National Immunization Schedule

Aim: To study the National Immunization Schedule

Theory: 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.

Immunization is a proven tool for controlling and eliminating life-threatening infectious diseases and is estimated to avert between 2 and 3 million deaths each year. It is one of the most cost-effective health investments, with proven strategies that make it accessible to even the most hard-to-reach and vulnerable populations. It has clearly defined target groups; it can be delivered effectively through outreach activities; and vaccination does not require any major lifestyle change.

India's UIP provide free vaccines against 11 life threatening diseases - Tuberculosis, Diphtheria, Pertussis, Tetanus, Polio, Hepatitis B, Pneumonia and Meningitis due to Haemophilus Influenzae type b (Hib), Measles, Rubella, Japanese Encephalitis (JE) and Rotavirus diarrhoea. (Rubella, JE and Rotavirus vaccine in select states and districts)

National Immunization Schedule

Immunization is one of the most important and cost effective strategies for the prevention of childhood sicknesses and disabilities and is thus a basic need for all children. The following schedule has been recommended by the Ministry of Health, Govt. of India and is one of the most widely followed by the child health care providers.

Vaccine	When to give	Maximum age	Dose	Route	Site
For Pregnant Women					
Tetanus & adult Diphtheria (Td -1)	early pregnancy	--	0.5ml	intra muscular	Upper arm
Tetanus & adult Diphtheria (Td -2)	4 weeks after 1st dose of Td*	--	0.5ml	intra muscular	Upper arm
Tetanus & adult Diphtheria (Td booster)	If received 2 Td doses in a pregnancy within the last 3yrs	--	0.5ml	intra muscular	Upper arm
For Infants					
BCG (Bacillus Calmette Guerin)	At birth or as early as possible till 1 year of age	At birth till one year	0.1ml (0.05ml until 1month age)	Intra-dermal	Left Upper Arm
Hepatitis B - Birth dose	At birth or as early as possible within 24 hours	At birth within 24 hours	0.5 ml	Intra-muscular	Antero-lateral side of mid-thigh
Oral Polio Vaccine (OPV) -0	At birth or as early as possible within first 15 days	Within the first 15 days	2 drops	Oral	Oral
Oral Polio Vaccine (OPV) -1,2,3,	6 weeks, 10 weeks & 14 weeks	Till 5 years of age	2 drops	Oral	Oral
Inactivated Polio Vaccine (IPV) 1 & 2	6 weeks & 14 weeks	1 year of age	0.1 ml	Intra-dermal	Right Upper arm
Pentavalent vaccine (Diphteria, Pertussis, Tetanus, Hepatitis B, Hib)- 1, 2 & 3	6 weeks, 10 weeks & 14 weeks	1 year of age	0.5 ml	Intra-muscular	Antero-lateral side of mid-thigh
Rotavirus Vaccine (RVV) 1, 2 & 3	At 6 weeks, 10 weeks & 14 weeks	1 year of age	5 drops (lyophilized vaccine)	Oral	Oral
Pneumococcal Conjugate Vaccine (PCV) 1, 2 & Booster	At 6 weeks, 14 weeks & 9 months	1 year of age	0.5 ml	Intra-muscular	Antero-lateral side of mid-thigh
Measles-Rubella (MR) 1	9 completed months - to 12 months. Give up to 5yrs if not received at 9 - 12 months age	5 years of age	0.5 ml	Sub-cutaneous	Right upper arm

Vitamin A (1st dose)	At 9 completed months	5 years of age	1ml (1lakh IU)	Oral	Oral
Japanese Encephalitis (1st Dose)***	At 9 completed months - 12 months	15 years of age	0.5 ml	Subcutaneous (live vaccine) Intramuscular (killed)	Left upper arm Antero-lateral side of mid thigh
For Children and adolescents					
Diphtheria Pertussis Tetanus (DPT) booster 1	16- 24 months	7 years of age	0. 5 ml	Intra- muscular	Antero-lateral side of mid-thigh
MR 2	16-24 months	5 years of age	0.5 ml	Sub-cutaneous	Right Upper arm
OPV Booster	16-24 months	5 years of age	2 drops	Oral	Oral
Japanese Encephalitis***(if applicable)	16-24 months	15 years of age	0.5 ml	Sub-cutaneous	Left Upper Arm
Vitamin A***(2nd to 9th dose)	18 months (2nd dose). Then, one dose every 6 months upto the age of 5 years.	5 years of age	2 ml (2 lakh IU)	Oral	Oral
Diphtheria Pertussis Tetanus Booster (DPT) booster 2	5- 6 years	7 years of age	0.5 ml	Intra-muscular	Upper arm
Tetanus & adult Diphtheria	10 years &16 years	16 years of age	0.5 ml	Intra-muscular	Upper arm

* Give Td-2 or Booster doses before 36 weeks of pregnancy. However, give these even if more than 36 weeks have passed. Give Td to a women in labour if, she has not previously received Td.

Pentavalent vaccine (containing Diphtheria+Pertussis+Tetanus+Hepatitis B+Hib)

*** JE vaccine at select endemic districts

Rotavirus vaccine (RVV) as part of Universal Immunization Programme

In India, every year 37 out of every 1000 children born are unable to celebrate their 5th birthday, and one of the major reasons for this is diarrheal deaths. Out of all the causes of diarrhoea, rotavirus is a leading cause of diarrhoea in children less than 5 years of age. It is estimated that rotavirus cause 8,72,000 hospitalizations; 32,70,000 outpatient visits and estimated 78,000 deaths annually in India. The introduction of Rotavirus vaccine will enable to directly address the problem of diarrheal deaths.

Rotavirus vaccine was introduced in 2016 in a phased manner, beginning with 4 states initially and later expanded to 7 more states making it a total of 11 states by end of 2018, where Rotavirus vaccine was available in the country. The vaccine has been further expanded to 17 more states. Rotavirus vaccine is now available in 28 States/UTs, namely, Andhra Pradesh, Haryana, Himachal Pradesh, Jharkhand, Odisha, Assam, Tripura, Rajasthan, Tamil Nadu, Madhya Pradesh, Uttar Pradesh, Manipur, Daman & Diu, Gujarat, Bihar, Sikkim, Arunachal Pradesh, Chhattisgarh, Maharashtra, Dadra & Nagar Haveli, Goa, Chandigarh, Nagaland, Delhi, Mizoram, Punjab, Uttarakhand, and Andaman and Nicobar Islands. The vaccine is expected to be available in all 36 States/UTs by September 2019.

Pentavalent vaccines

The pentavalent vaccine is a combination of DPT (diphtheria, Pertussis/whooping cough and tetanus), Hepatitis B and Hib vaccines. DPT and Hepatitis B vaccines are already a part of the immunisation programme. They are being replaced by pentavalent vaccine in a phased manner in the country. Each pentavalent vaccine consists of 0.5ml dose that will be given intramuscularly in the mid-thigh region through syringes.

The revised immunisation schedule, when pentavalent vaccines are introduced is as follows.

Vaccine	Schedule
BCG, Hep B birth dose, OPV-O	At Birth
Pentavalent (DPT + Hep B + Hib), OPV	6 weeks, 10 weeks and 14 weeks
Measles and Vitamin A	9-12 months
DPT booster, OPV booster, Measles2*	16-24 months
DPT booster	5-6 years

Introduction of Pneumococcal Conjugate Vaccine (PCV) under Universal Immunisation Programme

The Health Ministry has approved the introduction of Pneumococcal Conjugate Vaccine (PCV) under Universal Immunisation Programme. Himachal Pradesh will be among four other states where Pneumonia Vaccines will be introduced along with Bihar, Uttar Pradesh, Rajasthan and Madhya Pradesh in a planned manner from 2017.

IAP (Indian Academy of Pediatrics) Recommendations

Indian Academy of Pediatrics, the largest professional organization of pediatricians in our country, fully endorses and supports the national schedule. It supplements the above schedule further, with additional vaccines such as Hepatitis B vaccine to be given in three doses (at birth, one month and six months of age.) and MMR (Measles, Mumps & Rubella vaccine) at about 15 to 18 months of age. It must be remembered that even though rubella may appear to be a mild illness, it has a serious potential to cause congenital defects in a baby, whose mother is not protected against rubella and catches the infection during early pregnancy.

Age	Vaccines
Birth	BCG, OPV 0, Hepatitis B -1
6 weeks	IPV-1, DTwP-1, Hepatitis B -2, Hib -1, Rotavirus 1, PCV 1
10 weeks	DTwP-2, IPV 2, Hib -2, Rotavirus 2, PCV 2, Hep B 3
14 weeks	DTwP-3 , IPV-3 , Hib -3, Rotavirus 3, PCV 3, Hep B 4
6 months	Influenza (IIV) 1
7 months	Influenza (IIV) 2
6-9 months	Typhoid Conjugate Vaccine
9 months	MMR I
12 months	Hep-A 1
15 months	MMR 2, Varicella 1, PCV Booster
16-18 months	DTwP B 1 / DTaP booster -1, IPV B 1, Hib booster 1
18 - 19 months	Hep-A 2, Varicella 2
4 - 6 years	DTwP B 2 / DTaP booster -2, IPV B 2, MMR 3
10 - 12 years	Tdap / Td, HPV (Only for females, three doses at 0, 1-2 and 6 months

Abbreviations:

1. **BCG:** Bacillus Calmette Guerin
2. **OPV:** Oral poliovirus vaccine
3. **DTwP:** Diphtheria, tetanus, whole cell Pertussis
4. **DT:** Diphtheria and tetanus toxoids
5. **TT:** Tetanus toxoid
6. **Hep B:** Hepatitis B vaccine
7. **MMR:** Measles, Mumps and Rubella Vaccine
8. **Hib:** Hemophilus influenzae Type ‘b’ Vaccine
9. **IPV:** Inactivated poliovirus vaccine
10. **Td:** Tetanus, reduced dose diphtheria toxoid
11. **HPV:** Human Papilloma Virus Vaccine
12. **PCV:** Pneumococcal Conjugate Vaccine
13. **TdaP:** Tetanus and Diphtheria Toxoids and a Cellular Pertussis Vaccine

For the complete IAP recommended immunization schedule, visit Immunization schedule

WHO-India Recommendation

WHO recommended Immunization Schedule

Vaccine	Age				
	Birth	6 weeks	10 weeks	14 weeks	9-12 months
Recommendations for all children					
BCG	X				

Polio		X	X		X		X		
DTP			X		X		X		
Hepatitis B*	X		X		X		X		
Rotavirus				X		X	X		
Haemophilus influenzae type b				X		X		X	
Pneumococcal (Conjugate)				X		X		X	
Measles									X
Rubella									X

Conclusion: National Immunization Program is studies from the above mentioned tables and charts.