

A meta-analysis by Gross et al. based on 20 cohort studies gave the following pooled estimates of vaccine efficacy: 56% for preventing respiratory illness, 53% for preventing pneumonia, 48% for preventing hospitalization and 68% for preventing mortality. In the case-control studies, vaccine efficacy ranged from 32-45% for preventing hospitalization, 31-65% for preventing mortality from pneumonia and influenza, 43-50% for preventing hospital deaths from all respiratory illness and 27-30% for preventing deaths from all cases. In the randomized double-blind placebo controlled trials the vaccine was found to result in 50% or greater reduction in influenza-like illness. In conclusion, annual vaccination of elderly persons >65 years is an indispensable part of their care. (Level 1)
Evidence of Performance

- Improved academic achievement, as measured by grades and test scores.
- Increased student engagement and participation in class.
- Positive feedback from teachers and parents regarding student behavior.
- Higher graduation rates and post-secondary education enrollment.
- Reduced suspensions and expulsions.

For more information, contact [Contact Information].
TYPHOID

Introduction

Typhoid fever is an acute invasive septicemic illness caused by Salmonella typhi (current taxonomic designation S. enterica serovar Typhi). This organism consists of 3 different antigens: the somatic (O) antigen, the flagellar (H) antigen and the capsular (Vi) antigen. The Vi antigen is the polysaccharide responsible for virulence. Typhoid fever may be preceded by a diarrheal illness. It is usually associated with constitutional symptoms. Untreated it may result in perforation, gastrointestinal haemorrhage, peritonitis and death.

In Malaysia, the incidence of enteric fever (typhoid and paratyphoid fever) ranged from 906 cases with 8 deaths in 1995 to 605 cases with 1 death in 2001. Another major concern is the emergence of multi-drug resistant S. typhi especially from the Indian subcontinent, Asia and the Middle East.

Nature of vaccine

There are two types of typhoid vaccine. A parenteral vaccine based on the Vi polysaccharide antigen as well as an oral vaccine containing a live attenuated Ty 21a strain of S. typhi are available.

Mode of administration and dosing regimen

The Vi vaccine is administered as a single 0.5ml dose intramuscularly with boosters at 3 yearly intervals. The oral Ty 21a vaccine is administered by giving one capsule on days 1, 3 and 5, one hour before a meal. Boosters are required every 3 years to maintain immunity.

Contraindications and adverse reactions

The live oral (Ty21a) vaccine is contraindicated in immunocompromised patients and should not be administered to anyone on antimicrobial therapy. It should be administered 24 hours after an antimalarial dose. In addition, it should be delayed for 3 days if malaria prophylaxis is administered. The only contraindication to vaccination with the parenteral (VI) vaccine is a history of severe local or systemic reactions following a previous dose. Typhoid vaccines are generally safe. Local reactions at the injection site consisting of pain, redness and swelling can occur with the parenteral vaccines. Fever and headache can occur but are uncommon.

Availability in Malaysia

JAPANESE ENCEPHALITIS

Introduction

Japanese encephalitis is one of the most common causes of viral encephalitis worldwide, with estimated 50,000 cases and 15,000 deaths annually. About one third of patients die, and half of the survivors have severe neuropsychiatric sequela. Most of China, Southeast Asia and the Indian subcontinent are affected by the virus. Japanese encephalitis virus is transmitted by Culex mosquitoes.

The true incidence of JE in Malaysia is not known but the virus has been isolated from mosquitoes. Antibodies to the virus have been detected in swine and other animals and confirmed clinical cases have been reported.

Nature of vaccine

The biken vaccine is a freeze-dried preparation of formaldehyde inactivated JE virus derived from infected mouse brain. Reconstituted vaccine should be stored at 35-46 F and used within 8 hours. Reconstituted vaccine is a clear, colourless liquid. Do not administer if discoloured or contains particulate matter.

Mode of administration and dosage regimen

Initially 2 subcutaneous injections of 1 ml each at 1-2 weeks interval & additional 1 ml after 1 year. After receiving the 3 doses, another 1 ml is given every 3-4 years to maintain immunity. For adults >60 years or those going to highly endemic areas for the first time, 1 more injection of 1 ml is recommended 1 month after the initial 2 doses.

Precautions

Vaccinated persons should be monitored for 30 minutes and have ready access to medical care for 10 days after vaccination. Injectable epinephrine should be immediately available in the event of anaphylactic reactions (severe allergic reaction with shock).

Contraindications and adverse reactions

Fever, severe malnutrition, cardiovascular, renal or hepatic diseases in acute, exacerbation or active phases, a history of abnormal adverse reaction caused by this vaccine and a history of spasmodic symptoms within 1 year are contraindications.

Local reactions include redness, swelling, tenderness at the injection site. Fever, chills, headache and lassitude can also occur. In Caucasians itching, urticaria, and occasional angioedema of the face can occur several days after vaccination.
Contraindications and adverse reactions

Until the risks and benefits of BCG vaccination in immunocompromised host are clearly defined, BCG vaccination should not be administered to persons (a) whose immunologic response are impaired because of HIV infection, congenital immunodeficiency, leukemia, lymphoma or generalized malignancy. (b) whose immunologic response have been suppressed by corticosteroids, alkylating agents, anti-metabolites or radiation.

Its use in pregnancy should be avoided, though no harmful effects to the fetus have been associated with BCG vaccine.

A local reaction is common with a papule forming in 1-2 weeks. An ulcer forms in 2-6 weeks and healing occurs in about 12 weeks. Permanent scarring at the injection site occurs and keloids may form. Serious local reaction with ulceration and regional suppurative lymphadenitis with draining sinuses rarely occur. Rashes, osteitis affecting the long bones can occur several years later. Disseminated, fatal disease is extremely rare and occurs in those with impaired immunity.

Vaccines available in Malaysia

1. BCG vaccine (Merieux derived-Glaxo1077 strain)
2. Glaxo BCG vaccine (Tokyo 172 strain)
3. BCG Evans (English derived-Glaxo 1077 strain)

The BCG vaccine is available both as a multi-dose vial and a single dose vial.

Storage and handling

BCG vaccine should be stored and transported at +2 °C to +8 °C. The multi-dose vial contains a white freeze-dried plug, which disperses easily to form an opalescent liquid on reconstitution. It should be protected from exposure to light, refrigerated when not in use, and used within 8 hours of reconstitution. The diluent should not be frozen but kept cold.

Target groups

The national immunization programme recommends BCG vaccination to all newborn babies.

The efficacy of BCG vaccine in health care workers and HIV infected patients has not been well determined.

MEASLES

Introduction

Measles is a systemic viral infection whose main features are respiratory disease and rash. It is highly infectious among susceptible individuals and almost always produces clinical disease in those affected. The important impact of measles is threefold: (i) It can be severe and debilitating illness (ii) Secondary bacterial respiratory disease is common and may be severe (iii) Post-measles encephalitis is life-threatening and can leave severe sequelae. The most common complications are otitis media, diarrhea, pneumonia and encephalitis. Pneumonia is more common in young children and encephalitis is more common in adolescents and adults.

Nature of vaccine

Measles vaccine contains the live attenuated Schwarz strain. The Schwarz strain was derived from the Edmonston strain. Schwarz strain vaccine was first licensed in 1965 in United States and serves today as the standard measles vaccine in much of the world. The closely related Moraten strain was licensed in 1968 and has replaced the Schwarz strain in the United States.

Measles vaccine is available in a monovalent formulation and in combination with live attenuated rubella and mumps vaccines (MMR).

Mode of administration and dosing regimen

The live attenuated measles vaccine is administered in 0.5 ml subcutaneously. The standard dose of live attenuated measles vaccine contains between 10^7 and 10^8 TCID50 of infectious measles virus, usually in 0.5 ml.

Contraindications and adverse reactions

Pregnancy, anaphylactic allergy to eggs or neomycin, compromised immunity, except HIV infection and certain hematological malignancies that are in remission and for which immunosuppression therapy has been stopped for at least 3 months, and recent administration of immunoglobulin, IGIV, or other immunoglobulin containing products are all contraindications.

Like measles virus, measles vaccine is associated with transient immunosuppression that resolves within 4 weeks after vaccination. Tuberculin skin test may be abrogated for 4-6 weeks after immunization, but unlike wild-type measles vaccine does not exacerbate tuberculosis.
Evidence for effectiveness

Essentially all adult vaccinees achieve and maintain protective antitoxin levels for years. A Swedish study showed that the vaccine had a long-term efficacy rate of 94% after 10 years. Studies done in Denmark show efficacy rates of 96% after 13 to 14 years and 72% after 25 years. In one study, however, only 77% of elderly subjects had protective antitoxin levels 8 years after receiving a primary 3-dose series. Therefore, booster doses are recommended every 10 years.14

References:

MENINGOCOCCAL DISEASE

Introduction

Meningococcal disease most commonly is manifested as meningitis or septicemia, but can present as septic arthritis or pneumonia. The case fatality of meningococcal disease is 10% and substantial morbidity. Between 11-19% of survivors have sequelae, eg neurological deficit or hearing loss. Septicaemia without meningitis may be fulminant with hypotension, extensive purpura resulting from disseminated intravascular coagulopathy with high mortality. Preventing and controlling meningococcal disease remains a public health challenge because of the multiple serogroups and limitation of available vaccines. On the basis of surface polysaccharide, Neisseria meningitidis, the causative organism, is divided into 13 serogroups of which serogroups A, B, C, X, Y, Z, W-135, and L, have been associated with invasive disease. Serogroup A and C are the main cause of epidemic meningococcal meningitis. Serogroup B is generally associated with sporadic disease but may cause some upsurges or outbreaks. In 1997, a meningococcal serogroup A epidemic occurred among the Haj pilgrims and an epidemic of W-135 meningococcal disease was reported among the Haj pilgrims in year 2000.

Vaccine available

Bivalent capsular polysaccharide vaccine of serogroups A and C confers protective immunity to the 2 serogroups only. A quadrivalent polysaccharide vaccine comprising serogroups A, C, Y and W-135 is now available. A conjugate meningococcal serogroup A and C vaccine; and a conjugate meningococcal serogroup B vaccine which will induce T-cell memory response and provide long term protection for all ages are under active development at present.

Mode of administration and dose regimen

A single dose of 0.5 ml vaccine is given subcutaneously or intramuscularly. Revaccination after 2-3 years is required if the subject remains in a high risk area.

Contraindication and adverse reactions

Vaccination should be avoided during acute febrile illnesses. It is contraindicated in persons with previous serious reactions to the vaccine or its components. The adverse reaction is generally mild with pain and redness at the injection site lasting for 1-2 days. Transient fever occurs in up to 5% of vaccinees. Systemic allergic reaction and anaphylaxis has

54
The document is not legible due to the image's quality. It appears to be a page from a textbook or a report, but the text is not clear enough to transcribe accurately.
hypersensitivity reaction after a previous dose and severe febrile illness contraindications. Local reactions (usually erythema and induration, with or without tenderness) can occur after Td is administered. Fever and other systemic symptoms are less common. Arthus-type hypersensitivity reactions, characterized by severe local reactions starting 2-8 hours after an injection and often associated with fever and malaise, may occur, particularly among persons who have received multiple boosters of tetanus toxoid, adsorbed. Rarely, severe systemic reactions, such as generalized urticaria, anaphylaxis, or neurologic complications, have been reported.

Availability in Malaysia

In Malaysia, tetanus toxoid is available as follows:

- Tetanus toxoid
  - Tetavax (Aventis Pasteur)
  - Te Anatoxel Bema (Swiss Serum)
  - TT Vaccine (BioFarma, Indonesia)

Tetanus Immune Globulin (TIG) is available as follows:

- Tetanun Bema (Swiss Serum)
- Serotet (Green Cross, Korea)

At the time of printing, Td is not yet available in Malaysia.

Target groups (Toxoid indications):

- All adults lacking a complete primary series of diphtheria and tetanus toxoids should complete the series with Td.
- All adults for whom greater than or equal to 10 years have elapsed since completion of their primary series or since their last booster dose, should receive a booster dose of Td. Thereafter, a booster dose of Td should be administered every 10 years.
- Pregnant women not vaccinated previously against tetanus and diphtheria should receive two doses of Td, properly spaced. Those who have previously received one or two doses of tetanus or diphtheria toxoid should complete their primary series during pregnancy. Pregnant women who have completed a primary series should receive a booster dose of Td if greater than or equal to 10 years have elapsed since their last dose.
- Patients who have recovered from tetanus should complete the full immunisation schedule as the disease does not confer immunity.
- Patients with traumatic wounds (See post-exposure prophylaxis and treatment below).


Should an outbreak of smallpox be detected, this is considered an international emergency. WHO will help to pool available resources so as to contain the disease as rapidly and effectively as possible.

Target groups

In October 2001, the World Health Organisation further reiterated that pre-exposure vaccination of entire populations is not recommended. The reason is that there is a risk of severe reactions to the vaccine, including death. In any case, postexposure vaccination can prevent the onset of clinical smallpox. The vaccine would thus only be given to those who are at risk of exposure, namely:

- Laboratory workers in research centres involved with orthopox viruses,
- Health care workers involved in clinical trials of vaccinia recombinant vaccines, and
- Health care workers involved in search and containment exercise should an outbreak occur

Currently there are no identified target groups in Malaysia.

References


one dose of vaccine was approximately 95% efficacious in preventing mumps disease. However, field studies have documented lower estimates of vaccine efficacy, ranging from 75% to 95%. The 2-dose MMR vaccination schedule was adopted in response to increase rate of measles, but it effectively addressed the problem of primary mumps vaccine failure. (Level 2-3)

Vaccines available in Malaysia

- M-M-R II
- Priorix [Live attenuated Schwarz measles RT 4365 mumps (derived from Jeryl Lynn strain) and Wirser RA27/3 rubella strains of viruses]

References

Vaccines available in Malaysia

- M-M-R II
- Prorix [Mumps, measles and rubella vaccine]
- Genuvax [monovalent rubella vaccine]
- Enervax [monovalent rubella vaccine]

Target groups

- All susceptible adults, particularly females.
- All susceptible healthcare workers.

Evidence for effectiveness

In clinical trials, greater than or equal to 95% of susceptible persons aged greater than or equal to 12 months who received a single dose of strain RA 27/3 rubella vaccine developed serologic evidence of immunity. Clinical efficacy and challenge studies indicate that greater than 90% of vaccinated persons have protection against both clinical rubella and viremia for at least 15 years 1-4. (Level 2-3)

Evidence for effectiveness

A recent systematic review 2 concluded that there is not enough evidence to evaluate the effectiveness of any plague vaccine, or the relative effectiveness between vaccines and their tolerability. (Level 1) Circumstantial data from observational studies suggest that killed types may be more effective and have fewer adverse effects than attenuated types of vaccine. No evidence appears to exist on the long-term effects of any plague vaccine.

References


References

3. Tischer A, Gerike E Immune response after primary and re-vaccination with different combined vaccines against measles, mumps, rubella. Vaccine. 16(14):1362-52, 2000
RUBELLA

- Introduction
- General information
- Transmission
- Incubation period
- Clinical symptoms
- Diagnosis
- Treatment
- Prevention

Contaminations andentine reaction

- Exposure and infection
- Risk factors
- Prevention measures

Complications
- Neurological complications
- Cardiac complications
- Ocular complications
- Renal complications

Prognosis
- Recovery and long-term effects

References

Prometemhs
• at animal quarantine premises for imported animals and zoological establishments
• as conveying agents authorised to carry imported animals
• at national ports of entry where contact with imported animals is likely (e.g., Customs and Excise Officers)
• as veterinary and technical staff of the Ministry of Agriculture and Fisheries
• at approved research centres where primates and other imported animals are housed
• in laboratories handling rabies virus

2. Travelers planning to spend more than one month in areas of countries where rabies is a constant threat

Evidence for effectiveness

Studies demonstrate remarkably good immunogenicity in both preexposure and postexposure prophylaxis using HDCV.12,51 (Level 2). The use of human rabies immunoglobulin (HRIG) in conjunction with vaccination has clearly reduced human rabies mortality.1 (Level 4)

References


In general vaccination of pregnant women and immunocompromised persons should be avoided. However, if immediate protection is needed, eIPV is recommended.

Oral poliovirus vaccine (OPV) has, in rare instances, been associated with paralysis among healthy recipients and their contacts. The risk however is very low. No serious side effects have been documented with eIPV but as the vaccine contains trace amounts of streptomycin and neomycin, hypersensitivity to these antibiotics may occur.

Vaccines available in Malaysia

1. Oral poliovirus vaccine (OPV)
2. Inactivated poliovirus vaccine (eIPV)

Target groups

• Travelers to areas where wild poliovirus is epidemic or endemic.
  ○ If never vaccinated, the traveler would need two doses of eIPV one month apart. If travel plans do not permit this interval, a single dose of either OPV or eIPV is recommended.
  ○ If previously incompletely vaccinated with OPV or IPV, give the remaining dose of either vaccine for completion, regardless of interval since the last dose or the type of vaccine previously received.
  ○ If have previously completed a primary series of OPV, give a single supplementary dose of OPV.
  ○ If have previously completed a primary series of IPV, give a single supplementary dose of OPV or eIPV.

• Health-care personnel in close contact with patients who may be excreting wild poliovirus will need to be vaccinated. In the case of a health care worker without proof of having completed a primary series, completion with eIPV is recommended because adults have a slightly increase risk of vaccine-associated paralysis after receiving OPV. In addition, vaccine poliovirus may be excreted by OPV recipients for up to or more than 30 days thus increasing the risk of vaccine-associated paralytic poliomyelitis among the susceptible immunocompromised patients.

• Laboratory personnel handling specimens that may contain wild poliovirus

Evidence for effectiveness and cost effectiveness

Tested in both industrialised and developing countries, the enhanced-potency IPV appears to be effective.12,51 In one randomized control trial the third dose of inactivated polio vaccine produced significant increases in the reciprocal geometric mean titer against each of the three poliovirus types and resulted in significantly higher reciprocal geometric mean titers after three doses of vaccine
RABIES VACCINE

Introduction

Rabies is due to the rabies virus and is transmitted to man by contact, (generally as the result of a bite) with animals carrying the virus. The incubation period is generally two to eight weeks, but may range from nine days to two years. It manifests itself in the form of acute encephalomyelitis, the development of which is always fatal resulting from respiratory paralysis.

Rabies is widespread throughout the world. In Asia domestic animals like dogs and cats are predominantly infected. Indigenous human rabies is rarely seen in Malaysia because of the strict preventive measures as well as control of imported animals. The small number of cases that are reported appear to occur along the borders of Thailand, a country where rabies is endemic. The last reported case was in 1989 in Terengganu, following the bite of an infected dog.

Nature of vaccine

Rabies vaccine is used for pre-exposure protection, whilst both vaccine and rabies specific immunoglobulin may be needed for rabies post-exposure treatment.

The vaccine currently available is a human diploid cell vaccine (HDCV) which was first introduced in 1978. It is a killed virus human virus, grown in WI-38 (US) or MRC-5 (Europe) cells and is inactivated by tri-n-butyl phosphate (WI-38 strain) or beta-propiolactone (MRC-5 strain).

The human rabies immunoglobulin (HRIG) is prepared by cold ethanol fractionation of plasma to obtain a concentrated gamma globulin fraction from hyperimmunized human donors. (Further details may be obtained from the section on "Passive Immunisation").

Mode of administration

Two forms of human diploid cell vaccine (HDCV)

- Intramuscular – lyophilized vaccine reconstituted to 1.0 mL before administration
- Intradermal – reconstituted to 0.1 mL before administration

Dosing regimen

1. Pre-exposure prophylaxis
   - Intramuscular injection: Three 1.0 mL injections of HDCV on days 0, 7 and 28
   - Intradermal injection: Three 0.1 mL injections of HDCV on days 0, 7 and 21 or 28

PNEUMOCOCCUS

Introduction

Streptococcus pneumoniae (pneumococcus) is a leading cause of illness in young children and causes illness and deaths among the elderly and persons who have certain underlying medical conditions. Pneumococcal diseases include pneumonia, bacteremia, meningitis, otitis media and sinusitis. There are more than 90 serotypes identified, based on the antigenic and chemical composition of pneumococcal capsular polysaccharide. The capsular polysaccharide also acts as the virulence factor, inhibiting phagocytosis and interfering with intracellular killing of phagocytosed bacteria.

Vaccines available

Pneumococcal polysaccharide vaccine

The 14-valent pneumococcal vaccine was first licensed in 1977 which was later replaced by the 23-valent vaccine in 1983. The composition of the pneumococcal vaccine was determined by the observed frequency of individual serotypes that caused invasive diseases. The 23-valent vaccine represents at least 85-90% of the serotypes that cause invasive pneumococcal infections. Drug-resistant pneumococcal serotypes causing invasive infection are also represented in the 23-valent vaccine. One dose (0.5 mL) of the 23-valent vaccine contains 25 μg of each capsular polysaccharide antigen (serotypes 1, 2, 3, 4, 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B, 17F, 18C, 19A, 19F, 20, 22F, 23F, and 33F).

Pneumococcal conjugate vaccine

Pneumococcal polysaccharide antigens are covalently coupled to carrier proteins to induce immunological response in children under 2 years of age. Current conjugate vaccine development has focused on the serotypes most commonly causing infections in childhood. The 7-component conjugate pneumococcal vaccine efficacy study is ongoing.

Mode of administration and dosing regimen

One dose of 0.5 mL 23-valent vaccine is administered by intramuscular or subcutaneous route. Routine revaccination of immunocompetent persons previously vaccinated is not recommended. However, a single revaccination is recommended for persons aged 2 years who are at highest risk for serious pneumococcal infection and those who are likely to have a rapid decline in pneumococcal antibody levels, provided 5 years have elapsed since receipt of the first dose of pneumococcal vaccine.