

# **IMMUNIZATION IN CHILDREN**

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# ABOUT IMMUNIZATION

- **Immunization** is the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine. Vaccines stimulate the body's own immune system to protect the person against subsequent infection or disease.
- **MINISTRY OF HEALTH – UNIVERSAL IMMUNISATION PROGRAMME**

# VACCINES PROVIDED UNDER UIP

- **BCG**
- **About**-BCG stands for Bacillus Calmette-Guerin vaccine. It is given to infants to protect them from tubercular meningitis and disseminated TB.
- **When to give** – BCG vaccine is given at birth or as early as possible till 1 year of
- **Route and site**- BCG is given as intradermal injection in left upper arm.

- **OPV**
- **About**-OPV stands for Oral Polio Vaccine. It protects children from poliomyelitis.
- **When to give**- OPV is given at birth called zero dose and three doses are given at 6, 10 and 14 weeks. A booster dose is given at 16-24 months of age.
- **Route and site** - OPV is given orally in the form of two drops.

## Hepatitis B vaccine

- **About** – Hepatitis B vaccine protects from Hepatitis B virus infection.
- **When to give-** Hepatitis B vaccine is given at birth or as early as possible within 24 hours. Subsequently 3 dose are given at 6, 10 and 14 weeks in combination with DPT and Hib in the form of pentavalent vaccine.
- **Route and site-** Intramuscular injection is given at anterolateral side of mid thigh

## Pentavalent Vaccine

- **About**-Pentavalent vaccine is a combined vaccine to protect children from five diseases Diphtheria, Tetanus, Pertussis, Haemophilis influenza type b infection and Hepatitis B.
- **When to give** - Three doses are given at 6, 10 and 14 weeks of age (can be given till one year of age).
- **Route and site**-Pentavalent vaccine is given intramuscularly on anterolateral side of mid thigh

## Rotavirus Vaccine

- **About** -RVV stands for Rotavirus vaccine. It gives protection to infants and children against rotavirus diarrhoea. It is given in select states.
- **When to give** - Three doses of vaccine are given at 6, 10, 14 weeks of age.
- **Route and site**-5 drops of vaccine are given orally.

# PCV

- **About-** PCV stands for Pneumococcal Conjugate Vaccine. It protects infants and young children against disease caused by the bacterium *Streptococcus pneumoniae*. It is given in select states.
- **When to give** - The vaccine is given as two primary doses at 6 & 14 weeks of age followed by a booster dose at 9 months of age
- **Route and site-** PCV is given as intramuscular (IM) injection in outer right upper thigh. It should be noted that pentavalent vaccine and PCV are given as two separate injections into opposite thighs.



## fIPV

- **About-** fIPV stands for Fractional Inactivated Poliomyelitis Vaccine. It is used to boost the protection against poliomyelitis.
- **When to give-** Two fractional doses of IVP are given intradermally at 6 and 14 weeks of age.
- **Route and site-** It is given as intradermal injection at right upper arm.

- **Measles/ MR vaccine**
- **About**-Measles vaccine is used to protect children from measles. In few states Measles and Rubella a combined vaccine is given to protect from Measles and Rubella infection.
- **When to given**- First dose of Measles or MR vaccine is given at 9 completed months to 12 months (vaccine can be given up to 5 years if not given at 9-12 months age) and second dose is given at 16-24 months.
- **Route and site** – Measles Vaccine is given as subcutaneous injection in right upper arm.

## JE vaccine

- **About-** JE stands for Japanese encephalitis vaccine. It gives protection against Japanese Encephalitis disease. JE vaccine is given in select districts endemic for JE.
- **When to given-** JE vaccine is given in two doses first dose is given at 9 completed months-12 months of age and second dose at 16-24 months of age.
- **Route and site-** It is given as subcutaneous injection.

## DPT booster

- **About**-DPT is a combined vaccine; it protects children from Diphtheria, Tetanus and Pertussis.
- **When to give** -DPT vaccine is given at 16-24 months of age is called as DPT first booster and DPT 2<sup>nd</sup> booster is given at 5-6 years of age.
- **Route and site**- DPT first booster is given as intramuscular injection in antero-lateral side of mid thigh in left leg. DPT second booster is given as intramuscular injection in left upper arm.

## TT

- **About-** Tetanus toxoid vaccine is used to provide protection against tetanus.
- **When to give-** Tetanus toxoid vaccine is given at 10 years and 15 years of age when previous injections of pentavalent vaccine and DPT vaccine are given at scheduled age.
- Pregnant women-TT-1 is given early in pregnancy; and TT-2 is given 4 weeks after TT-1. TT booster is given when two doses of TT are given in a pregnancy in last three years.
- **Route and site-** TT is given as Intramuscular injection in upper arm.

## National Immunization Schedule (NIS) for Infants, Children and Pregnant Women

Vaccine	When to give	Dose	Route	Site
For Pregnant Women				
TT-1	Early in pregnancy	0.5 ml	Intra-muscular	Upper Arm
TT-2	4 weeks after TT-1*	0.5 ml	Intra-muscular	Upper Arm
TT- Booster	If received 2 TT doses in a pregnancy within the last 3 yrs*	0.5 ml	Intra-muscular	Upper Arm

For Infants				
BCG	At birth or as early as possible till one year of age	0.1ml (0.05ml until 1 month age)	Intra-dermal	Left Upper Arm
Hepatitis B - Birth dose	At birth or as early as possible within 24 hours	0.5 ml	Intra-muscular	Antero-lateral side of mid-thigh
OPV-0	At birth or as early as possible within the first 15 days	2 drops	Oral	Oral
OPV 1, 2 & 3	At 6 weeks, 10 weeks & 14 weeks (OPV can be given till 5 years of age)	2 drops	Oral	Oral
Pentavalent 1, 2 & 3	At 6 weeks, 10 weeks & 14 weeks (can be given till one year of age)	0.5 ml	Intra-muscular	Antero-lateral side of mid-thigh
Rotavirus#	At 6 weeks, 10 weeks & 14 weeks (can be given till one year of age)	5 drops	Oral	Oral
IPV	Two fractional dose at 6 and 14 weeks of age	0.1 ml	Intra dermal two fractional dose	Intra-dermal: Right upper arm
Measles /MR 1 <sup>st</sup> Dose\$	9 completed months-12 months. (can be given till 5 years of age)	0.5 ml	Sub-cutaneous	Right upper Arm
JE - 1**	9 completed months-12 months.	0.5 ml	Sub-cutaneous	Left upper Arm
Vitamin A (1 <sup>st</sup> dose)	At 9 completed months with measles-Rubella	1 ml ( 1 lakh IU)	Oral	Oral



**For Children**

DPT booster-1	16-24 months	0.5 ml	Intra-muscular	Antero-lateral side of mid-thigh
Measles/ MR 2 <sup>nd</sup> dose §	16-24 months	0.5 ml	Sub-cutaneous	Right upper Arm
OPV Booster	16-24 months	2 drops	Oral	Oral
JE-2	16-24 months	0.5 ml	Sub-cutaneous	Left Upper Arm
Vitamin A*** (2 <sup>nd</sup> to 9 <sup>th</sup> dose)	16-18 months. Then one dose every 6 months up to the age of 5 years.	2 ml (2 lakh IU)	Oral	Oral
DPT Booster-2	5-6 years	0.5 ml.	Intra-muscular	Upper Arm
TT	10 years & 16 years	0.5 ml	Intra-muscular	Upper Arm

- \*Give TT-2 or Booster doses before 36 weeks of pregnancy. However, give these even if more than 36 weeks have passed. Give TT to a woman in labour, if she has not previously received TT.
- \*\*JE Vaccine is introduced in select endemic districts after the campaign.
- \*\*\* The 2<sup>nd</sup> to 9<sup>th</sup> doses of Vitamin A can be administered to children 1-5 years old during biannual rounds, in collaboration with ICDS.
- #Phased introduction, at present in Andhra Pradesh, Haryana, Himachal Pradesh and Orissa from 2016 & expanded in Madhya Pradesh, Assam, Rajasthan, and Tripura in February 2017 and planned in Tamil Nadu & Uttar Pradesh in 2017.
- § Phased introduction, at present in five states namely Karnataka, Tamil Nadu, Goa, Lakshadweep and Puducherry. (As of Feb' 2017)





**KNOW YOUR CHILDS**

**VACCINATION  
SCHEDULE**

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Vaccination Chart for Indian Babies

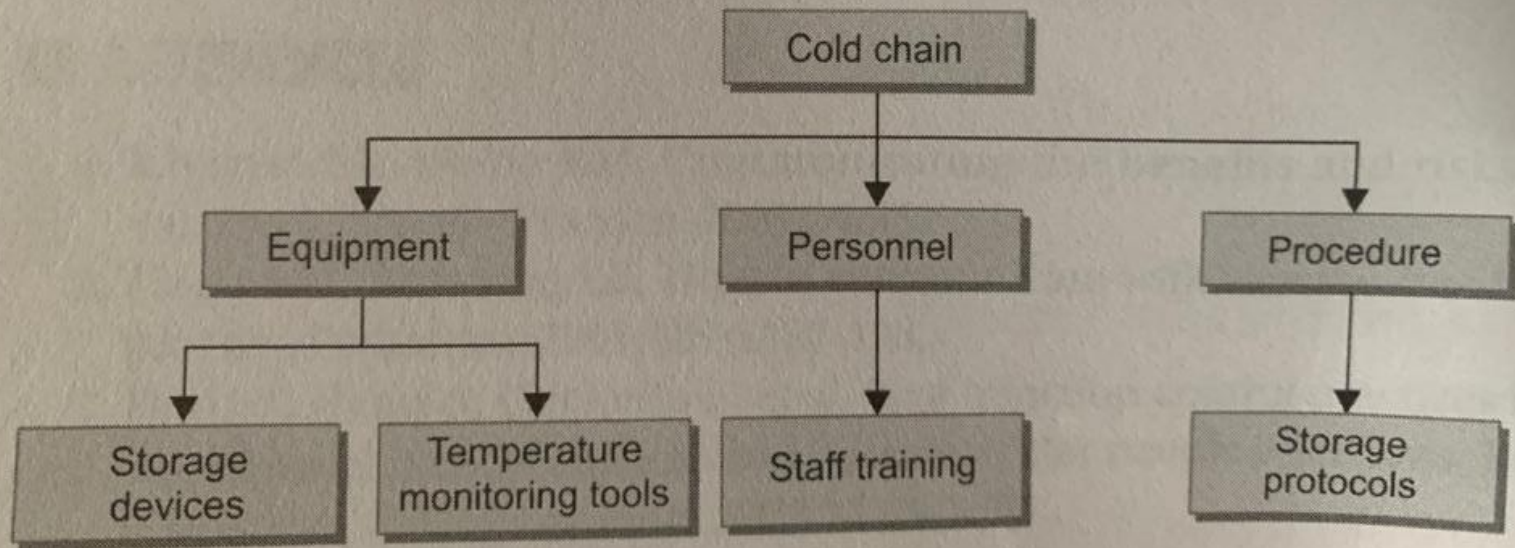
Age (completed weeks/months/years)	Vaccines
Birth	Bacillus Calmette–Guérin (BCG)
	Oral polio vaccine (OPV 0)
	Hepatitis B (Hep – B1)
6 weeks	Diphtheria, Tetanus and Pertussis vaccine (DTwP 1)
	Inactivated polio vaccine (IPV 1)
	Hepatitis B (Hep – B2)
	Haemophilus influenzae type B (Hib 1)
	Rotavirus 1
	Pneumococcal conjugate vaccine (PCV 1)
10 weeks	Diphtheria, Tetanus and Pertussis vaccine (DTwP 2)
	Inactivated polio vaccine (IPV 2)
	Haemophilus influenzae type B (Hib 2)
	Rotavirus 2
	Pneumococcal conjugate vaccine (PCV 2)
14 weeks	Diphtheria, Tetanus and Pertussis vaccine (DTwP 3)
	Inactivated polio vaccine (IPV 3)
	Haemophilus influenzae type B (Hib 3)
	Rotavirus 3
	Pneumococcal conjugate vaccine (PCV 3)

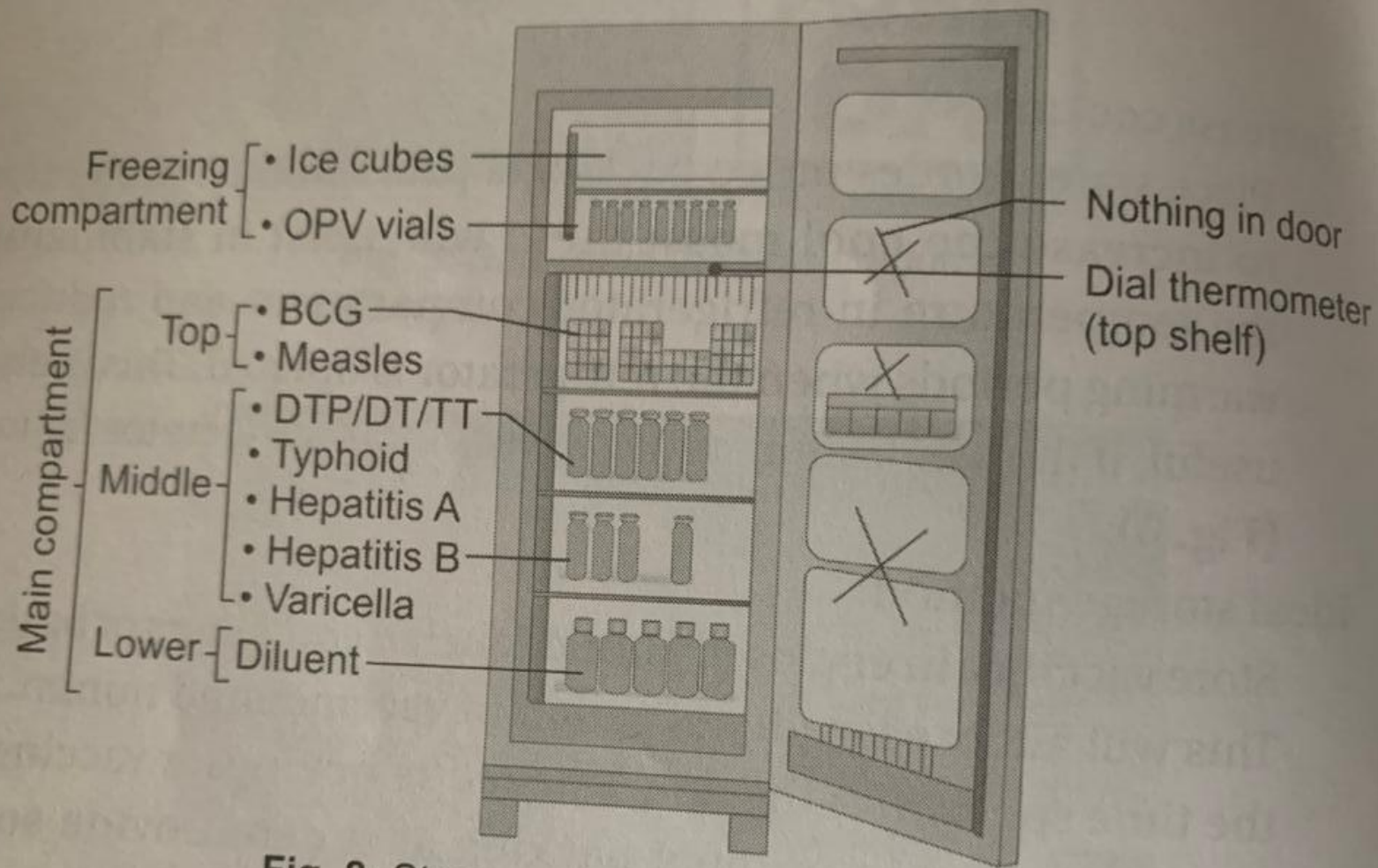
6 months	Oral polio vaccine (OPV 1)
	Hepatitis B (Hep – B3)
9 months	Oral polio vaccine (OPV 2)
	Measles, Mumps, and Rubella (MMR – 1)
9 – 12 months	Typhoid Conjugate Vaccine
12 months	Hepatitis A (Hep – A1)
15 months	Measles, Mumps, and Rubella (MMR 2)
	Varicella 1
	PCV booster
16 to 18 months	Diphtheria, Perussis, and Tetanus (DTwP B1/DTaP B1)
	Inactivated polio vaccine (IPV B1)
	Haemophilus influenzae type B (Hib B1)
18 months	Hepatitis A (Hep – A2)
2 years	Booster of Typhoid Conjugate Vaccine
4 to 6 years	Diphtheria, Perussis, and Tetanus (DTwP B2/DTaP B2)
	Oral polio vaccine (OPV 3)
	Varicella 2
	Measles, Mumps, and Rubella (MMR 3)
10 to 12 years	Tdap/Td
	Human Papilloma Virus (HPV)

## ■ WHAT IS THE COLD CHAIN?

The “cold chain” is the system of transporting and storing vaccines within recommended temperature from the place of manufacture to the point of administration. It has three main components: (1) personnel, (2) equipment, and (3) procedures (**Flowchart 1**).

**Flowchart 1:** Cold chain components.



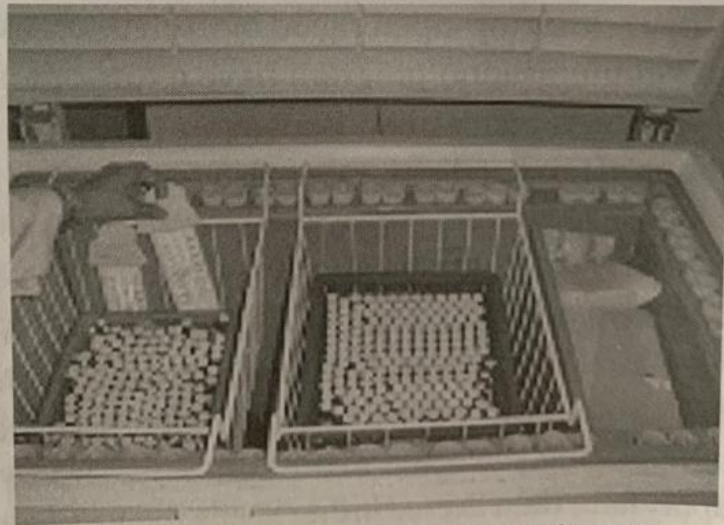


**Fig. 8: Storage protocol in domestic fridge.**  
 (OPV: oral poliomyelitis vaccine; BCG: Bacillus Calmette-Guérin; DTP: diphtheria, tetanus, and pertussis; DT: diphtheria and tetanus; TT: tetanus toxoid)





**Fig. 1:** Ice-lined refrigerator.



**Fig. 2:** Vaccine storage in ice-lined refrigerator.

**TOP SHELF:** HepB, HPV, Rabies, PCV,  
Darker VVMs, opened vials, Diluents

**MIDDLE SHELF:** DTP, DT, Td, TT, Tdap,  
DTP combos, Hib, Rotavirus (others), JE-  
inactivated

**LOWER SHELF:** Measles, MR, MMR,  
BCG, OPV, Varicella, 116E-RV vaccine



0.5 ml  
LM  
48°C  
single/  
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single

HEATmarker™ VVM14

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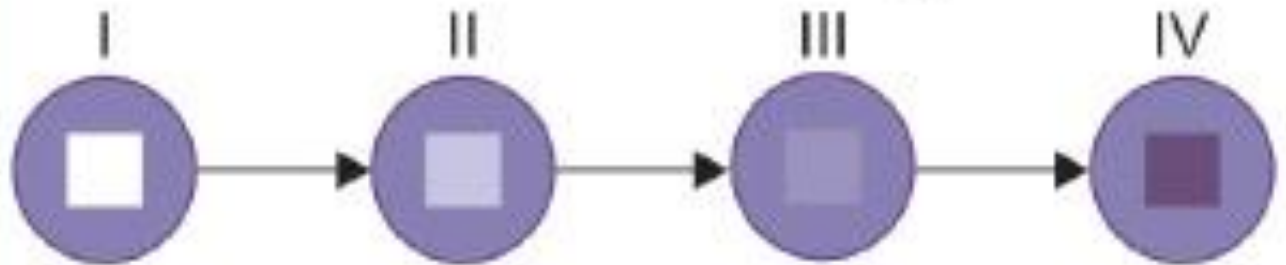
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Vaccine vial monitor stage

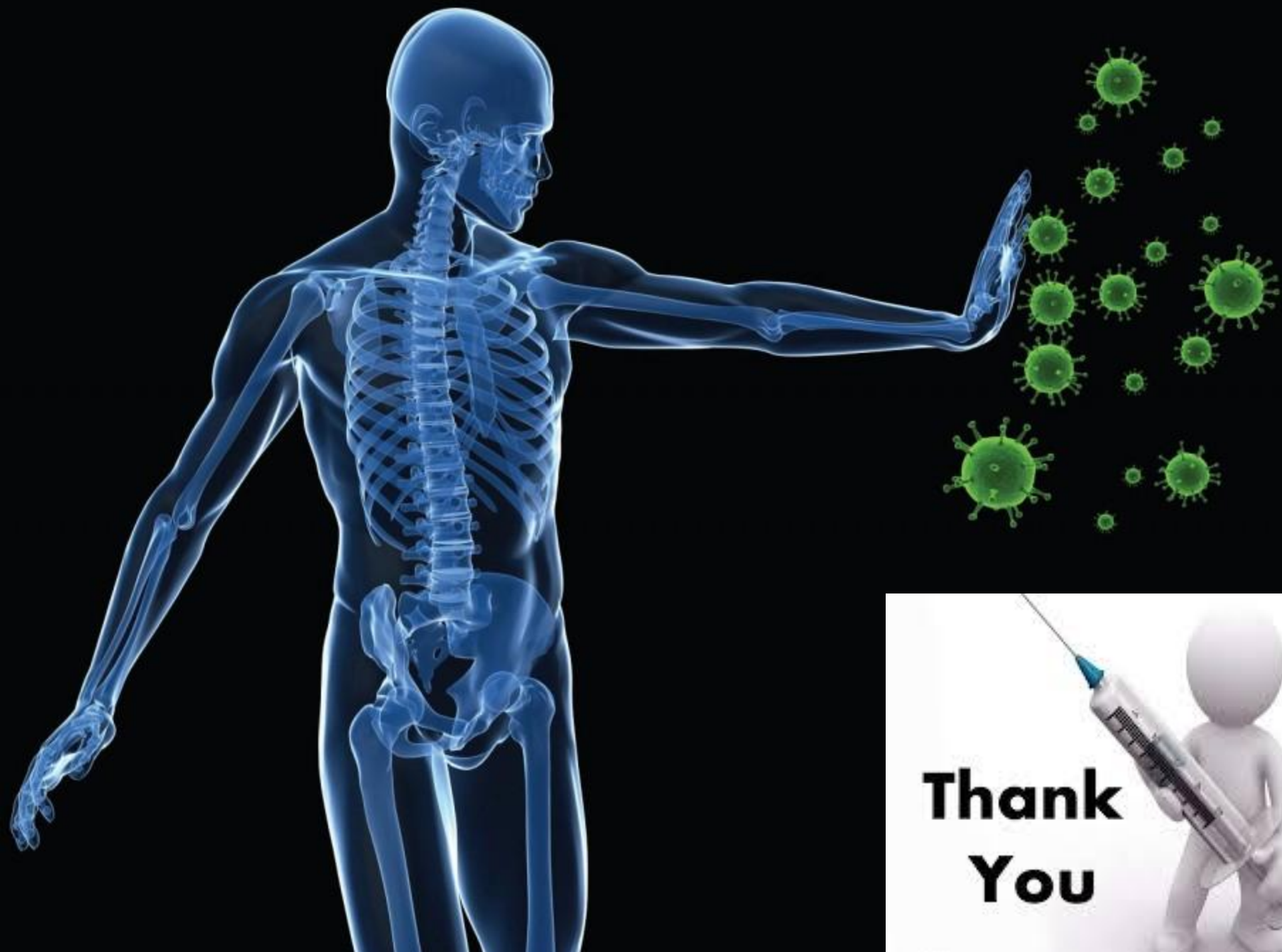


# Top 8 Reasons to Protect Children Through Vaccination

- As parents, we want to do everything possible to keep our children healthy and safe from preventable diseases. Vaccination is the best way to guarantee this.
- Vaccination is totally safe and effective. All vaccines undergo long and detailed review by scientists, doctors, and the government to make sure they are safe.
- Paediatric organizations such as the Indian Academy of Pediatrics and the Centers for Disease Control and Prevention strongly support protecting children with recommended vaccinations.

- Vaccination protects children from serious illness and complications. In the absence of vaccination, these diseases can lead to conditions such as paralysis of limbs, hearing loss, convulsions, amputation of an arm or leg, brain damage, or even death.
- Diseases like measles, mumps, and whooping cough are vaccine-preventable but still a threat globally. Many children get infected by them every year.
- Though vaccination has led to a sharp decline in the incidence of many infectious diseases, some of them are still quite common in other countries. They may be brought to your country by international travelers. If children are not vaccinated, they could get infected by one of these diseases from travelers or while traveling themselves.

- If many parents decide not to vaccinate their children, it might trigger an outbreak of preventable diseases. Such an epidemic can turn out to be disastrous for child healthcare.
- If children aren't vaccinated, they can spread diseases to other young children, babies who are too small to be vaccinated, or to people with weak immunity, such as cancer patients.



**Thank  
You**

