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What is Vaccination and Immunization

Vaccination is a process in which killed or modified disease causing germs, are introduced into the body, commonly by injections, but also by oral route and nasal sprays. The available vaccines prevent more than 20 diseases helping people of all ages live longer, healthier lives.



Vaccination is a simple, safe and effective way of protecting baby against harmful diseases, before they come in contact with the germs. It uses the body's natural defences to build resistance to specific infections and makes immune system much stronger. Vaccines reduces the risk of complications and mortality following subsequent exposure to an infectious agent. In this way vaccinated person develops immunity against the specific disease causing germ.

What is the importance of Vaccines

Vaccines have changed our perception about infectious diseases. Infections, which were considered as a curse for mankind, have reduced considerably, due to the effect of vaccines. Smallpox has been eradicated, polio is present only in two countries on this planet, measles, rubella, diphtheria, pertussis has declined considerably. It should be remembered that only a handful of infections-measles, rubella, polio, can be eliminated from the face of this earth.

The vast majority can only be kept under control and this can be achieved only by the continued use of vaccines even after the diseases are no longer widely seen in the community. We now have vaccines to prevent more than 20 life-threatening diseases. Immunization currently prevents 3.5-5 million deaths every year from diseases like diphtheria, tetanus, pertussis, influenza and measles.

Immunizations are also one of the best health investments money can buy. Immunization protects health of individuals, communities and economies from the devastating effects of Vaccine-Preventable Disease threats. The Covid-19 pandemic was a classic example of the devastation that an infectious disease can cause and how vaccines can hasten recovery of the economies from its effects.

Presently, the **National Immunization Program (NIP)**, of the government of India, provides protection against 12 disease causing germs. In the future, vaccines against HPV and typhoid are in pipeline.

In India, about 27 million children are born every year. The **National Immunization Program (NIP)**, which targets every newborn for vaccinations, constitutes the largest immunization program in the world.

The Indian Academy of Paediatrics (IAP) recommends vaccines against mumps, typhoid, hepatitis A, chicken pox and influenza. These diseases are not a major public health burden, but are important for improving the quality of life. Protection against these illnesses reduces school absenteeism, loss of working days to the parents, prevents rare complications caused by these disease causing germs and in general improves the quality of life.

The baby has spent 9 months in the mother's womb, protected from all germs and getting the optimal nutrition. From the moment of birth, the newborn is exposed to a multitude of germs, some of them are potentially dangerous. The baby may have some protection against some of the germs, but almost no protection against some of the dangerous germs. Hence, the need for vaccines to protect the baby.

Vaccines are the most valuable gift that can be given to a child, for a long healthy and productive life.

The National Immunization Schedule (NIP) by the Govt. of India

Vaccine	Due age	Max age	Dose	Diluent	Route	Site
For Infants						
BCG	At birth	till one year of age	(0.05 ml until 1 month) 0.1ml Beyond age 1 month	YES Manufacturer supplied diluent (Sodium chloride)	Intra-dermal	Upper Arm - LEFT
Hepatitis B - Birth dose	At birth	within 24 hours	0.5 ml	NO	Intra-muscular	Antero-lateral side of mid-thigh - LEFT
OPV-0	At birth	within the first 15 days	2 drops	-	Oral	Oral
OPV 1, 2 & 3	At 6 weeks, 10 weeks & 14 weeks	till 5 years of age	2 drops	-	Oral	Oral
Pentavalent 1, 2 & 3** (Diphtheria+ Pertussis + Tetanus + Hepatitis B + Hib)	At 6 weeks, 10 weeks & 14 weeks**	1 year of age	0.5 ml	NO	Intra-muscular	Antero-lateral side of mid-thigh - LEFT
Fractional IPV (Inactivated Polio Vaccine)	At 6w-14w-9m	1 year of age	0.1 ml	NO	Intra-dermal	Upper Arm - RIGHT
Rotavirus‡	At 6 weeks, 10 weeks & 14 weeks	1 year of age	5 drops	NO	Oral	Oral
Pneumococcal Conjugate Vaccine (PCV) (Where applicable)	At 6 weeks & 14 weeks At 9 completed months - booster	1 year of age	0.5 ml	NO	Intra-muscular	Antero-lateral side of mid-thigh - RIGHT
Measles / Rubella 1st dose ##	At 9 completed months-12 months.	5 years of age	0.5 ml	YES Manufacturer supplied diluent (Sterile water)	Sub-cutaneous	Upper Arm - RIGHT
Japanese Encephalitis – 1 @ (Where applicable)	At 9 months-12 months@	15 years of age	0.5 ml	YES - Manufacturer supplied diluent (Phosphate Buffer Solution)	Sub-cutaneous	Upper Arm - LEFT
Vitamin A (1st dose)	At 9 months	5 years of age (1 lakh IU)	1 ml	-	Oral	Oral

Vaccine	When to give	Max age	Dose	Diluent	Route	Site
For Children						
DPT Booster-1	16-24 months	7 years of age	0.5 ml	NO	Intra-muscular	Antero-lateral side of mid-thigh - LEFT
Measles / Rubella 2nd dose ##	16-24 months	5 years of age	0.5 ml	YES Manufacturer supplied diluent (Sterile water)	Sub-cutaneous	Upper Arm - RIGHT
OPV Booster	16-24 months	5 Years	2 drops	NO	Oral	Oral
Japanese Encephalitis – 2 @ (Where applicable)	16-24 months @	till 15 years of age	0.5 ml	YES Manufacturer supplied diluent (Phosphate Buffer Solution)	Sub-cutaneous	Upper Arm - LEFT
Vitamin A \$ (2nd to 9th dose)	At 16 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	7 Years of age	0.5 ml	NO	Intra-muscular	Upper Arm
Td	10 years & 16 years	16 Years	0.5 ml	NO	Intra-muscular	Upper Arm

The Indian Academy of Pediatrics (IAP) schedule

Vaccine	Age in completed weeks/months/years																
	Birth	6w	10w	14w	6m	7m	9m	12m	13m	15m	16-18m	18-24m	2-3 Y	4-6 Y	9-14 Y	15-16 Y	17-18 Y
BCG																	
Hepatitis B	HB 1*	HB 2	HB 3	HB 4 ^b													
Polio	OPV	IPV 1 ^c	IPV 2 ^c	IPV 3 ^c							IPV ^e B1			IPV ^e B2			
DTwP/DTaP		DPT 1	DPT 2	DPT 3							DPT B1			DPT B2			
Hib	Hib 1	Hib 2	Hib 3								Hib B1						
PCV	PCV 1	PCV 2	PCV 3								PCV B						
Rotavirus	RV 1	RV 2	RV 3 ^d														
Influenza					Dose 1*	Dose 2											
MMR							Dose 1			Dose 2					Dose 3		
TCV																	
Hepatitis A							Dose 1						Dose 2 ^f				
Varicella										Dose 1			Dose 2 ^g				
Tdap ^h																	
Td																	
HPV															1 & 2 ^{i,k}	1, 2 & 3 ^{j,k}	
Meningococcal ^l					Dose 1	Dose 2											
Jem ^m						Dose 1	Dose 2										
Cholera						Dose 1	Dose 2										
PPSV 23																	
Rabies																	
Yellow Fever																	

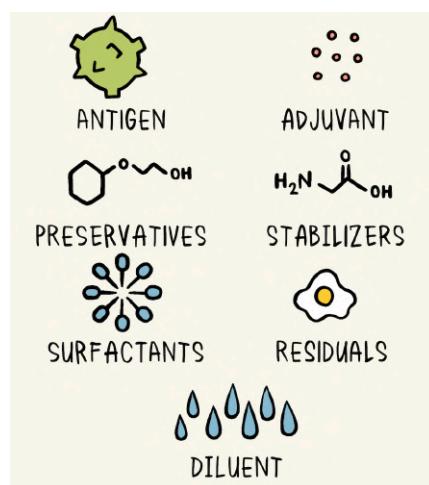
Recommended age

Catch up age range

Vaccination in special situations

What do vaccines contain?

1. Antigen: the most active part of the vaccine
2. Adjuvant: chemicals which enhance the immune response of the antigen
3. Preservatives: prevent germs from growing in the vaccine vial e.g., Thiomersal
4. Stabilizers: chemicals which maintain the potency of the vaccine during the manufacturing process and transport
5. Surfactants: chemicals which prevent the vaccine particles from sticking to each other
6. Residuals: chemicals which are left over after the final purification process, including antibiotics.

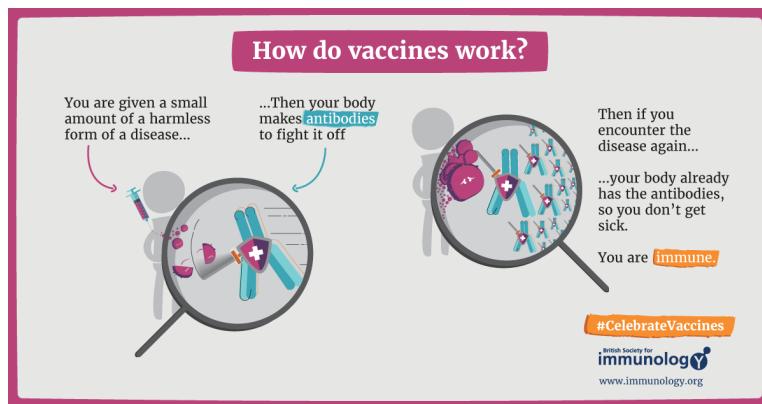


How do Vaccines work?

Vaccines are like superheroes for your child's health. They train the immune system to fight off the dangerous germs. It will not make your child sick, but will train the immune system how to recognize and fight off the real germ if exposed to it in the future.

This greatly reduces the risk of becoming seriously ill or spreading a disease to others.

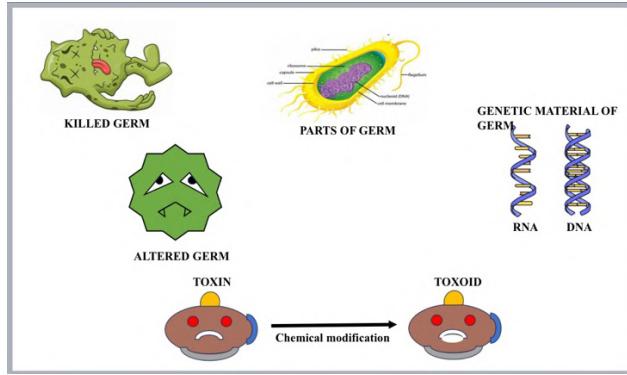
Vaccines can protect against one or multiple diseases. Sometimes, multiple vaccines may be given at once to protect against several diseases.



Vaccines trick the immune system into believing that the actual disease causing germs have entered the body. When a vaccine is introduced into the body, the immune system of the body interacts with the germs present in the vaccine and produces proteins known as antibodies, which act only against the germs in the vaccine. In addition, certain cells get programmed to remember this exposure to the germs. When the germ enters the body again, these specialized cells known as memory cells, get activated and produce very large quantities of antibodies. These antibodies surround the germs and kill them, thus preventing these germs from causing disease in the vaccinated person. It should be noted that vaccines protect the vaccinated individual only against the germ present in the vaccine.

What are the types of vaccines:

Vaccines are made using several processes. They may contain

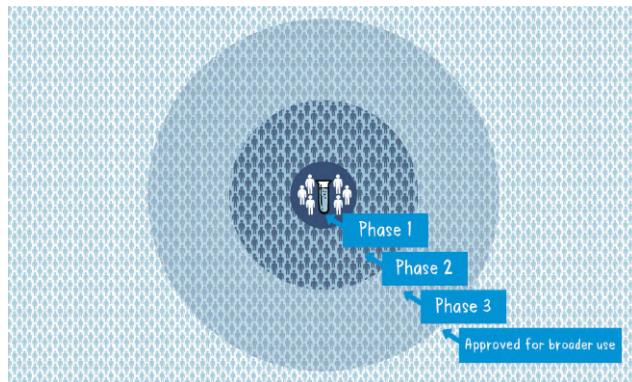


1. Live viruses or bacteria that have been attenuated (weakened or altered so as not to cause illness). Protection induced by live vaccines are very long lasting. Chicken pox, Measles-Mumps-Rubella vaccines are some examples
2. Inactivated or killed organisms or viruses. Organisms are killed by heat or chemicals. The organism cannot multiply but retains the ability to stimulate the immune system of the vaccinated person. Inactivated Polio vaccine and Conjugate Typhoid vaccines are some examples.
3. Inactivated toxins. Some diseases e.g. Tetanus and Diphtheria are caused by chemicals released by the organism. These chemicals are called toxins. Inactivated toxins are made into toxoid vaccines. Tetanus Toxoid and Diphtheria toxoids are some examples.
4. Segments of the pathogen. The vaccine contains specific proteins or sugars found on the surface of the organism. Hib vaccine and the Pneumococcal conjugate vaccines are some examples.
5. Genetic material of the organism. mRNA and DNA vaccines have shot into prominence during the Covid pandemic. Covid vaccines by Pfizer and Moderna are examples of mRNA vaccines and ZyCoV-D is an example of a DNA vaccine.

How are vaccines developed and tested before being used in the population?

Each and every vaccine undergoes rigorous testing, in different phases, during its development phase. The various phases of vaccine development are:

1. Exploratory Phase: in this phase, scientists study to find out which part of the organism can be used as a vaccine, and whether any modification are necessary to make that vaccine recognisable by the immune system of humans.
2. Pre-Clinical Phase: In this phase, the vaccine candidate is tested in laboratory animals to check for safety and the ability of the vaccine to stimulate the immune response. This phase may last 1-2 years.



- 3 Phase I: The vaccine is studied in a small group of 20-50 adults. The goal of Phase I is to check if the vaccine is safe and how well it stimulates the immune system of the vaccinated individual.
- 4 Phase 2: The vaccine is tested in a few hundred people. In this phase, the investigators focus on the vaccine's safety, its ability to produce protective antibodies, the best dose, timing of doses, interval between doses and the route of administration of the vaccine.
- 5 Phase 3: Vaccines which have completed phase 2 trial successfully, enter the phase 3 trial. Phase 3 trials recruit thousands or many thousands of volunteers, from sites across the world, in different continents and different socio-economic conditions. The primary objective is to assess safety and identify rare side effects. The ability of the vaccine to prevent the targeted diseases is assessed. In addition, the antibody levels elicited by the vaccine is also assessed.
- 6 Phase 4: phase 4 trials are conducted after the vaccine has been introduced in the population. This phase, assess how well the vaccine performs in the population and not in highly controlled situations. It assesses how well the vaccine performs in the elderly population, and those with medical conditions which may affect the response

to vaccines. It can also unravelled very rare side-effects. This phase can go on for a few years.

As will be noted, at every stage of vaccine development, safety assessment is of paramount importance. Any vaccine found to be unsafe will never enter the stage of usage in humans.

Till recently, the development of a vaccine, from first identifying the causative agent of a disease to delivering a vaccine for use in the population, could take anywhere from 10 to 15 years. Present day technology enables development of vaccines at a much faster pace. The first Covid-19 vaccine was developed in less than a year. Till recently different phases of vaccine development was done in sequential manner , the covid pandemic demanded that developmental phases should be accelerated .Thus arose the new pattern of vaccine development where in the different phases were done parallelly. The safety assessment of vaccines were not compromised.

Are vaccines safe?

As the child's guardian and caretaker, parents are concerned about the safety of vaccines. Considering all factors, vaccines are the safest and most cost-effective method of protecting children from infectious diseases.

Before any vaccine is introduced into the market, it has to undergo rigorous trials and testing, initially in the laboratory and later, through the three phases of clinical trials on human beings. At every stage, assessment of safety is of paramount importance.

Vaccines are safe and effective.

Any licensed vaccine is rigorously tested before it is approved for use, regularly reassessed and constantly monitored for side effects. In the rare event a serious side effect is reported, it is immediately investigated.



Any vaccine, which is not proven to be safe, will never be used in humans, especially very young children. Even after the vaccine is introduced in the population, they are continuously monitored for any side effects which were not detected in the phase of clinical trials.

When any unusual side effects are noticed following any use of vaccine ,well established protocols are in place, by international bodies viz WHO, to establish whether any reported side effects occurring following the administration of a vaccine is caused by the vaccine itself or is a coincidental side effect. This is called adverse events following immunisations(AEFI) surveillance ,reporting and causality assessment.

Although generally very safe, like any other medicine, vaccines can cause side effects. However, most of these are very minor and are of very short duration. Examples of this type of side effects include pain, swelling or mild fever. Severe allergic reactions following vaccinations are extremely rare and occur in about 1-2 cases per million. Claims that vaccines cause allergies, autism, brain damage or diabetes have been carefully researched and disproved.

What are vaccine schedules?

A vaccination schedule is a timetable of the series of vaccination of the same vaccine or multiple vaccines. A vaccination schedule mentions the name of the vaccine, age group eligible for vaccination and the interval between doses of the same vaccine. It also mentions the interval between different vaccines.

Many vaccines require multiple doses for maximum effectiveness, either to produce sufficient initial immune response or to boost response that fades over time.

Vaccine schedules are developed by governmental agencies or medical organizations, to achieve maximum effectiveness using required and recommended vaccines, while minimizing the number of visits to the health care system.

In India, two schedules are followed: the National Immunization Program (NIP) schedule and the Indian Academy of Pediatrics (IAP) schedule. The government immunisation programme (NIP) caters to the population at large and provides vaccines free of charge, as recommended by the National Technical Advisory Group on Immunizations.(NTAGI). It targets diseases which cause high mortality and morbidity in the community and thus have a significant public health importance. On the other hand, private providers follow the IAP schedule, which includes vaccines which are important for the individual child but not of public health importance. These vaccines prevent loss of school days, prevent loss of work days by the caregivers and improve the quality of life. NIP provides fewer vaccines than the IAP schedule. Moreover, the schedules of the NIP and IAP differ to some extent.

While schedules are to be followed, a delay in the schedule does not warrant starting all over again. The schedule can be completed with the remaining doses at the recommended intervals.

Is it safe to give my child extra doses of vaccines given in campaigns?

Generally, extra doses of most vaccines are safe. These campaigns are conducted to raise the population immunity against the targeted germs and to halt the transmission of the germs in the community. This will hasten eradication of the germ. These programs are not primarily intended for individual protection. It is your duty to vaccinate your child during these campaigns. Examples of campaign mode vaccines include the oral polio vaccine (OPV-Pulse polio campaign)and the Measles, Rubella (MR)campaign. Child should receive the vaccines administered in campaign mode even if they have received these vaccines as part of their routine immunisation. It is necessary and safe.

Vaccines are not for children only – Adolescents and Adults too need them.

- Adults are 100 times more likely than children to die of diseases that can be prevented by vaccines
- Childhood administered vaccine induced immunity can begin to fade over time. So, adults and adolescents may need periodic boosters of some vaccines e.g. Td
- Some adults were never vaccinated as children
- Newer vaccines were not available when some adolescents and adults were children. Such adolescents and adults should receive these newer vaccines
- As we age, we become more susceptible to serious disease caused by common germs (e.g., Flu, Pneumococcus). Effective and safe vaccines are available against these germs

FAQs

1. Do infants have natural immunity? If yes, why do they need vaccines?

Babies may get some temporary protection from antibodies transferred, during pregnancy, from the mother's blood to the newborn. This is only for diseases to which

mother is immune. Breastfeeding may also protect the baby temporarily from minor infections. These antibodies do not last long, leaving the baby vulnerable to disease.

2. Is natural immunity better than vaccine-acquired immunity?

In some cases, natural immunity is longer-lasting than the immunity gained from vaccination. But natural infection carries the risk of complications which are very rare following vaccinations. Natural Measles infection can cause brain involvement in 1 in 1000 individuals. This risk is practically not there with measles vaccine. Severe allergic reactions to MMR vaccine occurs at the rate of 1 in 1 million vaccinated individuals.

3. Why should my baby receive vaccines so early in life? Can I postpone it by a few months?

In developing countries like India, infection occur very early in life. Hence, it is essential to begin the process of vaccinations when the baby is just a few weeks of age. The baby does not have natural immunity to most of these infections. These infections can be devastating to the baby.

4. Why should my child receive so many vaccines?

The young infant is susceptible to many germs, in whom the complications of the infections are much higher than in older children. Hence, the need for protection against multiple germs simultaneously.

5. Why should my child receive so many doses of the same vaccine?

The young infant's immune system is not completely mature. The immune response to each dose, is less than that as would occur in older children. Hence the need for multiple doses to get a protective immune response. For some infections, e.g. Diphtheria ,Tetanus, the protection wanes over a period of time. Hence, repeat dose called booster are to be administered periodically.

6. We give so many vaccines, in such a short period of time, to such a young baby!

Will the baby's immune system be overloaded?

The human body has a fantastic capability to respond to innumerable antigens at the same time. Hence, multiple vaccines cannot overload the baby's immune system or make the baby's immune system weak.

7.I have heard that many vaccines contain mercury which can damage the brain. Is it true?

The type of mercury used in vaccines is called Thiomersal. Mercury in very low doses can prevent the growth of germs in the vaccine vial. This is particularly important when multi dose vaccine vials are being used. Large studies, done by very important and prestigious medical organisations, have very clearly demonstrated that there is no link between the use of mercury in vaccines and brain damage or autism. Mercury in vaccines is safe.

8.What about Aluminium in vaccine? Is it safe?

Aluminium is a substance added to vaccines to enhance the immune response by the vaccine. Aluminium is very commonly found in nature and is present in air, food, and water. Previous scientific research has shown the amount of aluminium exposure in people who follow the recommended vaccine schedule is low and is not readily absorbed by the body and found to be safe.

9.My brother's child developed features of autism in the second year of life, after the administration of the MMR vaccine. He firmly believes that MMR caused autism and has advised me not to administer the vaccine to my toddler. What are the facts about the link between MMR and autism?

A scientific paper was published in 1999 by a British physician who claimed to have evidence that the MMR (measles, mumps and rubella) vaccine was linked to autism. The potential link has been thoroughly explored; study after study has found no such link, and The Lancet, which had originally published it, has formally retracted the original 1998 study, as there were serious methodological flaws and conflicts of interest. It is likely that this misconception persists because of the coincidence of timing between early childhood vaccinations and the first appearance of symptoms of autism. **MMR does not cause Autism.**

10. Why do some children develop the disease in spite of taking the vaccines?

All vaccines are not 100% effective. Vaccines work by eliciting an immune response in the body of the vaccinated person. This capacity to mount an immune response may not be sufficient in a few individuals in the population. The vaccines may not protect them. On the other hand, most vaccines protect over 95% of the vaccinated individuals. Non-responsiveness to a vaccine is more an exception rather than a rule.

11. Can you get a disease from the vaccine that's supposed to prevent it?

Live, attenuated (or weakened) vaccines are theoretically capable of causing illness: because they can still replicate (though not well), mutation is possible, which can lead to a virulent form of the pathogen. This has been reported with the oral polio vaccine. However, it is very rare.

12. Do I need to be vaccinated against diseases that I do not see in my community or my country?

Although vaccine-preventable diseases have become uncommon in many countries, the infectious agents that cause them continue to circulate in some parts of the world. In a highly inter-connected world, they can cross geographical borders and infect anyone who is not protected.

13. What if my baby has a cold or fever, or is taking antibiotics? Can they still get vaccinated?

Yes. Your child can still get vaccinated if they have a mild illness, a low-grade fever, or when taking antibiotics. Your doctor is the most appropriate person to take this decision.

14. Why should I vaccinate my child against a mild illness like chickenpox?

Even uncomplicated cases of chickenpox cause children to miss a week or more of school, with a caregiver missing work to care for the sick child. The disease can spread to other children. If a child with a weak immunity gets chickenpox, it can lead to serious complications.

15. What are the risks and benefits of vaccines?

Getting naturally exposed to diseases like pertussis, diphtheria and measles can result in significant complications to your child. On the other hand, vaccines may cause

minor side-effects like fever, pain, swelling and poor feeding. Serious reactions to vaccines are extremely rare. Thus, the disease-prevention benefits of vaccination are much greater than the possible side effects for almost all children.

16. What are the common side effects observed after vaccination?

Vaccines, like any medication, may cause some side effects. Most of these side effects are very minor, like soreness or some swelling where the shot was given, fussiness, or a low-grade fever. These side effects typically only last a couple of days and are treatable.

17. Can serious or severe side effects occur following vaccinations?

Serious allergic reactions to vaccines are extremely rare. The rates are 1 to 2 per million doses of the vaccines. Every doctor who administers vaccines, has facilities and the expertise to deal with these emergencies at the site of vaccination.

18. Why do the private providers (Indian Academy of Paediatrics schedule) offer some vaccines that are not available in Government's programme?

The government immunisation programme (NIP) caters to the population at large and provides vaccines recommended by the National Technical Advisory Group on Immunisations(NTAGN). It targets diseases which cause high mortality and morbidity in the community and thus have a significant public health importance. On the other hand, private providers follow the IAP schedule, which includes vaccines which are not public health issues, but which are important at the individual level. These vaccines prevent loss of school days, prevent loss of work days by the caregivers and improve the quality of life. NIP provides fewer vaccines than the IAP schedule. Moreover, the schedules of the NIP and IAP differ to some extent.

19. If all the children in my surrounding are vaccinated, should my child still receive vaccines? Will my child not be protected by “Herd Immunity”?

A population with a high number of members with immunity to a particular disease or pathogen may give protection from that infection to the small number who have not been vaccinated. This is known as “herd immunity” or “community immunity” or “population immunity”. However, it is not safe to depend on herd immunity for individual protection. Herd immunity is applicable only for diseases where there is a

person-to-person transmission and the germ does not exist in any host apart from humans.

20. My child missed the 3rd dose of the Hexavalent vaccine given at 14 weeks. He is now 5 months of age. Should the doses be started all over again?

No. Delayed doses does not warrant restarting the entire series. Your child can receive the 3rd dose now and complete the schedule. However, you should be timely in the vaccinations and avoid such situations.

21. The government conducts nationwide programs e.g Pulse Polio and MR campaigns. My child has received all his regular vaccines. Should he still receive these additional doses?

Yes. These campaigns are conducted to raise the population immunity against the targeted germs and to halt the transmission of the germs in the community. This will hasten eradication of the germ. These programs are not primarily intended for individual protection. It is your duty to vaccinate your child during these campaigns. Additional doses of vaccines are safe.

Tag lines

1. Healthy Beginnings, Bright Futures: Routine Immunization is the way forward
2. Ensuring a Healthy Start: Routine Immunization for every child
3. Immunization for everyone : From New born to Old age
4. Make your child a VIP (Vaccinated, Immunized and Protected)
5. Immunizations: The best investment for a child's health My choices

Press note

- Vaccines currently protect against 20 infections and Immunization currently prevents 3.5-5 million deaths every year. Smallpox has been eradicated, polio is present only in two countries on this planet, measles, rubella, diphtheria, pertussis (whooping cough) has declined considerably.
- According to NFHS-5, 2019-21, the country's full immunization coverage stands at 76.1%, which means that one out of every four children is missing out on essential vaccines. According to the latest UNICEF report, in 2022, 93% of surviving infants received the third dose of DTP-containing vaccine and 90% received the second dose of a measles-containing vaccine.
- The eradication of polio In India is one of the greatest public health success stories, not only for India, but for the entire world. Against all odds, delivering the vaccines to inaccessible areas, vaccinating all the difficult to reach populations, India achieved this commendable goal. Not only that, India continues to have a very high quality surveillance system in place, to detect any polio virus in environment and India has succeeded in keeping even the environment free of any polio viruses.
- The role of the IAP is most important in the immunization program of the country.
- The recommendations of the Indian Academy of Paediatrics (IAP) is followed by 45,000 Paediatrician- members of the IAP.
- In addition to those recommended by the Government, the IAP also recommends vaccines, which are not against essentially life-threatening illnesses or which do not constitute a significant public health burden. But these vaccines do prevent illnesses which negatively affect the quality of life. They prevent loss of school days and loss of work days by the parents. In addition, it prevents complications arising from these illnesses.
- Challenges seen/faced/anticipated?

While significant progress has been seen in the field of immunization coverage, several challenges have impeded the desired progress. Inequitable distribution of vaccines and inability to reach the magic figure of 90% coverage, gaps in available human resources, issues related to financing of vaccinations and the necessary infrastructure, uneven access to vaccines at affordable prices, gaps in coverage and disease surveillance, wavering community demand for vaccination (Covid vaccines),

outbreaks, conflicts, and humanitarian emergencies, have all contributed to the progress.

The future lies in the Immunization Agenda 2030 (IA 2030), which envisions “a world where everyone, everywhere, at every age, fully benefits from vaccines to improve health and well-being.”

- **Recommendations of IAP for**

- **Government:** The Govt. of India should expedite the introduction of HPV vaccine and the Typhoid conjugate vaccine. Both diseases constitute a significant public health burden. Safe, effective and low-cost, “Made in India” vaccines are available.
- **Parents:** Every child should be immunized with the NIP vaccines. The additional vaccine recommended by IAP is aimed to improve the quality of life. The additional vaccines are safe and effective. All schedules should be completed within the recommended time frame.
- **Vaccine makers:** The need of the hour is research and development of vaccines against the vector borne diseases (Dengue, Nipah virus, Chickungunya) and other diseases which constitute a significant public health burden.
- **Other Stakeholders:** Continued support for the development, licensure and roll-out of all new vaccines to be introduced. ...

IAP CURRENT ACTIONS/PROGRAM/MISSION MODE: The IAP is committed to work in tandem with the Govt. of India in all vaccine related issues. Support and involvement, with the Govt. of India, in the endeavour, to improve the immunization rates in the community, is a mission for IAP.

"With the exception of safe water, no other public health intervention, not even antibiotics, has had such a major effect on mortality reduction as have resulted from the extensive use of vaccines."



Indian Academy of
Pediatrics



ROUTINE IMMUNISATION

is birth right of the child



Routine Immunization is birth right of the child

Experts

Dr S G Kasi(Convenor)

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Dr Muralidhar Reddy



The baby has spent 9 months in the mother's womb, protected from all germs and getting the optimal nutrition.



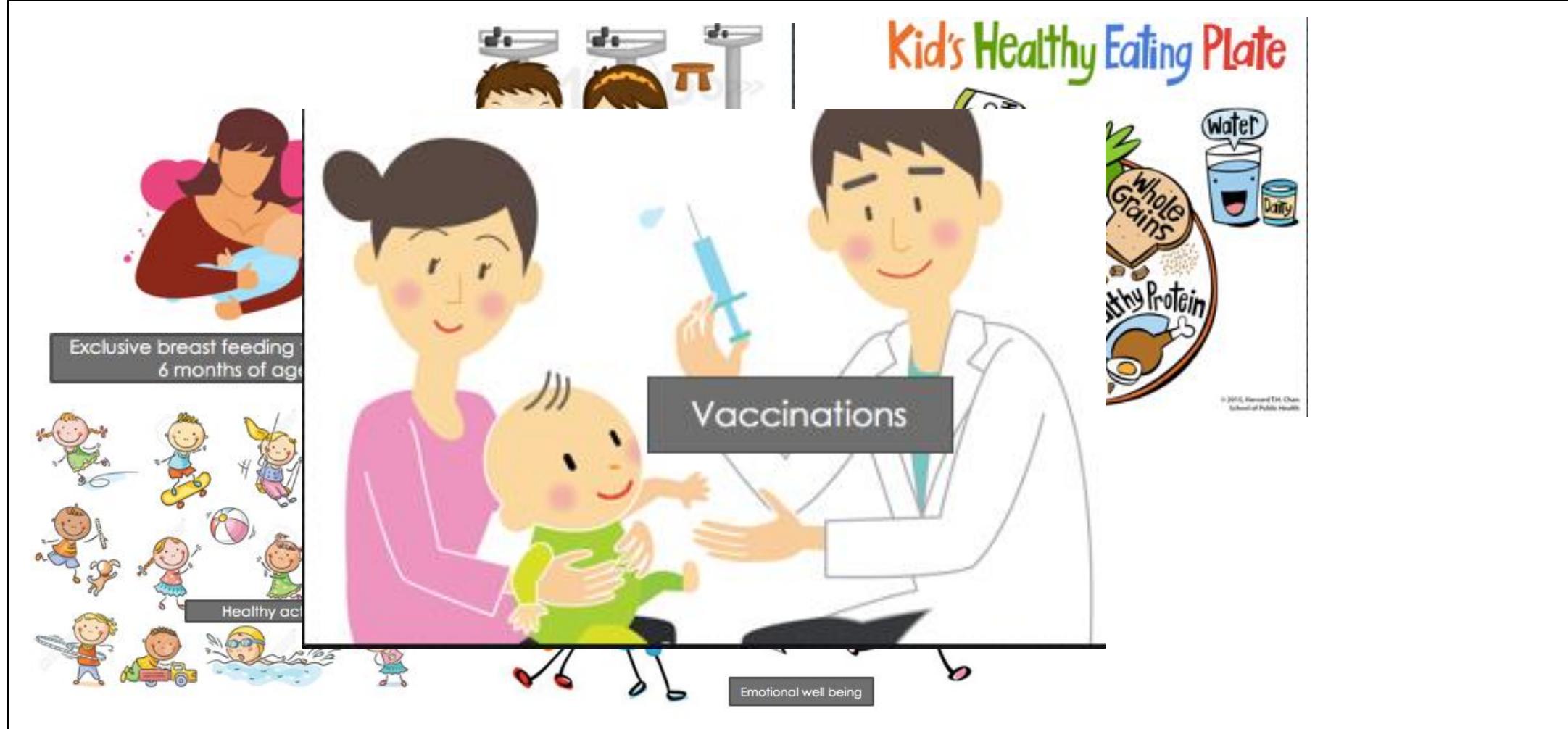
The little one enters this world. It is our duty to provide the best possible protection to enable optimum growth and development.



Circle of
protection

From the moment of birth, your child is exposed to thousands of germs every day in his environment through *the food he eats, the air he breathes and things he puts in his mouth.*

This circle of Protection can be provided by various strategies



What are vaccines?

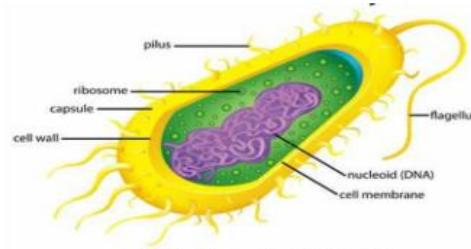


Vaccines are injections (shots), liquids, or nasal sprays that is given to the baby, to teach the baby's immune system to recognize and defend itself against harmful germs.

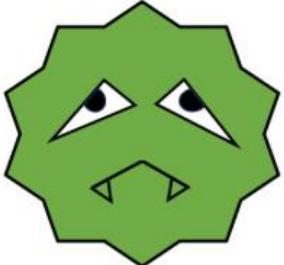
Types of Vaccines



KILLED GERM



PARTS OF GERM



ALTERED GERM



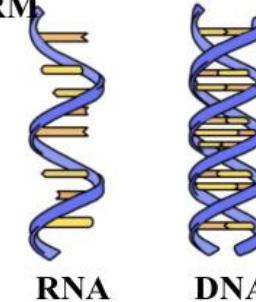
TOXIN

Chemical modification



TOXOID

GENETIC MATERIAL OF GERM



RNA

DNA

Vaccines also contain ...



Help vaccines to induce better immune response by the body

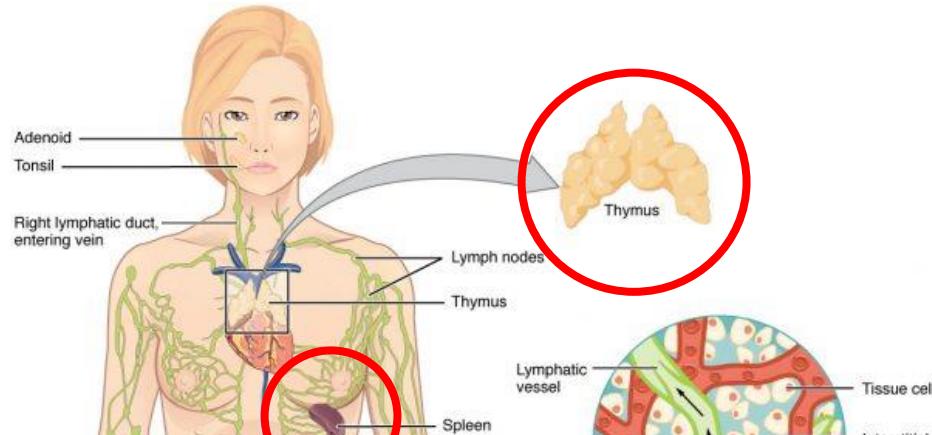


stabilizers like **amino acids, vitamins, sugars, & salts**, to preserve the vaccine



and finally, **antibiotics** to keep the vaccine fresh!

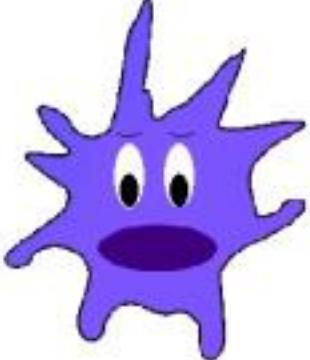
The human immune system consists of



Neutrophil



Macrophage



Dendritic Cell



B Cell

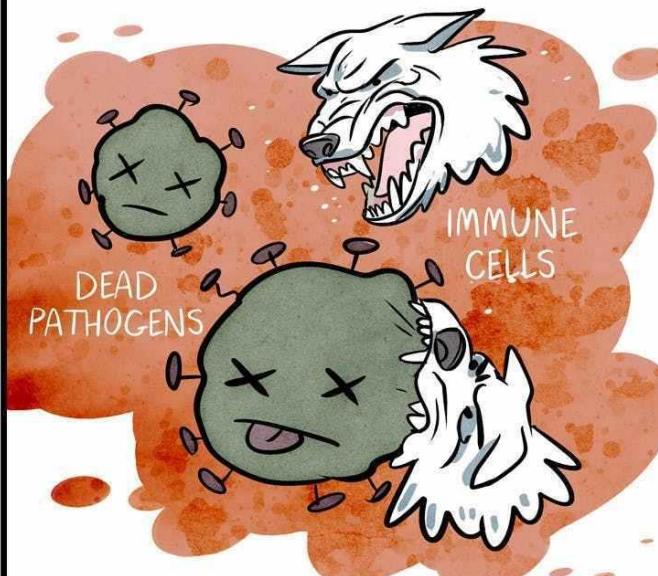


T Cell

how

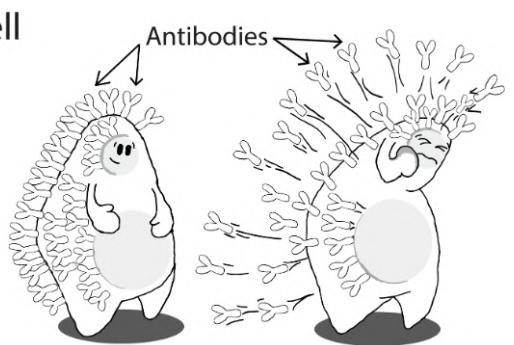
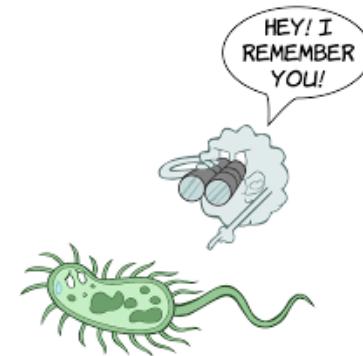
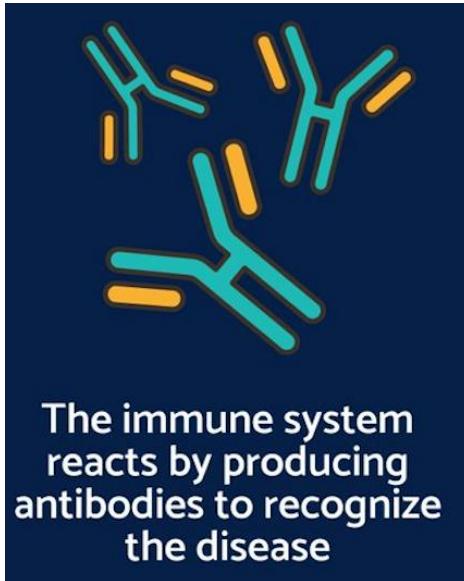


Vaccines are like a training exercise for your body. They use dead or damaged viruses to provoke an immune response, without having to get sick.



rk?







*Vaccines erect an almost
impenetrable wall of protection
between your child and
childhood infections*



The National Immunization Schedule (NIP) by the Govt. of India

Vaccine	Due age	Max age	Dose	Diluent	Route	Site
For Infants						
BCG	At birth	till one year of age	(0.05 ml until 1 month) 0.1ml Beyond age 1 month	YES Manufacturer supplied diluent (Sodium chloride)	Intra-dermal	Upper Arm - LEFT
Hepatitis B - Birth dose	At birth	within 24 hours	0.5 ml	NO	Intra-muscular	Antero-lateral side of mid-thigh - LEFT
OPV-0	At birth	within the first 15 days	2 drops	-	Oral	Oral
OPV 1, 2 & 3	At 6 weeks, 10 weeks & 14 weeks	till 5 years of age	2 drops	-	Oral	Oral
Pentavalent 1, 2 & 3** (Diphtheria+ Pertussis + Tetanus + Hepatitis B + Hib)	At 6 weeks, 10 weeks & 14 weeks**	1 year of age	0.5 ml	NO	Intra-muscular	Antero-lateral side of mid-thigh - LEFT
Fractional IPV (Inactivated Polio Vaccine)	At 6w-14w-9m	1 year of age	0.1 ml	NO	Intra-dermal	Upper Arm - RIGHT
Rotavirus‡	At 6 weeks, 10 weeks & 14 weeks	1 year of age	5 drops	NO	Oral	Oral
Pneumococcal Conjugate Vaccine (PCV) (Where applicable)	At 6 weeks & 14 weeks At 9 completed months - booster	1 year of age	0.5 ml	NO	Intra-muscular	Antero-lateral side of mid-thigh - RIGHT
Measles / Rubella 1st dose ##	At 9 completed months-12 months.	5 years of age	0.5 ml	YES Manufacturer supplied diluent (Sterile water)	Sub-cutaneous	Upper Arm - RIGHT
Japanese Encephalitis - 1 @ (Where applicable)	At 9 months-12 months@	15 years of age	0.5 ml	YES - Manufacturer supplied diluent (Phosphate Buffer Solution)	Sub-cutaneous	Upper Arm - LEFT
Vitamin A (1st dose)	At 9 months	5 years of age (1 lakh IU)	1 ml	-	Oral	Oral

Vaccine	When to give	Max age	Dose	Diluent	Route	Site
For Children						
DPT Booster-1	16-24 months	7 years of age	0.5 ml	NO	Intra-muscular	Antero-lateral side of mid-thigh - LEFT
Measles / Rubella 2nd dose ##	16-24 months	5 years of age	0.5 ml	YES Manufacturer supplied diluent (Sterile water)	Sub-cutaneous	Upper Arm - RIGHT
OPV Booster	16-24 months	5 Years	2 drops	NO	Oral	Oral
Japanese Encephalitis – 2 @ (Where applicable)	16-24 months @	till 15 years of age	0.5 ml	YES Manufacturer supplied diluent (Phosphate Buffer Solution)	Sub-cutaneous	Upper Arm - LEFT
Vitamin A \$ (2nd to 9th dose)	At 16 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	7 Years of age	0.5 ml	NO	Intra-muscular	Upper Arm
Td	10 years & 16 years	16 Years	0.5 ml	NO	Intra-muscular	Upper Arm

The Indian Academy of Pediatrics (IAP) schedule

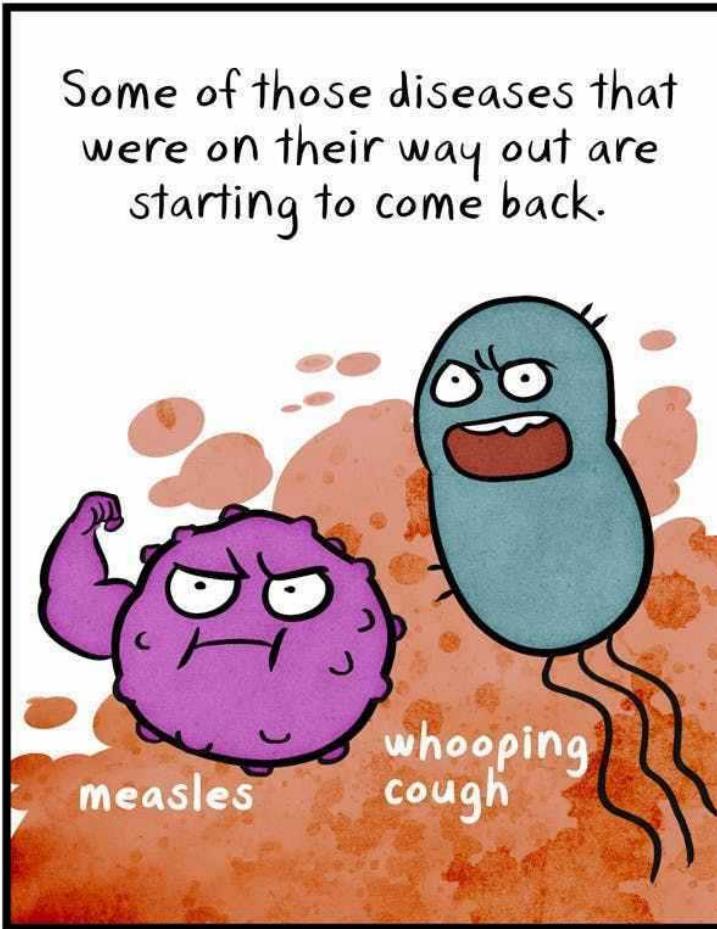
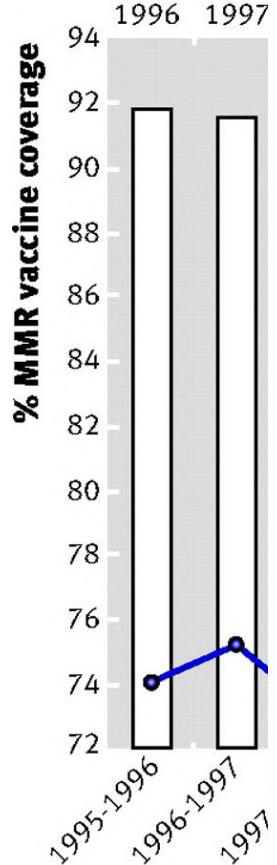
Vaccine	Age in completed weeks/months/years																		
	Birth	6w	10w	14w	6m	7m	9m	12m	13m	15m	16-18m	18-24m	2-3 Y	4-6 Y	9-14 Y	15-16 Y	17-18 Y		
BCG																			
Hepatitis B	HB 1 ^a	HB 2	HB 3	HB 4 ^b															
Polio	OPV	IPV 1 ^c	IPV 2 ^c	IPV 3 ^c									IPV ^c B1						
DTwP/DTaP		DPT 1	DPT 2	DPT 3									DPT B1				IPV ^c B2		
Hib		Hib 1	Hib 2	Hib 3									Hib B1						
PCV		PCV 1	PCV 2	PCV 3									PCV B						
Rotavirus		RV 1	RV 2	RV 3 ^d															
Influenza					Dose 1 ^e	Dose 2	Annual Vaccination												
MMR							Dose 1						Dose 2				Dose 3		
TCV																			
Hepatitis A								Dose 1						Dose 2 ^f					
Varicella													Dose 1		Dose 2 ^g				
Tdap ^h																			
Td																			
HPV																1 & 2 ^{i,k}	1, 2 & 3 ^{j,k}		
Meningococcal ^l							Dose 1	Dose 2											
JE ^m									Dose 1	Dose 2									
Cholera									Dose 1	Dose 2									
PPSV 23																			
Rabies																			
Yellow Fever																			

Recommended age

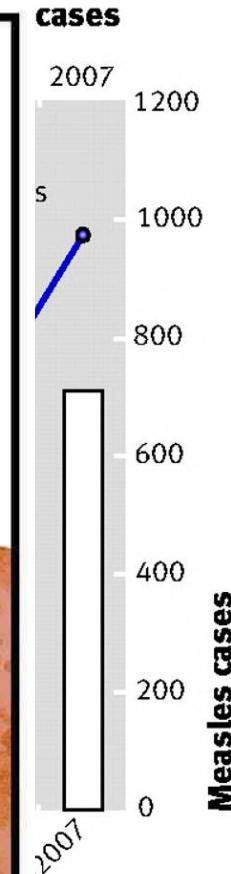
Catch up age range

Vaccination in special situations

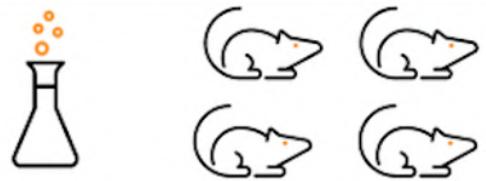
Why should my child receive vaccines when the infections are no longer seen?



Period of MMR coverage



Are Vaccines safe??



Safety studies: in depth testing of the vaccine candidate's safety in laboratory and animal models (local and systemic toxicity). This is done **following regulatory guidelines**.

Studies in animals



Phase I: the vaccine candidate is tested on a small number of healthy individuals to assess **safety**.

Phase II: the vaccine is tested on a larger number of people to evaluate **safety and immune response**, and explore the **optimal dose**.

Phase III: thousands of people, to assess **protection against the target infection & safety**.



Post-marketing safety and efficacy are **continuously monitored**, throughout the entire life of the vaccine. Any side effects or issues observed and reported after vaccination are carefully assessed. Issues can be reported by patients and healthcare professionals.

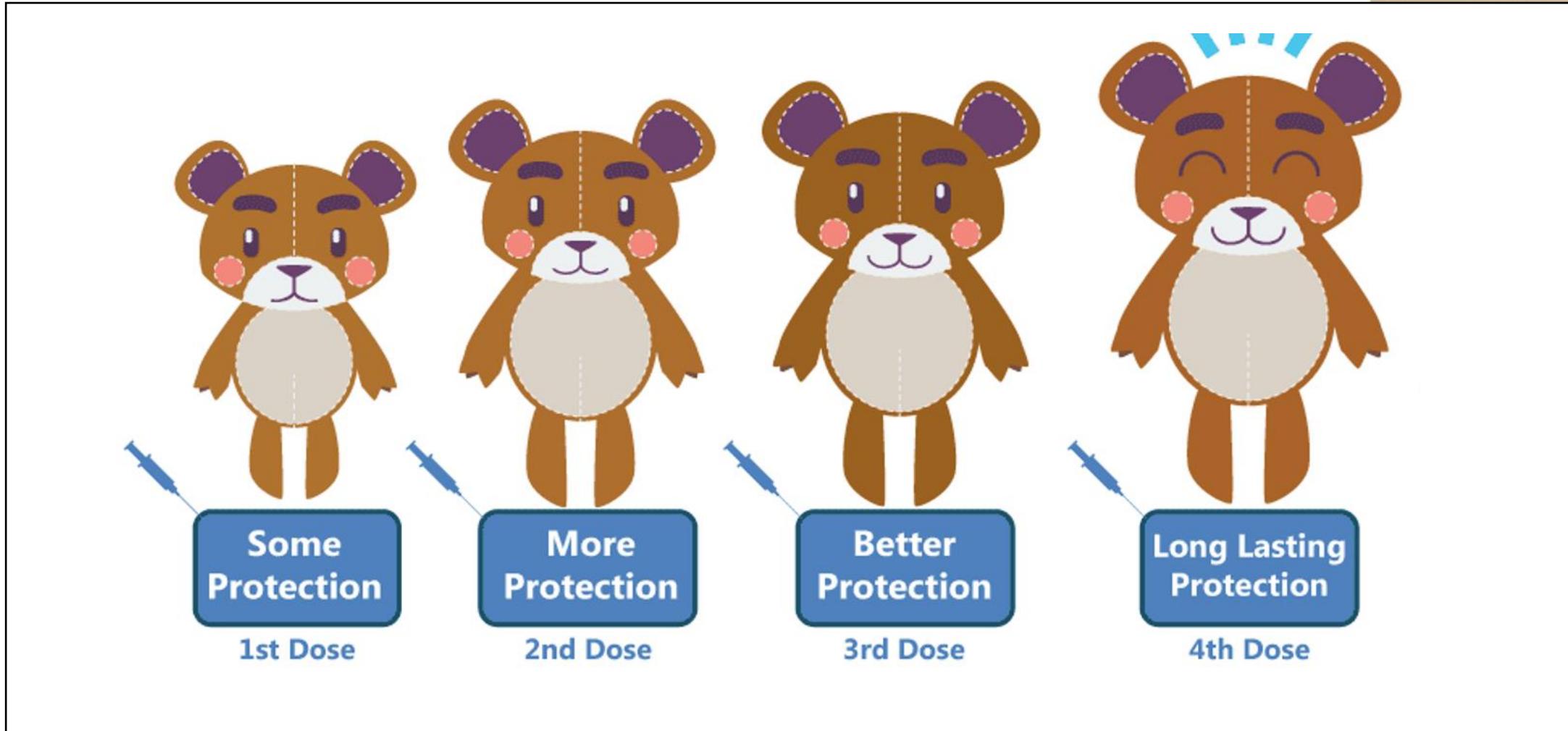


e
fects:

Why so many vaccines ? and so early in life?

- Immunity transferred from mother and from breast milk does not last for more than a few months.
- The baby is susceptible to many dangerous infections
- In a country like India, these disease occur very early in life as compared to High-Income western countries
- So, the baby needs many vaccines in the first year of life.

Why so many doses of the same vaccine?



Globally, How well have vaccines worked?

Vaccines are life-changing scientific breakthroughs and play a critical role in fighting preventable diseases.
Thanks to vaccines:

Measles deaths have dropped by 73% worldwide from 2000-

2018

73%



We're closer than ever to polio eradication, with cases down 99% worldwide

99%



The world has been smallpox-free since 1980



How well have vaccines worked in India?

Disease	Before vaccine	After vaccine	% change
Smallpox	1970: 23546	1976: 0	100
Polio	1980: 18975	Since 2012: 0	100
Tetanus: Neonatal	1988: 11,849	2021: 81	95
Tetanus: Total	1980: 45948	2021: 1240	95
Diphtheria	1980: 39231	2018: 8788	78
Pertussis	1980: 320,109	2018: 13208	95
Measles	1980: 114,306	2023: 13220	89

Vaccines cause Allergies, Autism
and more ???



ANTI-VAXXERS

Vaccines do so many *GOOD* things to your baby



I Medical costs

P Prevention of the disease

Vaccination is the most important thing we can do to protect ourselves and our children

*And Remember
Vaccines are not just for babies!!*



Vaccines are for everyone



World
Immunisation
Week

VACCINES

prevent more than 20 diseases helping
people of all ages live longer, healthier lives

**ROUTINE IMMUNISATION IS
BIRTH RIGHT OF THE CHILD**



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Do You Know?

The National Program (NIP) of India
is the Largest **Immunization** Program in the World!



It targets every newborn (~27 million every year)
for Immunization



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Indian Academy of
Pediatrics



SUCCESS STORY

Vaccines Protect Against



Mumps



Typhoid



Hepatitis A



Chicken Pox



Influenza

- ▶ Reduces school absenteeism
- ▶ Loss of working days for the parents
- ▶ Prevents rare complications caused by these disease causing germs
- ▶ In general improves the quality of life

**The Indian Academy of Paediatrics (IAP)
Recommends Vaccines**



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Indian Academy of
Pediatrics



Q & A

IS IT SAFE TO GIVE EXTRA
DOSES DURING THE
VACCINES GIVEN IN
CAMPAIGNS?



YES!

**EXTRA DOSES
ARE SAFE**

These campaigns are
conducted to raise the
population immunity &
it is your duty to
vaccinate your child
during these campaigns



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MYTH

VACCINES are for
children only.

Adolescents and
Adults don't need them.

**VACCINATION
IS FOR ALL!**

FACT

Adults are far more likely
than children to be affected
by diseases that can be
prevented by VACCINES.



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Indian Academy of
Pediatrics



MAKE YOUR CHILD A



VIP
VACCINATED
IMMUNIZED
PROTECTED



VACCINES are the most valuable gift that can be given to a child, for a long healthy and productive life.



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My children are healthy. Why do I need to vaccinate them?

Babies receive temporary protection for minor infections like colds from antibodies passed from the mother during pregnancy and breastfeeding.

These antibodies diminish quickly, leaving the baby susceptible to disease.

Hence Vaccines are necessary!



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Indian Academy of
Pediatrics



The baby's immune system can handle even multiple vaccines, in a short duration

True or False?



Swipe to know more ➤

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FACT!

The human body has a fantastic capability to respond to innumerable antigens at the same time. Hence, multiple vaccines cannot overload the baby's immune system or make the baby's immune system weak.



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MYTH



MMR Vaccine can
cause Autism



FACT

**MMR Vaccine cannot
cause Autism**

It is likely that this misconception persists because of the coincidence of timing between early childhood vaccinations and the first appearance of symptoms of autism.



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WHAT DOES IAP RECOMMEND TO PROTECT YOUR DEAREST ONE!

The Indian Academy of Pediatrics (IAP) schedule

Vaccine	Age in completed weeks/months/years															
	Birth	6w	10w	14w	6m	7m	9m	12m	13m	15m	16-18m	18-24m	2-3 Y	4-6 Y	9-14 Y	15-18 Y
BCG																
Hepatitis B	HB 1*	HB 2	HB 3	HB 4*												
Polio	OPV	IPV 1*	IPV 2*	IPV 3*							IPV B3			IPV B2		
DTwP/DTaP		DPT 1	DPT 2	DPT 3							DPT B1			DPT B2		
Hib	Hib 1	Hib 2	Hib 3								Hib B1					
PCV	PCV 1	PCV 2	PCV 3								PCV B					
Rotavirus	RV 1	RV 2	RV 3*													
Influenza				Dose 1*	Dose 2						Annual Vaccination					
MMR						Dose 1					Dose 2				Dose 3	
TCV																
Hepatitis A							Dose 1					Dose 2*				
Varicella									Dose 1			Dose 2*				
Tdap*																
Td																
HPV														1 & 2*	1, 2 & 3*	
Meningococcal					Dose 1	Dose 2										
MMR							Dose 1	Dose 2								
Cholera							Dose 1	Dose 2								
PPSV 23																
Rabies																
Yellow Fever																

Recommended age

Catch up age range

Vaccination in special situations

(**SAVE IT!**) Contact your Pediatrician for details

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