

EXPANDED PROGRAM OF IMMUNIZATION (EPI)

Definition

Program adopted by WHO since 1974, it includes child immunization & vaccination of pregnant women.

Objectives of EPI

- ☐ ↓ incidence of target diseases
(**T.B. – Polio**myelitis – **Diphtheria – Pertussis – Tetanus - Hepatitis B – Measles – Mumps - Rubella**) and Vit. A deficiency.
- ☐ ↓ mortality rates from these diseases

Strategy

A. Child immunization Egyptian immunization schedule

At birth (zero dose)	OPV (Sabin) BCG	2 drops 0.05 ml	Oral ID, upper left arm
2 nd , 4 th , 6 th months (1 st , 2 nd , 3 rd doses)	OPV (Sabin), Penta vaccine: (DPT-HB-Hemophilus influenza)	2 drops 0.5 ml	Oral IM, Outer left mid-thigh
9 th month	Vitamin A OPV (Sabin)	1 Capsule 2 drops	Squeezed in mouth Oral
12 th month	MMR OPV (Sabin)	0.5 ml 2 drops	S.C Oral
18 month	OPV (Sabin) DPT MMR Vitamin A	2 drops 0.5ml 0.5ml 2 capsules	Oral I.M S.C Squeezed in mouth
School entry Age (5-6 years)	OPV (Sabin) DT BCG Meningococcal vaccine	2 drops 0.5ml 0.1 ml 0.5ml	Oral I.M ID, upper left arm (for tuberculin nonreactors) S.C

<p>1. Pregnant women: T.T is given during pregnancy to protect the mother against puerperal tetanus & baby against tetanus neonatorum.</p> <p>The first dose of T.T is given after 1st trimester to avoid false beliefs that T.T cause abortion.</p>	<p>Tetanus toxoid:</p> <p><u>If not previously immunized:</u></p> <ul style="list-style-type: none"> - 2 doses of TT - 4-6 weeks apart - after 1st trimester of usually at the 5th month of pregnancy. 	<p><u>If previously immunized:</u></p> <ul style="list-style-type: none"> ▪ A booster dose of TT at least one month before delivery. 3rd dose at least 6 months after 2nd dose. ▪ 4th dose at least one year after 3rd dose. ▪ 5th dose after one year. ▪ Now, she is fully immunized & take one booster dose /10 years
<p>2. Food handlers :</p>	<ol style="list-style-type: none"> 1. TAB vaccine against typhoid & paratyphoid. 2. Hepatitis A vaccine. 	
<p>3. Military groups:</p>	<ol style="list-style-type: none"> 1. Tetanus toxoid. 2. Meningococcal polysaccharide vaccine 3. BCG for non reactors. 	

VACCINATION & IMMUNIZATION

1. Live attenuated vaccines:	<ul style="list-style-type: none"> ✓ Prepared from attenuated microorganisms. ✓ e.g. BCG vaccine. Polio vaccine (Sabin). MMR
2. Killed or inactivated vaccines:	<ul style="list-style-type: none"> ✓ Prepared from killed microorganism. ✓ e.g. - Pertussis vaccine. - Salk vaccine.
3. Toxoids:	<ul style="list-style-type: none"> ✓ Prepared from detoxicated exotoxin. ✓ e.g. diphtheria & tetanus.
4. Recombinant DNA technique vaccine:	<ul style="list-style-type: none"> ✓ Hepatitis B vaccine

Contraindications for child vaccination

(1) **Vaccination should be delayed** in children with:

- High fever.
- Severe illness that need hospitalization.

• **Otherwise, there are almost no contraindications to vaccination of children.**

(2) **If a child had severe reaction after DPT** (convulsion or shock). Subsequent doses of DPT are contraindicated. Give him DT vaccine.

1. **Moderately ill children:** should be immunized as usual (delay vaccination → many children will contract the target disease).
2. **Children with malnutrition:** can develop good immunity, so immunize them as usual.

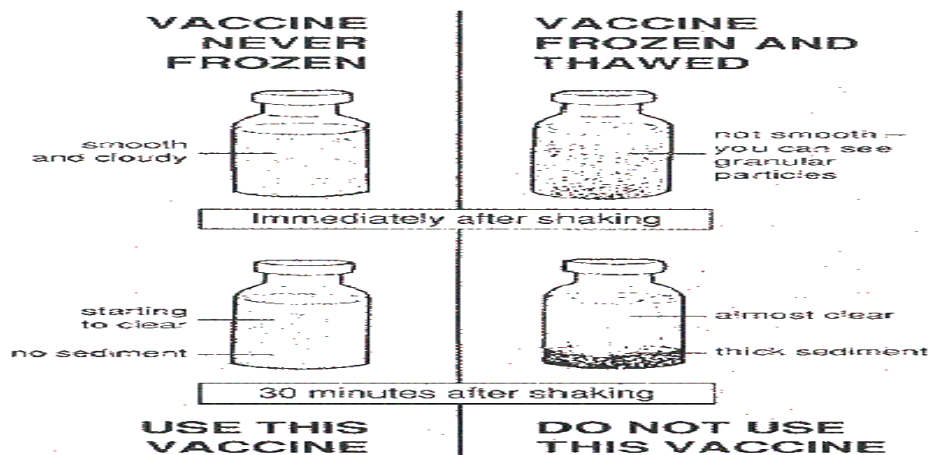
(3) **B.C.G & live attenuated vaccines** are contraindicated in children with AIDS or immune deficiency disease.

What damages vaccines?

- | | |
|--|--|
| <ul style="list-style-type: none"> <input type="checkbox"/> All vaccines lose potency after expiry date. <input type="checkbox"/> Heat & sunlight damage vaccines especially living attenuated e.g. BCG. | <ul style="list-style-type: none"> <input type="checkbox"/> Freezing damage toxoid & killed vaccines. <input type="checkbox"/> Disinfectants or antiseptics. |
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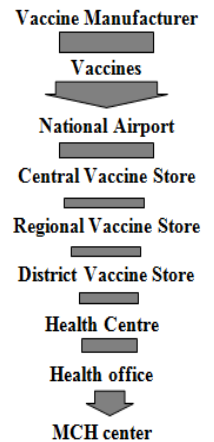
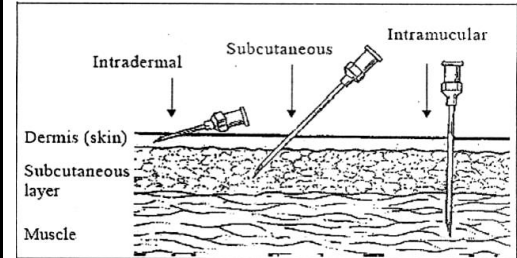
How can you differentiate between D.P.T vaccines damaged by freezing and other never frozen before?

	Vaccine never frozen	Vaccine frozen and thawed
Immediately after shaking	Smooth cloudy	Show granular particles
15-30 m after sharking	Clear with no sediment	Clear with thick sediment



Injection sites

Vaccine	Route of administration	Injection site
BCG	Strict I.D	Upper left arm
DPT	I.M	Outer mid-thigh (left)
OPV	Oral	Mouth
HBV	I.M	Outer mid-thigh (right)
MMR	SC	Upper right arm
Tetanus toxoid	I.M	Outer, upper arm



Cold Chain System

DEFINITION:

- System for distributing vaccines in a potent state from the manufacture to the actual vaccination site.
- Series of transportation links during which adequate refrigeration is required to maintain the vaccine potency.

- From site of manufacture
 - Air port
 - Central vaccine store
 - Regional vaccine store (governorate)
 - District store
 - Site of vaccination (Health center or Health officer or Maternal & Child Health center) .

COMPONENTS:

- **People:** well trained to manage cold chain system and organize the vaccine distribution.
- **Equipment:** to store and transport vaccines .

Cold chain equipment used in health facilities

1. REFRIGERATORS

Characters of ideal refrigerator:

- Put in a place away from direct sunlight (shaded place).
- Put in ventilated area away from the wall → 10 -15 cm.
- Have intact rubber insulation.
- Have a thermometer inside.
- Have a temperature chart to register temperature.
- Have a person in charge to keep it will.
- Be defrosted if ice around the freezer more than ½ cm thick.

2.COLD BOXES

Insulated container lined with ice-packs to keep vaccines & diluents cold during transportation and /or short period storage (from 2-7days).

3.VACCINE CARRIERS

Insulated containers lined with frozen ice-packs, keep vaccines and diluents cold during transportation and/or temporary storage (maximum for 48 hours with the lid closed) .

4. FOAM PADS

A foam pad is a piece of soft foam that fits on top of the ice packs in a vaccine carrier

5.ICE-PACKS

- Ice-packs are flat square plastic bottles filled with water and kept frozen.
- Ice-packs are used to keep vaccines cool inside the vaccine carrier or cold box.

HOW TO LOAD VACCINES IN A REFRIGERATOR ?

A main compartment (the refrigerator):

for storing vaccines & diluents, in which the temperature should be between **0°C & +8°C** (thermostat is used to adjust the temperature).

The freezer:

for freezing ice-packs. If the refrigerator is working properly, this section will be between **-5°C & -15°C**.

- (1) Freeze & store ice-packs in the freezer compartment.
- (2) All vaccines & diluents stored in the refrigerator compartment.
- (3) If there is not enough space, diluents stored at ambient temperature (but must be chilled by putting them in the refrigerator before use).

(4) Arrangement:

1. In the top shelf under the freezer: put polio & measles vaccines
2. (Excess amount of polio & measles vaccines could be kept in the freezer).
3. In the middle shelf: put B.C.G. vaccine.
4. In lower shelf: put other vaccines as TT, DT, DPT hepatitis B & diluents.
5. Pack vaccine & diluents in rows with 1-2 cm in between (for air circulation).
6. DPT, DT & TT → shouldn't touch evaporator plate at the back (may freeze).
7. Separate different types of vaccine clearly.
8. Newest vaccine is put on the right, remove oldest one from the left.
9. Keep vials with VVMs showing more heat exposure in the box labeled "use first". Use these vials first in the next session.

(5) Put:

1. **Thermometer** inside the refrigerator to adjust temperature, check it twice daily.
2. **Salt water bottles** in lower compartment of refrigerator (help to keep temperature cool in case of a power cut).

(6) Don't

1. Put vaccines on the door shelves (too warm to store vaccines).
2. Store food & drinks in a vaccine refrigerator.

(7) Discard the following vaccines immediately according to the **national guidelines**:

1. Expired vaccines.
2. Vaccines with VVMs reached or beyond discard point.
3. Reconstituted vaccines for more than 6 hours.

