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## INTRODUCTION

Infectious diseases are the most common causes of morbidity and mortality in childhood. Immunisation is the most cost-effective way of preventing these diseases or reducing their severity. All children have the right to receive complete immunisation. Thus it is important for the health staff to equip themselves with current knowledge about developments in immunisation.

The Ministry of Health, Malaysia started its immunisation programme against 6 target diseases. They are :

- Tuberculosis
- Diphtheria
- Whooping cough (Pertussis)
- Tetanus
- Polio
- Measles

In 1988, MOH introduced the rubella immunisation for girls in Form 3 (15 years). The age of immunisation was subsequently lowered to girls in Year 6 (12 years). In 1989, the Hepatitis B immunisation programme for the newborn was started.

The Ministry of Health is introducing the new immunisation schedule in the year 2002. With this in mind this booklet has been developed to:

- Update the health staff's knowledge on immunisation with emphasis on Hib and MMR.
- Enable health staff to impart correct information to the public on these illnesses, vaccines and the new immunisation schedule.

## **Section 1 : Diseases for Which We Immunise and Their Effects**

The diseases in this category are those that cause substantial risk of mortality (death), morbidity (serious illness) and whether the diseases can be treated.

There are many diseases that can be immunised against such as tuberculosis, measles, mumps, rubella, diphtheria, pertussis, tetanus, chicken pox, Japanese encephalitis etc. Some of these diseases are more common and have more serious complications than others. As such the Ministry of Health of Malaysia recommends immunisation against diseases such as tuberculosis, hepatitis B, diphtheria, pertussis, tetanus, poliomyelitis, Hib disease, measles, mumps and rubella.

### **Tuberculosis (TB)**

- TB is caused by bacteria usually entering the respiratory tract, although it can affect other organs in the body including the brain, gut and kidneys.
- It is acquired through airborne transmission from an infected person, often a member of the same household.
- Later complications may include infections of the lymph nodes, bronchitis and emphysema, and more rarely tuberculosis meningitis, tuberculosis peritonitis, tuberculosis bones and joints and renal tuberculosis.
- TB continues to be a disease associated with poverty and overcrowding. In recent years, TB has reemerged as a significant condition due to increasing immigrant population and the increasing incidence of HIV.

### **Hepatitis B**

- Hepatitis B is a blood borne viral infection which presents as jaundice and fever.
- It can cause chronic infection in 10 percent of all cases and may result in cirrhosis and liver cancer.
- In addition the carrier remains a source of infection to others.
- In Malaysia, Hepatitis B immunisation in the newborn was started in 1989 and subsequently extended to the health staff.

### **Diphtheria**

- Diphtheria is caused by bacteria, which produces a toxin (poison) that inflames the membranes of the nose and throat resulting in blocked airways, which may lead to death by suffocation.
- Antibiotics can kill the bacteria, but if an antitoxin is not given quickly, the toxin attacks the heart and nervous system causing permanent damage and even death.
- Immunisation is the only effective way to prevent your child from the disease.

## **Pertussis (Whooping Cough)**

- Pertussis is an infectious disease caused by bacteria that affect the throat and airways, resulting in paroxysmal coughing.
- The illness, resulting in a chronic cough can last for 3 months and brings suffering to the child even after appropriate treatment.
- Death is most common in babies under 6 months.
- Serious complications include convulsions, lung damage, pneumonia, brain damage and bleeding into the covering of the eyes.

## **Tetanus**

- Tetanus spores are present in the soil. The tetanus spores are commonly transmitted through contamination of wounds, from contaminated nails, scissors and other equipments.
- There is no cure and it can only be prevented by immunisation.

## **Poliomyelitis**

- Polio is caused by the polio virus which attacks the nerves .
- It is spread by contamination of hands, food or water from the faeces of an infected person.
- Polio causes paralysis by affecting the nerves supplying the muscles of the limbs. Sometimes the breathing muscles are also affected and this results in respiratory failure and death.

## **Hib Disease**

- Hib disease is caused by a bacterium (Haemophilus influenzae type b)
- Hib, in Malaysia, causes 30-50% of meningitis in children under 5.
- It can also cause epiglottitis which blocks the entrance of the airway and may lead to death by suffocation.
- Hib also causes pneumonia which can be treated with antibiotic.
- It can lead to complications such as cerebral palsy, hydrocephalus, deafness blindness and mental retardation and even death.

## **Measles**

- Measles virus is one of the most infectious viruses and without immunisation **everyone** would be at risk from measles.
- It is not a minor disease of childhood. Death is more common in babies under a year and rises with advancing age after 9 years.
- It is caused by a virus for which there is no treatment.
- Complications are common in approximately 15 children out of every 100.
- They include ear infections leading to deafness, bronchitis, pneumonia, eye infection leading to blindness, convulsion, encephalitis and a rare but fatal complication known as subacute sclerosing panencephalitis (SSPE) that often follows early measles infection which may not have been recognized.

## **Mumps**

- Mumps is caused by a virus and is characterized by either unilateral or bilateral swelling of the parotid glands.
- It is a common cause of viral meningitis. In young boys it can cause inflammation of the testes (orchitis) which may result in infertility. Other complications include encephalitis, sensor neural hearing loss, and pancreatitis.

## **Rubella**

- Rubella is caused by the Rubella virus.
- If contracted in early pregnancy it will cause foetal damage in 90 per cent of cases.
- Babies may be stillborn or suffer one or multiple defects known as Congenital Rubella Syndrome. These include cataracts leading to blindness, deafness or impaired hearing, heart defects, intrauterine growth retardation and mental retardation .

## **Section 2 : Basic Principles of Immunisation**

Immunisation is one of the safest and most effective way of giving protection against certain infectious diseases such as diphtheria, whooping cough, tetanus, polio, tuberculosis, measles, rubella, mumps, and Hib disease. Immunisation is a process to build resistance or immunity to specific infections through the giving of vaccines, that is, getting the injection or swallowing the drops.

### **2.1 Why Immunise**

- Immunisation is a positive health benefit for children as it can prevent many of the serious infectious diseases that kill and handicap children.
- For most of the immunisable diseases there is either no treatment or the complications of the disease leads to permanent disabilities.
- Prevention is better than cure and avoids unnecessary suffering to the individual, child and disruption to the family.
- It prevents outbreaks and epidemics of infectious diseases.
- It can eradicate or decrease the incidence of certain diseases e.g. polio, smallpox, diphtheria and Hib
- Vaccination is the single most cost- effective health interventions.

### **2.2 Facts and Fallacies of Immunisations**

The fallacies around vaccination are nothing new. Thus it is important that healthcare professionals are well-informed and able to counteract them.

#### **i) Vaccines don't work**

If vaccines didn't work, then we would see substantial outbreaks of preventable diseases. Although we know that not everyone has immunity, we have no way of knowing who these individuals are. It is important that everyone is immunised so that everyone is protected.

#### **ii) Immunisation isn't necessary for my child because there are not many of these illnesses about.**

This is not true. It is important to keep your child healthy. In Malaysia there are still reported cases of immunisable diseases.

#### **iii) I can protect my baby by keeping him/her away from other children.**

It is just not possible or advisable to totally isolate your baby. Indeed, it is not just other children but adults as well who can carry the bacteria and viruses. Also, tetanus bacteria are present in the soil and it is impossible to protect your child from minor cuts and grazes which carry a risk of infection.

**iv) Vaccines aren't safe - they carry more risks than the illnesses themselves.**

No, vaccines are safe. All vaccines are rigorously tested for their effectiveness and safety. The incidence and severity of adverse reactions are also tested and continue to be monitored even after the vaccines have been licensed. We know that the majority of vaccines may have a small risk of side effects, but these are less common than the risk from actual disease.

### Section 3 : New Immunisation Schedule

- The DPT+Hib and MMR vaccines will be given routinely by the Ministry of Health from the date of launch of the revised schedule on **1<sup>st</sup> July 2002**.
- In the first 6 months, 3 doses of Hib immunisation are needed by babies. This is given at 2<sup>nd</sup>, 3<sup>rd</sup> and 5<sup>th</sup> month. This is given together with DPT immunisation as a single injection.
- DPT and OPV will be given in an accelerated schedule at 2, 3 and 5 months from the existing schedule of 3,4 and 5 months.
- MMR will be given at 12 months. A booster will be given at Year 1 in primary school.

#### New Immunisation Schedule

Immunisation	Age in Months									School Level		
	0	1	2	3	5	6	9	12	18	Year 1	Year 6	Form 3
BCG	1									No scar		
Hepatitis B	1	2			3							
DPT+Hib			1	2	3							
DPT									B	DT		
OPV			1	2	3				B	B		
Measles						S						
MMR								1		Booster		
Rubella											1*	
Tetanus												B

#### Notes:

- “No scar” means BCG to be given only to children without a BCG scar at Year 1 in school.
- “S” means a single extra dose of mono component measles at 6 months to all children in **Sabah** only.
- “B” means booster dose.
- “DT” means diphtheria & tetanus vaccine.
- “1\*” means that the Rubella single dose at Year 6 will continue to be given to girls until the children who have received the primary and booster dose of MMR have reached Year 6.

## Inclusion Criteria

- Babies born on and after **1st May 2002** are eligible for DPT+Hib immunisation at 2<sup>nd</sup>, 3<sup>rd</sup> and 5<sup>th</sup> month (i.e. 3 doses of DPT and 3 doses of Hib in a combination vaccine) and booster DPT at 18 months of age (**Revised Schedule**). No booster dose for DPT+Hib is required at 18 months.
- Any child **born between 1<sup>st</sup> January 2001 and 30<sup>th</sup> April 2002** are not eligible for the full revised schedule but will receive a single dose DPT+Hib (i.e. 1 dose of DPT and 1 dose of Hib in a combination vaccine) at 18 months of age (this serves as a catch up strategy).

Examples:

- a. If a child is born on 1st June 2002 he gets 3 doses of DPT+Hib and booster DPT following the new schedule.
- b. If a child is born on 1st March 2002 he gets 3 doses of DPT following the old schedule and DPT+Hib catch up at 18 months
- c. Any child born before 1st January 2001 does not receive any DPT+Hib immunisation and will follow the old schedule.

## Late presentation/Defaulters

Age of presentation of child at the clinic	Immunisation (type & number of doses)
From 2 to 6 months of age	3 doses of DPT+Hib (i.e. 3 doses of Hib and 3 doses DPT in a combination vaccine)
Above 6 months to 1 year of age	2 doses of DPT+Hib and 1 dose of DPT (i.e. 2 doses of Hib and 2 doses DPT in a combination vaccine, and 1 dose of DPT)
Above 1 year and below 5 years of age	1 dose of DPT+Hib and 2 doses of DPT (i.e. 1 dose of Hib and 1 dose DPT in a combination vaccine, and 2 doses of DPT)
Other presentations (apart from the above)	Require individualized decisions,( discuss with MOH/FMS). Example a child who has received the first dose of DPT+Hib at 2 months and defaults until 12 months of age should receive only one further dose of DPT+Hib and another dose of DPT one month later.

NB: Each dose should be given with one month interval in between.

## Section 4 : Hib Immunisation

### 4.1 What is Hib? What disease does it cause?

Hib is an abbreviation for Hemophilus influenzae type b, a bacterium that causes severe infections, including

- Bacterial meningitis-inflammation of the membranes that cover and protect the spinal cord and brain.
- Pneumonia-inflammation of the lungs. Also known as acute respiratory infection (ARI).
- Epiglottitis-inflammation of the area around the vocal cords and can lead to obstruction of the airway.
- Septicaemia-presence of pathogenic bacteria in the blood; also called blood poisoning
- Septic Arthritis-inflammation of the joints

Hib disease is NOT the same as Hepatitis B or HIV infection. The vaccine against Hepatitis B is a different vaccine called Hepatitis b vaccine.

### 4.2 Why is Hib disease a problem?

Hib disease is a problem because:

- It causes serious diseases that can result in hospitalization or death, including;

**Pneumonia:** This is one of the contributors of death of children in Malaysia.

**Bacterial Meningitis:** In Malaysia Hib is the most common cause of bacterial meningitis, which accounts for about 30% to 50%.

Up to 10% of these children die and 30% suffer permanent brain damage which leads to blindness, deafness, cerebral palsy, learning and behavioural problems.

- It is easily spread, especially among children.

#### **4.3 Who can get Hib disease? Who is most at risk?**

Hib disease most often affects children under 5 years of age; children below 12 months of age are most at risk. By age five most children have developed antibodies against the disease, so serious disease is uncommon in older children and adults.

Infants who are breastfed received some protection from Hib disease from their mothers but they still require the Hib immunisation for maximum protection. Close contact with other children increases the risk of Hib infection.

#### **4.4 How is it spread?**

Hib bacteria are passed from child to child in droplets of saliva expelled when an infected child coughs or sneezes. Hib is also spread among children when they share toys and other things that they put in their mouths.

#### **4.5 How can Hib disease be prevented?**

Hib vaccine, a newly introduced vaccine will prevent all diseases caused by Hib bacteria in most children. Hib vaccine does not protect against diseases caused by other bacteria or viruses. Thus, after Hib immunisation, a child may still get other types of pneumonia and meningitis or viral infection such as flu.

#### **4.6 Who should be immunised with Hib vaccine?**

All infants aged 2, 3 and 5 months of age should be given Hib immunisation.

#### **4.7 How many doses are needed? When should they be given?**

Hib immunisation schedule differs from country to country. In Malaysia, three doses are given as follows :-

<b>Age</b>	<b>Dose</b>
2 months	1 <sup>st</sup> dose
3 months	2 <sup>nd</sup> dose
5 months	3 <sup>rd</sup> dose

#### **4.8 How is Hib immunisation given?**

Hib immunisation is given by injection in the thigh. It is combined with diphtheria, pertussis and tetanus vaccines (DPT) and given as a single injection. It can be given safely with other vaccines eg. Hepatitis B vaccine.

#### **4.9 What are the side effects?**

Hib immunisation is safe. Side effects which may occur are usually mild and are not dangerous when compared to getting the disease or its complications. However, redness, swelling or pain may occur at the injection site. These usually start within one day after the immunisation and last from one to three days. Less commonly, children may develop fever for a short time after immunisation.

**Immunise your child according to the schedule**

## **Section 5 : MMR Immunisation**

### **5.1 What is MMR?**

MMR is an abbreviation for Measles, Mumps and Rubella. It is a combination vaccine given as a single injection to protect your child against measles, mumps and rubella.

### **5.2 What is Measles?**

Measles is an infectious disease caused by Measles virus.

- Signs and symptoms include rash, high fever, cough, runny nose and red watery eyes lasting about a week.
- Measles can result in severe complications including pneumonia (infection of the lungs), encephalitis (infection of the brain), blindness, deafness and fits.
- Measles can be fatal and may lead to death.

### **5.3 What is Mumps?**

Mumps is a disease caused by Mumps virus.

- Signs and symptoms include fever, headache, muscle ache and swelling of the lymph nodes close to the jaw and ear.
- Mumps can lead to severe complications including encephalitis (infection of the brain), inflammation of the testicles that may result in infertility, inflammation of the pancreas and deafness.

### **5.4 What is Rubella?**

Rubella is a disease caused by Rubella virus.

- Signs and symptoms include rash and fever for 2 to 3 days. It is usually a mild disease in children and adults.
- However if a woman who has never been immunized gets rubella during pregnancy, it can affect the unborn baby and lead to multiple abnormalities known as Congenital Rubella Syndrome. This includes deafness, cataracts (leading to blindness), heart defects, growth and mental retardation.

### **5.5 Why are measles, mumps and rubella a problem?**

Measles, mumps and rubella are a problem because:

- They affect both children and adults
- They are easily spread from person to person
- These diseases can result in serious complications and may lead to death

**5.6 How are measles, mumps and rubella spread?**

All these 3 diseases are spread from person to person in droplets of moisture when an infected person coughs or sneezes.

**5.7 How can Measles, Mumps and Rubella be prevented?**

MMR immunisation will prevent all these diseases.

**5.8 Who should be given MMR immunisation?**

All children aged 1 year and in Year 1 ( primary school) should be immunised.

**5.9 How many doses are needed? When should it be given?**

MMR immunisation is given in 2 doses.

<b>Age</b>	<b>Dose</b>
12 months	1 <sup>st</sup> dose
Year 1 Primary school	Booster

**5.10 How is MMR immunisation given?**

MMR is a combination immunisation made up of Measles, Mumps and Rubella vaccines. It is given as a single injection in the thigh (young child) or in the arm of an older child.

**5.11 What are the side effects of MMR immunisation?**

MMR immunisation is safe. Side effects which may occur are usually mild and are not dangerous when compared to getting measles, mumps and rubella or their complications. However, a mild rash, slight swelling of the lymph nodes in the neck, low grade fever and sleepiness may occur 7 to 10 days following the injection.

## **Section 6 : Frequently Asked Questions by Parents Regarding Immunisation**

Your child needs all the care and protection that you can give. Begin by making sure' that your child gets immunised on time.

### **6.1 What is immunisation?**

#### Immunisation

- A simple, safe and effective way of protecting children against certain diseases.
- This can be done by giving vaccines to stimulate the body's defense mechanism to produce antibodies.
- Vaccines are modified or killed virus/ bacteria, which are given by injection or by mouth.

#### Immunity

There are 2 types of immunity

- Active : Antibodies are produced following exposure to the disease
- Passive : Antibodies are produced after immunisation

### **6.2 What are the diseases that I can protect my child against?**

Immunisation protects your child against many childhood diseases such as:

- Tuberculosis
- Hepatitis B
- Diphtheria
- Pertussis
- Tetanus
- Polio
- Hib disease caused by Haemophilus influenzae type b (bacteria)
- Measles
- Mumps
- Rubella

### 6.3 What are the complications that can be prevented through immunisation?

<u>Disease</u>		<u>Complications</u>
• Tuberculosis	-	pneumonia
	-	meningitis (infection of the coverings of the brain)
	-	infection of other organs such as the gut, bones, joints and kidneys
	-	death
• Hepatitis B	-	chronic liver disease
	-	liver cancer
• Diphtheria	-	breathing difficulties
	-	heart problem
	-	nerve problems.
• Pertussis (whooping cough)	-	pneumonia
	-	fits
	-	death in young children.
• Tetanus	-	stiffness and spasms of the muscles leading to severe pain
	-	breathing difficulties
	-	death.
• Polio	-	paralysis (physical disabilities)
	-	encephalitis (brain infection)
	-	death.
• Hib disease (Haemophilus influenzae type b)	-	pneumonia
	-	meningitis (infection of the coverings of the brain) , deafness, blindness, cerebral palsy and mental retardation
	-	epiglottitis (blockage of the airway) which may lead to death by suffocation
• Measles	-	diarrhoea
	-	pneumonia
	-	meningitis (infection of the coverings of the brain)
	-	encephalitis (brain infection)
	-	death
• Mumps	-	encephalitis (brain infection)

- orchitis (inflammation of the testes) which may cause infertility.
- Rubella
  - Rubella is usually a mild disease of childhood
  - However, babies born to mothers infected with rubella during pregnancy can develop abnormalities known as Congenital Rubella Syndrome. These include cataract leading to blindness, deafness, heart defects, growth and mental retardation

#### 6.4 Why should I immunise my child?

- To protect him from diseases which can be prevented through immunisation.
- These diseases can cause serious complications and even death

#### 6.5 When should I bring my child for immunisation?

Bring your child for immunisation according to the new immunisation schedule.

#### Immunisation Schedule

Age	At birth	1 month	2 months	3 months	5 months	12 months	18 months	Std. 1	Form 3
Type of immunisations	BCG Hepatitis B Dose 1	Hepatitis B Dose 2	DPT+ Hib Dose 1 Polio Dose 1	DPT+ Hib Dose 2 Polio Dose 2	DPT+ Hib Dose 3 Polio Dose 3 Hepatitis B Dose 3	MMR Dose 1	DPT Booster dose Polio Booster dose	MMR Booster dose Polio Booster dose DT Booster dose	Tetanus Booster dose

**IT IS IMPORTANT TO COMPLETE YOUR CHILD'S IMMUNISATION ACCORDING TO THE NEW SCHEDULE**

- If your child missed any of these immunisations please bring your child to the health clinic.
- It is important to complete your child's immunisation according to the new immunisation schedule.
- DPT + Hib is given as a single injection (4 in 1).

#### **6.6 Is immunisation safe?**

- Immunisation is very safe
- Side effects which may occur are usually mild and not dangerous when compared to getting the diseases or their complications.
- Serious side effects such as high grade fever ( more than 38 °C), generalized rash and swelling and fits seldom occur
- If your child has any of these serious side effects, bring your child to the clinic/hospital immediately.

#### **6.7 Can more than one immunisation be given at the same time?**

- Yes more than one immunisation can safely be given at a single visit
- Can be given in different parts of the body such as both the thighs or arms.

#### **6.8 Can my child be immunised if he is not well?**

Your child can be safely immunised if he has minor illnesses such as:

- Low grade fever
- Ear infection
- Cough
- Runny nose

#### **6.9 Can my child be immunised if he is born prematurely?**

- Yes, your child can be immunised following the recommended immunisation schedule
- Consult your doctor/health staff for advice.