PRACTICAL 6 IMMUNIZATION

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6.0 OBJECTIVES
After completing this practical, you should be able to:
• distinguish EPI and UIP;
• describe National Immunization Schedule;
• explain composition, indications, reconstitution, dose and contraindications of each of the vaccines;
• administer vaccines to children safely; and
• implement the nursing responsibilities while administering immunization.

6.1 INTRODUCTION
You have already studied immunization in detail in your early courses. We shall try to review the same. As you know immunization is considered as the most cost effective health intervention for gaining benefits in relation to reduction in mortality and morbidity of children and prevention of disability. One of the greatest contributions of modern medicine to human welfare, is safe and effective immunization against a number of childhood infectious diseases which, if not prevented become important cause for morbidity, disability and death. Young children all over the world and particularly in developing countries have been victims of higher morbidity and mortality as they are very vulnerable to disease due to poor immune status. Most important component of preventive paediatrics is protection of the children against the killer diseases by immunization. In this practical, you will learn about immunization schedule, composition, indications and contraindications of vaccines. At the end you will learn about your responsibility in reconstitution and administration of vaccines.
In May 1974, WHO started the Expanded Programme on Immunization (EPI) to bring six antigens to all the children of the world through improved management training of health personnel and development of effective cold chain to maintain vaccine potency. EPI was adopted by Government of India in 1978 to reduce the incidence of common infectious diseases in childhood which are tuberculosis, diptheria, tetanus, pertusis, polio and measles.

In 1985, the Universal Immunization Programme (UIP) was launched, which aims at immunizing all children before their first birthday against the six vaccine preventable diseases. Under UIP the emphasis is on the “under five”. Universal immunization was hoped to be achieved by 1990. UIP is aimed at adding impetus to the global programme of EPI.

Recently as you all know Govt. of India has launched a Pulse Polio Programme to eradicate the polio in the country. In this programme all children below 5 years are given doses of vaccine (OPV) irrespective of primary immunization.

The WHO recommends four basic doses of trivalent OPV at birth, 6, 10, and 14 weeks.

**Pulse Polio Immunization (PPI)**

The word pulse denotes sudden, simultaneous mass administration of OPV on a single day to all children 0-5 years of age. In this approach, all children in the country are simultaneously administered OPV in a single fixed day, repeated after 4-6 weeks. As a result, the wild polio virus strains get replaced by the harmless protective OPV strain.

**Check Your Progress 1**

What is the aim of Universal Immunization Programme?

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**6.3 COLD CHAIN SYSTEM**

Vaccines are sensitive to heat. On exposure to heat their potency is lost. Once a vaccine has lost its potency it cannot be regained, so it is important to maintain cold chain. We shall briefly outline the Cold chain system here.

One of the important components of EPI and UIP is the maintenance of cold chain. The cold chain consists of a series of transportation links during which adequate refrigeration is required to maintain potency of vaccine. All vaccines retain their potency at temperature between +2 to +8 degree Celsius. The temperature of refrigerator should be recorded on temperature chart everyday.
Dial thermometer is used to check temperature of the vaccine. The vaccines should not be frozen or exposed to direct sun light.

### 6.4 NATIONAL IMMUNIZATION SCHEDULE

The National Immunization Schedule is given below.

#### 6.4.1 Immunization Schedule

<table>
<thead>
<tr>
<th>Age</th>
<th>Vaccine</th>
<th>Hepatitis B</th>
</tr>
</thead>
<tbody>
<tr>
<td>At birth or soon thereafter</td>
<td>BCG, OPV</td>
<td></td>
</tr>
<tr>
<td>6 weeks</td>
<td>DPT, OPV₁</td>
<td></td>
</tr>
<tr>
<td>10 weeks</td>
<td>DPT, OPV₂</td>
<td></td>
</tr>
<tr>
<td>14 weeks</td>
<td>DPT, OPV₃</td>
<td>5 years</td>
</tr>
<tr>
<td>9 months</td>
<td>OPV, Measles</td>
<td>10 years</td>
</tr>
<tr>
<td>18-24 months</td>
<td>DPT (Booster)</td>
<td>16 years</td>
</tr>
<tr>
<td></td>
<td>OPV (Booster)</td>
<td></td>
</tr>
</tbody>
</table>

- If born in hospital, BCG vaccination may be administered at birth or before discharge.
- If delivery takes place in an institution, give an additional dose of OPV before baby is discharged. But do not count this dose, it is known was 0 dose of OPV.

**Note:**
- OPV at birth is recommended by WHO.
- OPV at nine month is included in this schedule.

#### Optional Vaccination

- Hib. (Haemophilus influenza type B)
- MMR 12-15 months
- Chickenpox (VZV)

**Hepatitis A:** Several inactivated or live attenuated vaccines against Hepatitis A have been developed. The vaccines are given parenterally, as a 2 dose series, 6-18 months apart.

**Hepatitis B:** Vaccine is given in 3 doses at 0, 1 and 6 months. Immunity continues at protective levels for approximately 3-5 years. Booster dose may be given after 3-5 years.

MMR is combined measles, mumps and rubella vaccine, single dose of 0.5 ml I/m.

### 6.5 VACCINES

We shall discuss the administration, dose, indication constitution and side effects of various vaccines briefly as given in Table 6.1.
<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Composition</th>
<th>Indications</th>
<th>Contraindications</th>
<th>Reconstitution</th>
<th>Dose</th>
<th>Administration</th>
<th>Reaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCG</td>
<td>Live freeze dried vaccine made from attenuated strain of mycobacterium bacilli</td>
<td>For prevention of tuberculosis given to all infants as soon as after birth</td>
<td>• Serious cell medicated immune deficiency</td>
<td>• Fill the neck part of the BCG ampule with the file</td>
<td>Children under 1 year - 0.05 ml</td>
<td>— Clean skin with volatile disinfectant</td>
<td>— Advice mother</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Progressive dermatitis</td>
<td>• With a syringe add the whole amount of saline diluent into the BCG ampule</td>
<td></td>
<td>— Let disinfectant completely dry</td>
<td>• not to expose the area vaccinated to direct sunlight</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Shake gently the ampule to ensure homogeneity of the suspension</td>
<td></td>
<td>— Administer vaccine on left upper arm in deltoid muscle</td>
<td>• not to give shower or bath on the day of vaccination</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>— Administer vaccine intradermally by tuberculin syringe</td>
<td></td>
</tr>
</tbody>
</table>
### Vaccine Reactions

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Composition</th>
<th>Indications</th>
<th>Contraindications</th>
<th>Reconstitution</th>
<th>Dose</th>
<th>Administration</th>
<th>Reactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diphtheria</td>
<td>Diphtheriatoxoid-30 flocculating units, Tetanus toxoid-10 units, Pertussis IU in each ml of vaccine</td>
<td>Prevention of diphtheria, tetanus and pertussis in infant and children of 6 weeks to 2 years of age</td>
<td>- Infants and children with progressive neurological disease or uncontrolled convulsions</td>
<td>Not required/available in diluted form</td>
<td>3 doses of 0.5 ml between 6 weeks-9 months of age spaced at an interval of 4-6 weeks</td>
<td>Shake well, withdraw 0.5 ml aseptically from the vial. Administer intramuscularly in the vastus lateralis muscle. Inform mother regarding reaction and administration of antipyretics ordered</td>
<td>Slight pain, redness, swelling at site of injection, mild fever. Rarely — convulsions</td>
</tr>
<tr>
<td>Tetanus and Pertussis Vaccine (DPT) +2°C to +8°C</td>
<td>Live, mixture of three polio viruses (Sabin strains). A recommended dose contains — Type I Polio virus 10^6 TCID 50 Type II Polio virus 10^5 TCID 50 Type III Polio virus 10^4 TCID 50</td>
<td>For prevention of polio in infants and children by stimulating the body to produce active immunity</td>
<td>No known contraindication</td>
<td>Available as clear transparent and light pink coloured pink solution</td>
<td>1 booster 0.5 ml between 18-24 months of age. 3 doses of 2 drops between 6 weeks-9 months of age spaced at an interval of 4-6 weeks</td>
<td>Remove the vaccine vial from cold storage and allow it to thaw. Examine the vial to ensure that vaccine is clear and transparent. Take off the metal seal, remove the rubber cork and fix dropper on to the vial. Remove the cap of the dropper and feed two drops of vaccine directly into the mouth of a child by pressing the dropper. Put cap onto the dropper and return the vial to cold storage. The reconstituted vaccine is administered subcutaneously into the upper part of arm or thigh.</td>
<td>TCID 50 refers to tissue culture infective dose</td>
</tr>
<tr>
<td>Polio Vaccine/ Sabin Trivalent Vaccine</td>
<td>Each dose contains below 2°C - 1000 TCID 50 of measles virus</td>
<td>For prevention of measles of all susceptible children and particularly important for malnourished children.</td>
<td>- acute infectious disease - high grade fever - severe impairment of renal function, hemotopoietic system, central nervous system.</td>
<td>0.5 ml at 9 months age</td>
<td></td>
<td>Marginal temperature, mild rash generally appears between 5th and 12th day after vaccination and lasts for one to two days.</td>
<td></td>
</tr>
</tbody>
</table>
Check Your Progress 2

Enlist the vaccines for six preventable childhood diseases.

Check Your Progress 3

Complete the following statements.

a) The vaccines should be stored at temperature range .............degree Celcius.

b) To check the temperature of vaccine ...............thermometer is used.

c) Vaccines are sensitive to ...........

d) ...............syringe is used for administration of BCG vaccine.

e) BCG vaccines is administered by ...............route.

f) The route for administration of measles vaccine is ............

Activity 1

i) Record the immunization schedule followed in under five clinic of your hospital/health centre.

ii) Meeta, 1½ month old infant brought to the under five clinic for immunization. Immunize the infant and advice mother regarding reaction to vaccine and when to bring Meeta next time.
Guideline — Immunization

**Nursing Responsibilities**

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**6.7 LET US SUM UP**

Prevention is better than cure. Immunization is the key component of preventive paediatrics. You have learnt how various vaccines are administered to children in right dose at right age with correct technique. This will prevent them from six childhood diseases to ensure healthy childhood. Reduction in mortality rate and handicaps in children can be achieved by simple and effective measure i.e. immunization. At the end you have learnt about your role while administering immunization.

**6.8 ANSWERS TO CHECK YOUR PROGRESS**

**Check Your Progress 1**

Universal immunization programmes aims at immunizing all children before the first birthday against the six vaccine preventable diseases.

**Check Your Progress 2**

The vaccines for six preventable childhood disease are: BCG vaccine, DPT vaccine, Oral polio, Measles vaccine.

**Check Your Progress 3**

a)  2-8  
b) Dial  
c) Heat  
d) Tuberculin  
e) Intradermal  
f) Subcutaneous
### List of Activities

**Hours:** 120  
**Marks:** 100

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Practical No.</th>
<th>Activity</th>
<th>Area</th>
<th>Hours</th>
<th>Marks</th>
</tr>
</thead>
</table>
| 1.     | Block 1  
Practical 1  
Block 2  
Practical 9 | Select a child in post-operative period. Provide daily nursing care and prepare a nursing care plan using nursing process approach and make presentation | Paed. /Surg. Ward | 24    | 10    |
| 2.     | Block 1  
Practical 1, 2  
Block 2  
Practical 9 | Provide nursing care to a neonate under incubator/radiant warmer and phototherapy and record the nursing intervention | Nursery | 8     | 10    |
| 3.     | Block 1  
Practical 3 | Carry out examination of two normal newborns and record findings | Postnatal ward | 8     | 10    |
| 4.     | Block 1  
Practical 3 | Carry out assessment of gestational age of low birth weight baby using appropriate scale | Nursery | 8     | 5     |
| 5.     | Block 1  
Practical 4 | Practice neonatal resuscitation on manikin, observe and record the steps of resuscitation of newborn (practice at least three newborns) | Nursery/ Labour Room | 8     | 5     |
| 6.     | Block 1  
Practical 5 | Administer nasogastric/orogastric / gastrostomy feeding to two hospitalized children | Nursery/ Paed. Ward (5+5) | 4     | 10    |
| 7.     | Block 1  
Practical 6 | Administer and record immunization. Practice administration of all types of vaccination | Under five clinic | 8     | 5     |
| 8.     | Block 2  
Practical 7 | Monitor growth and development of an infant and a toddler/preschooler and record it | Pead. ward/Under five clinic (5+5) | 8     | 10    |
| 9.     | Block 2  
Practical 8 & 9 | Select a child in medical ward and provide nursing care. Write a case study, highlighting the diagnostic investigations, procedure assisted and/or carried out, independently and present the case study. Prepare, observe and assist in various diagnostic investigations e.g. LP/Biopsy, sample collection etc. | Pead./Med. Ward | 32    | 15    |
| 10.    | Block 2  
Practical 10 | Demonstrate administration of oral-medication (select at least five cases). Calculate and record dosage. | Paed./Med. Ward | 4     | 5     |
<table>
<thead>
<tr>
<th>S. Practical No.</th>
<th>Activity</th>
<th>Area</th>
<th>Hours</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 Block 2</td>
<td>Demonstrate administration of injection/fluid therapy (select at least five cases). Calculate and record fluid requirements.</td>
<td>Under five clinic</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Practical 11</td>
<td>Plan and conduct health teaching on the assigned topic. Conduct incidental health teaching on the basis of felt need.</td>
<td>Under five clinic</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Nursery/ Paed. ward</td>
<td>Nursery/ Paed. ward</td>
<td>(5+5)</td>
<td></td>
</tr>
<tr>
<td>S. Practical No.</td>
<td>Activity</td>
<td>Area</td>
<td>Hours</td>
<td>Marks</td>
</tr>
<tr>
<td>-----------------</td>
<td>--------------------------------------------------------------------------</td>
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<td>-------</td>
</tr>
<tr>
<td>1. Block 1</td>
<td>Observe the procedure of resuscitation of a newborn. Record the type of procedure, condition of the newborn and nursing care given.</td>
<td>Nursery/ Paed. Ward</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>3. Block 2</td>
<td>Select a hospitalized child with any medical or surgical problem on I/V therapy. Calculate and record fluid requirement of the child for 24 hours. Administer the drugs, prescribed. Record the dosage and calculations used to prepare a paediatric dose. Record the action dosage and side effects of the drugs given.</td>
<td>-do-</td>
<td>32</td>
<td>25</td>
</tr>
<tr>
<td>4. Block 2</td>
<td>Prepare a patient for any diagnostic test. Write the steps of the procedure and record findings.</td>
<td>-do-</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>5. Block 2</td>
<td>Select a child for post operative nursing care of any surgical condition and do procedure required for the child</td>
<td>-do-</td>
<td>24</td>
<td>15</td>
</tr>
<tr>
<td>6. Block 2</td>
<td>Collect the various types of records from your paediatric wards. Fill in at least one record from each area e.g. treatment record intake and output record and nurses notes.</td>
<td>-do-</td>
<td>8</td>
<td>10</td>
</tr>
</tbody>
</table>