



VACCINATION FOR KIDS

An in-depth overview of vaccination, especially pneumococcal vaccination.

INTRODUCTION

Vaccination for children is one of the most effective ways for parents to protect infants and children from potentially harmful diseases that can be serious and even deadly. Infants have natural immunity from their mothers in their earliest months. As that begins to wane, vaccines are given to take over and help keep babies from falling ill. In Malaysia, the vaccines are routinely offered to infants and children for free at the public health facilities. The Ministry of Health, Malaysia recommended schedule for vaccinations is as given in figure 1.

Vaccines help protect children against diseases that their friends, playmates, classmates, and family members may introduce to them.

NOTE:

- Vaccines given at government health facilities:
- **Bacillus Calmette–Guérin (BCG), vaccine that gives protection against tuberculosis**
- DTaP is the combination of diphtheria(D), tetanus(T) and acellular pertussis(aP)
- DT is a booster dose which protects against diphtheria (D) and tetanus (T)
- Hib is *Haemophilus Influenza* type B
- MMR is the combination of Measles(M), Mumps(M) and Rubella(R)
- MR vaccine provides protection against Measles (M) and Rubella (R). MR Dose 2 at 7 years old, until year 2022
- JE is vaccine against Japanese Encephalitis. This vaccine is only provided in Sarawak
- HPV is Human Papillomavirus. This vaccine is provided only for girls aged 13 years. Dose 2 is given 6 months after dose 1

VACCINATION SCHEDULE BY THE MINISTRY OF HEALTH MALAYSIA

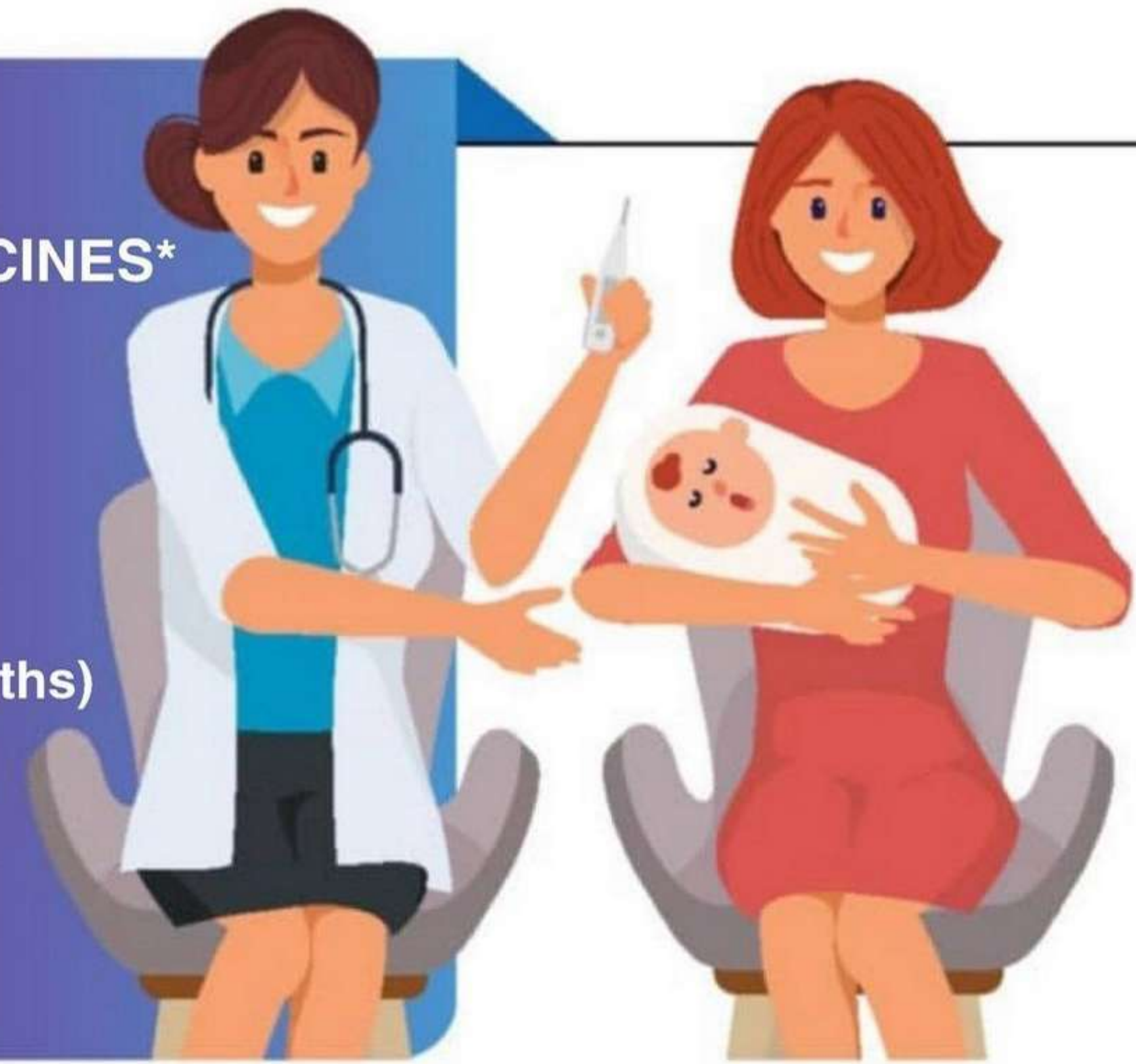


WHAT IT MEANS

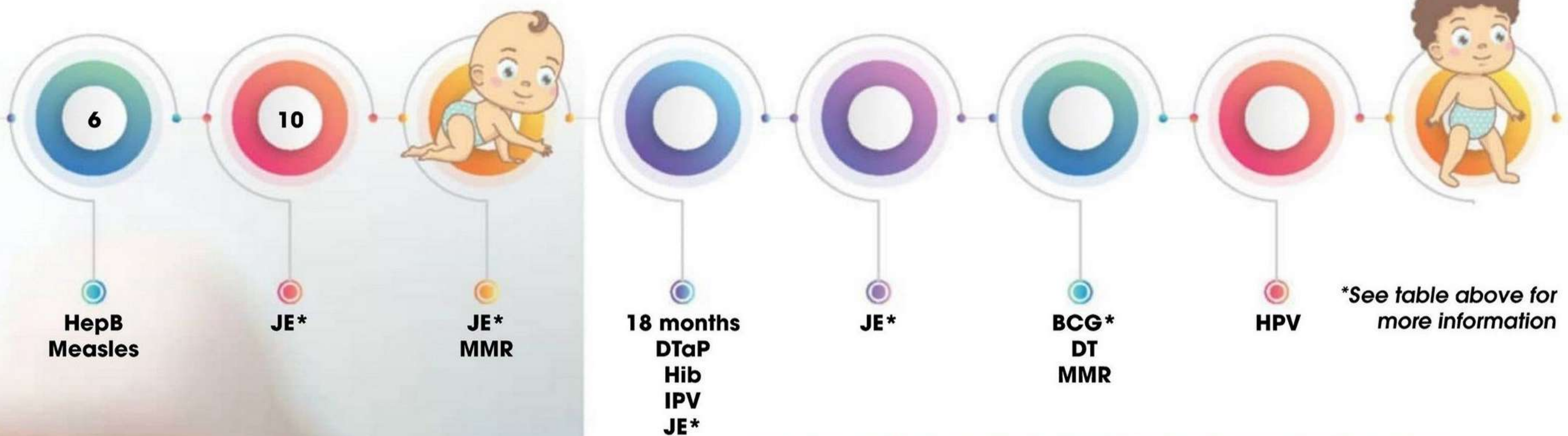
BCG: Bacillus Calmette–Guérin (for tuberculosis)
 DTaP: Diphtheria, Tetanus, acellular Pertussis
 IPV: Inactivated Poliovirus
 Hib: Haemophilus influenza b
 MMR: Mumps, Measles, Rubella
 DT: Diphtheria, Tetanus
 HPV: Human papillomavirus
 TT: Tetanus

OPTIONAL VACCINES*

Pneumococcal
 (2 months up)
 Influenza
 (6 months up)
 Rotavirus
 (6 weeks to 6 months)
 Hepatitis A
 (10 months up)
 Chickenpox
 (12 months up)



*The optional vaccines can be obtained at a private clinic or hospital of your choice.



VACCINATIONS MYTHS (WWW.HEALTH.HARVARD.EDU)

MYTH	FACT
I'll catch the flu from the influenza vaccine.	The injectable flu vaccine is not a live vaccine, so it cannot, in any way, transmit the flu virus.
The flu vaccine isn't effective in older adults.	Each year, the flu vaccine formulation is based on predictions of which strains are most likely to circulate in the coming flu season. Other strains may enter the mix. But even if you catch a flu virus that wasn't in the vaccination, the vaccine isn't useless. It could make the infection less severe.
Vaccines contain mercury, which could make me sick.	According to the CDC, there is no evidence that the low doses of thimerosal, a mercury-containing preservative used in some vaccines, is harmful. If you're still concerned, you can ask your doctor for a thimerosal-free flu vaccine.
Vaccines overload the immune system.	Considering that the immune system faces constant bombardment from microbes in the environment, the small amount of bacteria and viruses in one vaccination can barely be considered an assault. In fact, vaccines strengthen the immune system by arming it against infectious agents.
Older adults don't need to be vaccinated.	The opposite is actually true. Among many older individuals, the immune system loses some of its ability to protect against infectious diseases even as they face an increasing number of chronic health conditions that can leave them more susceptible to infection.

IMMUNE SYSTEM

The body's immune system helps protect against pathogens that cause infection. Most of the time, it's an efficient system. It either keeps

microorganisms out or tracks them down and gets rid of them.

However, some pathogens can overwhelm the immune system. When this happens, it can cause serious illness.





The pathogens most likely to cause problems are the ones the body doesn't recognize. Vaccination is a way to "teach" the immune system how to recognize and eliminate an organism. That way, your body is prepared if you're ever exposed.

Vaccinations are an important form of primary prevention. That means they can protect people from getting sick. Vaccinations have allowed us to control diseases that once threatened many lives, such as:

- measles
- polio
- tetanus
- whooping cough

A healthy immune system defends against invaders. The immune system is composed of several types of cells. These cells defend against and remove harmful pathogens. However, they have to recognize that an invader is dangerous.

Vaccination teaches the body to recognize new diseases. It stimulates the body to make antibodies against antigens of pathogens. It also primes immune cells to remember the types of antigens that cause infection. That allows for a faster response to the disease in the future.

When the body responds to the vaccine, it builds an adaptive immune response. This helps equip the body to fight off an actual infection.

TYPES OF VACCINES

(US Department of Health & Human Services)

There are several different types of vaccines. Each type is designed to teach your immune system how to fight off certain kinds of germs — and the serious diseases they cause. When scientists create vaccines, they consider:

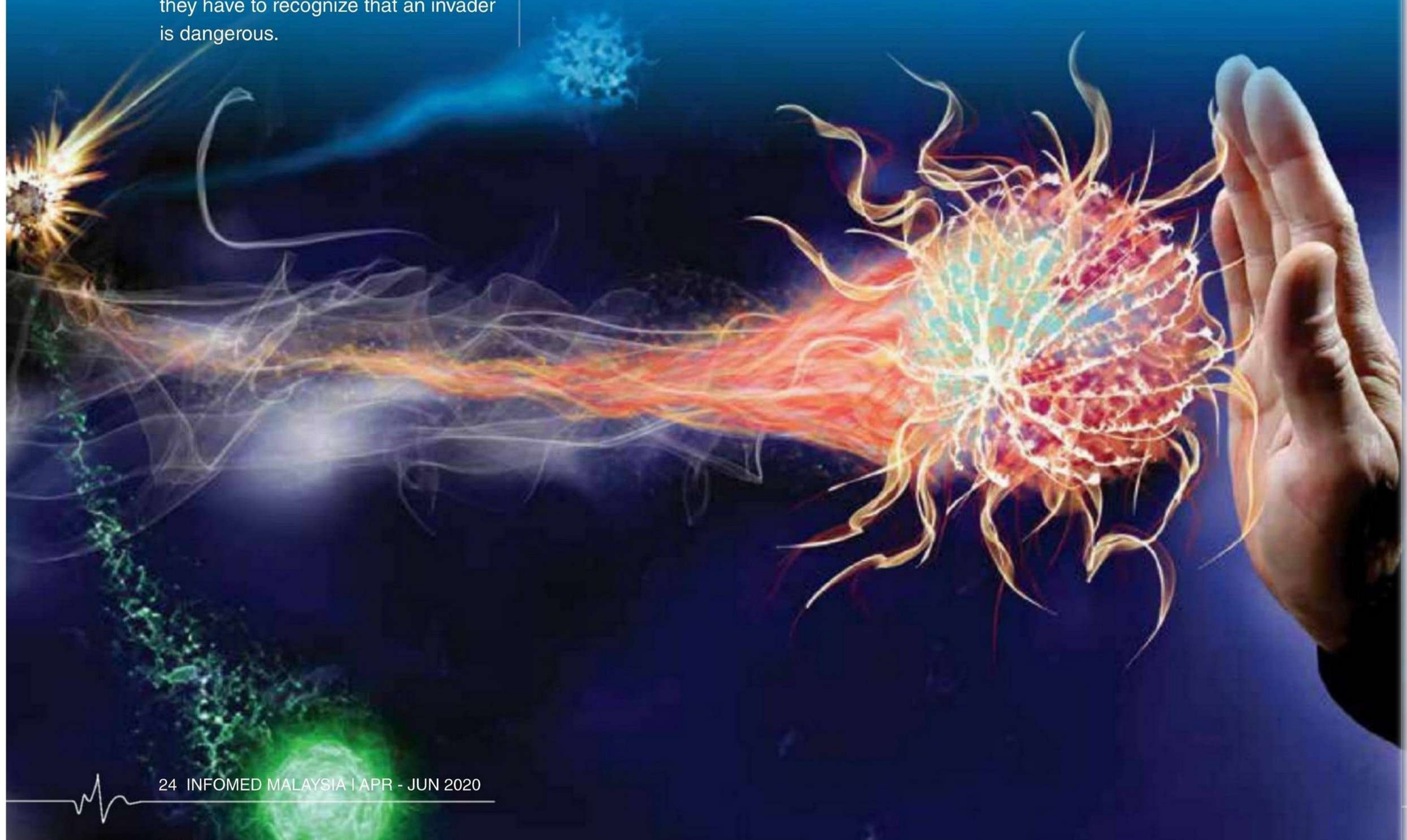
- How your immune system responds to the germ
- Who needs to be vaccinated against the germ
- The best technology or approach to create the vaccine

Based on a number of these factors, scientists decide which type of vaccine they will make.

There are 4 main types of vaccines: **Live-attenuated vaccines** - use a weakened (attenuated) version of a virus or bacterium.

Inactivated vaccines - made from a virus or bacterium that is not living.

Subunit, recombinant, polysaccharide, and conjugate vaccines - take a structural component from a virus or bacterium that can train your immune system to attack this part of the germ.



Toxoid vaccines - come from a harmful chemical or toxin that is made by bacteria or viruses. Toxoid vaccines do not make you immune to the germ. Instead, they make you immune to the harmful effects from the toxin of a germ.

THE FUTURE OF VACCINES

Scientists are still working to create new types of vaccines. Here are two exciting examples:

- **DNA vaccines** are easy and inexpensive to make — and they produce strong, long-term immunity.
- **Recombinant vector vaccines** (platform-based vaccines) act like a natural infection, so they're especially good at teaching the immune system how to fight germs.

InfoMed spoke with Dr. Tan Ru Wei, Consultant Pediatrician, Columbia Asia Hospital – Klang on vaccination and specifically in relation to the pneumococcal vaccine for children. Also known as the pneumonia vaccine. The pneumococcal vaccine protects against serious and potentially fatal pneumococcal infections.

Pneumococcal infections are caused by bacterium *Streptococcus pneumoniae* and can lead to pneumonia, septicaemia (a kind of blood poisoning) and meningitis. At their worst, the pneumococcal infections can cause permanent brain damage or even death.



Although the pneumococcal infection can affect anyone, babies, adults above 65 years old and children and adults with certain long-term health conditions, such as a serious heart or kidney condition are at higher risk of serious illness.

InfoMed: What's the checklist of vaccines and the ages at which

they should be ideally be given for kids?

Dr Tan Ru Wei: There is a National Vaccination Schedule published by the Ministry of Health, Malaysia. Majority of these vaccines will be completed by 18 months of age with some booster doses to be given at school going age. These include BCG; Hep B; 5-in-1 vaccine against Diphtheria, Tetanus, Pertussis, Polio, and Haemophilus Influenzae Type B; MMR that covers Measles, Mumps and Rubella. There are also some vaccines no included in the National Schedule but highly recommended, such as Pneumococcal vaccine, Rotavirus vaccine, Influenza vaccine, Meningococcal vaccine and Varicella vaccination. These vaccines are readily available in most private hospitals and GP clinics.

InfoMed: If you miss any of the vaccines at the recommended age, is it possible to catch up later in life?

Dr Tan Ru Wei: There are many reasons why vaccination needs to be postponed. The good news is other than Rotavirus vaccine that needs





to be completed before 32 weeks of age, all other vaccines in the National Vaccination Schedule can be given later for catch up immunization. However, it is advisable to stick to the vaccination schedule as much as possible for optimal protection.

InfoMed: What is the primary reason for the vaccinations in the context of the present situation?

Dr Tan Ru Wei: Based on WHO estimation, globally 1 in 26 children die before the age of 5 in the year 2018. More than half of these deaths can be prevented or treated with simple, affordable interventions including vaccination, adequate nutrition, safe water and food, and appropriate care by a trained health care provider. The main purpose of vaccinations is to help our body build up immunity against some of the deadly childhood diseases.

InfoMed: Can you elaborate on the importance of pneumococcal vaccine (PCV) for babies?

Dr Tan Ru Wei: The bacteria pneumococcus can attack different parts of the body, leading to meningitis, pneumonia, bacteraemia,

or otitis media. It can lead to brain damage, hearing loss and even death. It is recommended that infants receive at least three doses PCV within the 1st year of life, starting as young as six weeks of age to prevent pneumococcal diseases.

InfoMed: How does the pneumococcal vaccine work, and how do children respond to the vaccine?

Dr Tan Ru Wei: PCV works by injection of the vaccine into the body to stimulate the normal immune system to produce antibodies that are directed against the bacterium. Children, in general, respond very well to the vaccine.

InfoMed: Can the PCV (vaccine) cause the disease they protect against?

Dr Tan Ru Wei: Short answer: No. Long answer: There are two types of pneumococcal vaccines. Pneumococcal conjugate vaccine (PCV) that is used for children, and pneumococcal polysaccharide vaccine (PPV) for adults. Both vaccines are inactivated or “killed”

vaccine that does not contain any live organisms. They cannot cause the disease they protect against.

InfoMed: Should PCV be delayed or avoided completely for anyone and why?

Dr Tan Ru Wei: The only reason PCV should be avoided is when there is reported severe local reaction at the injection site from a previous dose or reported a severe allergic reaction to a previous PCV dose or one of the components of the vaccine. Vaccination can be postponed during an acute fever episode.

InfoMed: What are the side effects of the pneumococcal vaccine for kids?

Dr Tan Ru Wei: Severe side effects are rare, common and short term side effects seen in children include soreness and redness on the injection spot and fever. Other possible side effects include reduced appetite, irritability, drowsiness.

InfoMed: The implications for not giving the PCV for kids?

Dr Tan Ru Wei: Individually, children not vaccinated against pneumococcus are at higher risk of being infected by the bacteria. When the pickup rate of a vaccine increases in a community, the incidence of the disease reduces significantly within the community. This will help protect those who are not able to receive the vaccine.

InfoMed: In the current situation of COVID-19 spreading, how or to what extent does the pneumococcal vaccine gives protection?

Dr Tan Ru Wei: To expect pneumococcal vaccine protect against COVID-19 is like taking antihypertensives to bring down the blood sugar. It just doesn't work that way. The best way to prevent COVID-19 spread is to wash hands, avoid touching one's face, wear mask

and self-isolate if symptomatic, and cut down unnecessary travelling.

InfoMed: Please explain briefly on children's flu vaccine?

Dr Tan Ru Wei: Flu vaccine is meant to protect the child against influenza viruses. There two major types of Influenza vaccine available. The Tetravalent vaccine that protects against 2 Influenza A virus and 2 Influenza B virus. The Trivalent vaccine which excludes 1 Influenza B virus. Everyone 6 months or older should get the flu vaccine. It is especially important for children from 6 months to 5 years old, or who have chronic underlying diseases such as asthma, heart conditions, HIV infection. Children who never received the vaccine before requiring a 2nd dose 4 to 6 weeks after the 1st dose. For continuing yearly protection, revaccination is required.

InfoMed: How does it work, and does it help to build up the child's immunity?

Dr Tan Ru Wei: Like PCV, Influenza vaccine uses inactivated viruses to

induce an immune response to the antigens present on the virus. It is estimated to have an efficacy of 70 - 90%.

InfoMed: Once the flu vaccine is started, does it have to be given every year and why?

Dr Tan Ru Wei: Yearly vaccination is required because the flu virus changes constantly and rapidly. Every year WHO will review the flu vaccine formulation and update it to keep up with the changing flu viruses. Another reason is because our body's immune response from vaccination declines over time, and yearly vaccination is needed for optimal protection.

InfoMed: How is the flu vaccine for children administered?

Dr Tan Ru Wei: There are two ways flu vaccination can be administered, either via injection or via nasal spray method. Recent studies show that nasal mist administration has a lower efficacy in flu prevention compared to a flu jab. Also, nasal spray uses a weakened form live virus as a vaccine, therefore is not suitable for immunocompromised patients. It is however a good alternative for parents and children who are anxious of getting a needle injection.

RECOMMENDED VACCINATIONS FOR KIDS:

- Chickenpox (varicella) vaccine.
- Diphtheria, tetanus, and pertussis vaccine (DTaP)
- Hepatitis A vaccine (HepA)
- Hepatitis B vaccine (HepB)
- Hib vaccine.
- Human papillomavirus (HPV) vaccine.
- Influenza vaccine.
- Measles, mumps, and rubella vaccine (MMR)

