EXPANDED PROGRAMME ON IMMUNISATION

Expanded Program On Immunization

"EPI"

Expanded Program on Immunization (EPI)

World Health Organization

In 1974

The EPI was launched by WHO

EPI

Expansion Denotes:

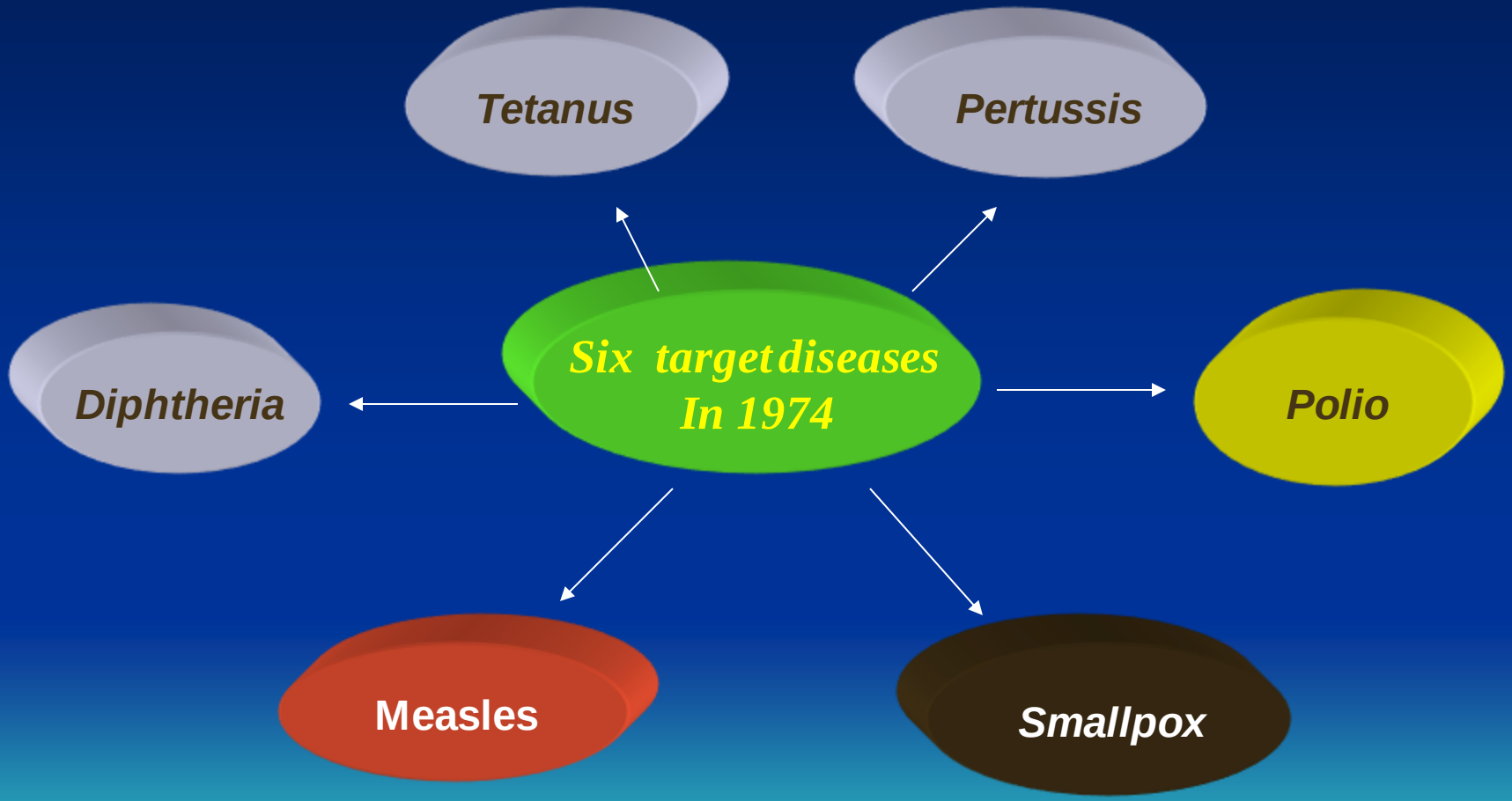
1

Introduction of additional disease antigens in the vaccine schedule

2

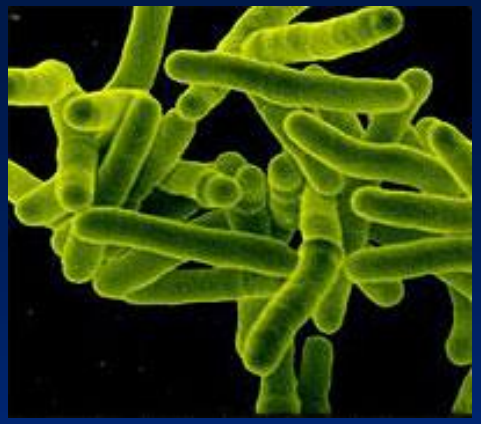
Increase in targets to be covered (children and women)

EPI In 1974: less than 5% of children were immunized

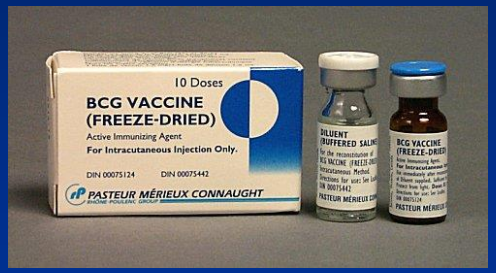


The EPI vaccines

BCG



- *BCG (Bacille Calmette-Guérin)*
- *It is a live freeze-dried vaccine which must be reconstituted*
- *Administered intra-dermally*
- *Using a special needle and syringe.*



BCG vaccine

- *It is given at the deltoid region on the left side*
- *Dose: 0.05 ml*
- *If given correctly, the injection raises a small "bleb" which looks like the peel of an orange.*

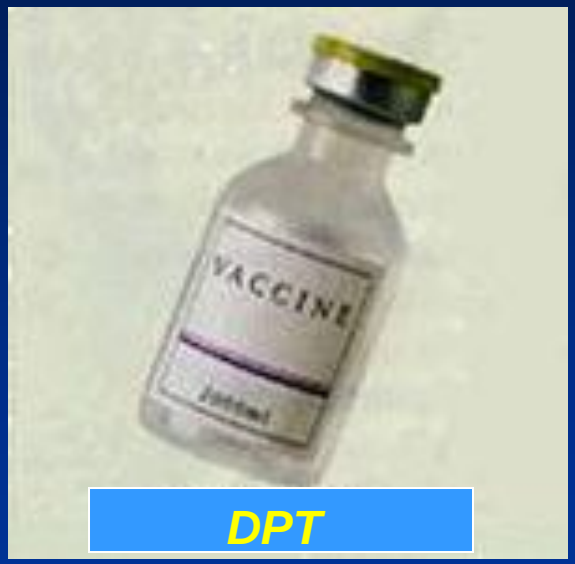
Potency of BCG

- *However, the vaccine is only 50%-80% effective against these forms of childhood TB.*
- *BCG offers some protection against leprosy*
- *but its protection against adult forms of tuberculosis is uncertain.*

Booster doses of BCG are not recommended by WHO

Triple vaccine (DTP)

- *The DTP combination vaccine is a liquid vaccine, which must not be frozen.*
- *It contains vaccine components against diphtheria, Pertussis*, and tetanus (*whooping cough).*
- *The vaccine is given intramuscularly.*
- *Antero-lateral, right thigh or upper arm*
- *Three doses are needed for full protection, at least four weeks apart.*
  (2, 4, 6 months)
- *Dose: 0.5 ml I. M.*



Triple vaccine (DTP)

- *Other variations include:*
  - *DT (with a full diphtheria component),*
  - *TT (tetanus toxoid alone) for women of childbearing age,*
  - *Td (with a reduced diphtheria component) for adults.*
  - *Some countries have substituted acellular pertussis vaccine (aP) for the whole cell pertussis component.*

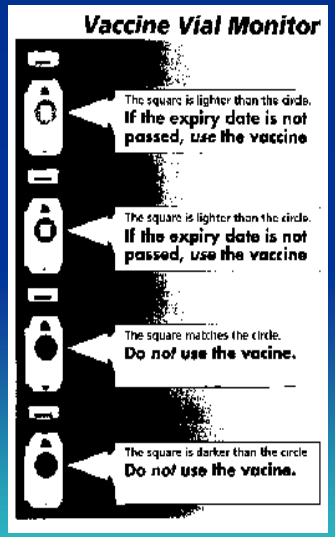
Oral polio vaccine (OPV)

- *OPV is a liquid vaccine comprising three serotypes of live attenuated poliovirus.*
- *The vaccine is administered orally.*
- *Dose: 2 drops*

Oral polio vaccine (OPV)

- ***Once opened, vials of OPV can be stored and re-used - provided they are kept within the cold chain and not used beyond the expiry date.***

- ***Since 1996, the phased introduction of "vaccine vial monitors" (VVMs) on vials of OPV ensures that health workers can determine whether vaccine has been damaged by heat or is still safe to use***



Oral polio vaccine (OPV)

- *There are two kinds of polio vaccine - an inactivated injectable polio vaccine (IPV) originally developed in 1955 by Dr Jonas Salk,*
- *and a live attenuated oral polio vaccine (OPV) developed by Dr Albert Sabin in 1961.*
- *Although both are highly effective against all three types of poliovirus, there are significant differences in the way each vaccine works.*

IPV

OPV

Oral polio vaccine (OPV)

- *OPV is the vaccine of choice for eradication of poliomyelitis. WHY?*
  - ***It is less expensive (IPV costs five times as much)***
  - ***and easier to administer than an injectable vaccine.***
  - ***But the overriding reason is its ability to induce immunity in the gut - the key site where poliovirus multiplies, can be shedded in feces for 6 weeks***

Injectable polio vaccine (IPV)

- *IPV provides individual protection against polio paralysis*
- *but is not capable of preventing the spread of wild poliovirus, since it induces only very low immunity in the gut.*
- ***Because of this, IPV cannot be used to eradicate polio.***

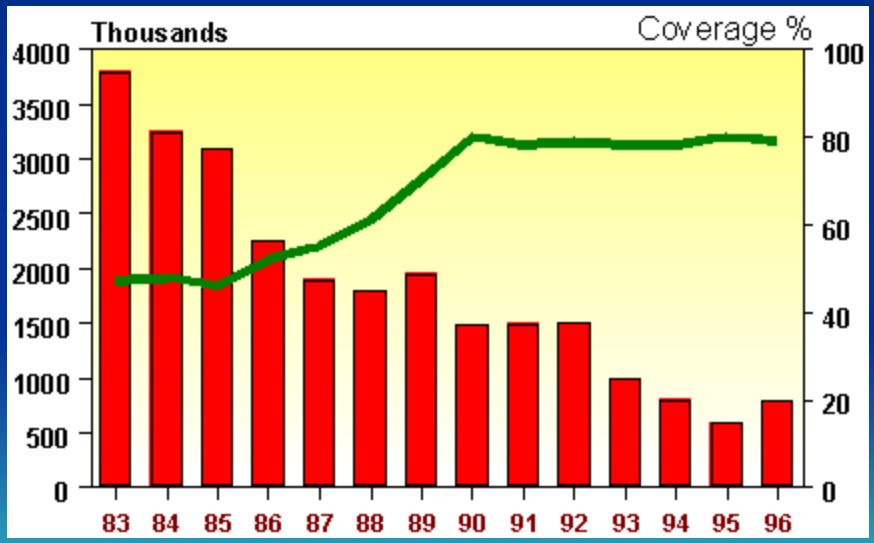
Oral polio vaccine (OPV)

Age	Vaccines	Hepatitis B (Hep B) vaccine *** Scheme A	Scheme B
Birth	BCG, OPV 0 *	Hep B 1	
6 weeks	DPT 1, OPV 1, HiB 1	Hep B 2	Hep B 1
10 weeks	DPT 2, OPV 2, HiB 2	Hep B 3	Hep B 2
14 weeks	DPT 3, OPV 3, HiB 3		Hep B 3
9 months	Measles, Vitamin A, Yellow Fever **		
Mothers	Vitamin A – 1 dose at delivery or within 6-8 weeks of delivery		
Women of childbearing age, and especially pregnant women	TT1 – as soon as possible in pregnancy or as early as possible in childbearing years TT2 – at least 4 weeks after TT1 TT3 – at least 6 months after TT2 TT4 and TT5 – at least one year after the previous TT dose		

- *WHO recommends that four doses of OPV should be given before the first birthday.*
- *However, additional (supplementary) doses are needed to achieve eradication*
- *During National Immunization Days (NIDs) in 1997, 450 million children - almost two thirds of the world's children under five - were given supplementary doses of polio vaccine.*

Measles

- *Measles is a highly infectious vaccine preventable disease*



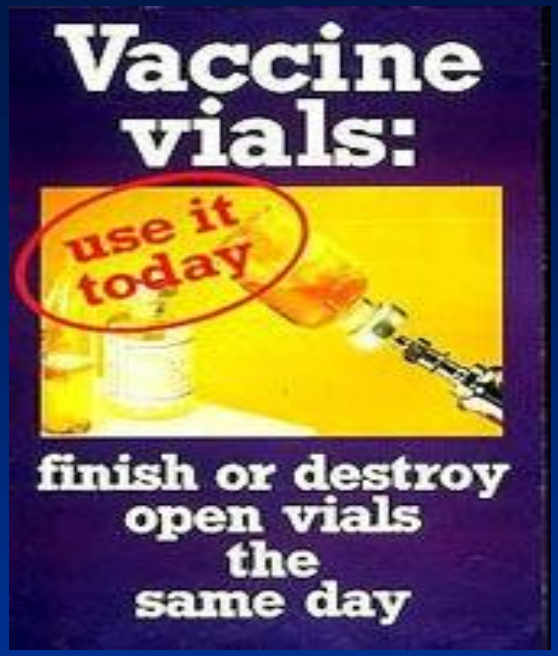
Measles vaccine

- *Measles vaccine is a live attenuated freeze-dried vaccine*
- *It is given subcutaneously, at the right arm*
- *Dose: 0.5 ml*

Measles vaccine

- ***Once the vaccine has been reconstituted, it must be protected from the light and kept as cool as possible.***

- ***Any doses remaining in an opened vial at the end of a vaccination session must be discarded.***



MMR vaccine

- *The vaccine contains the three live viruses which have been weakened against measles, mumps and rubella*
- *It is offered to all children aged 12 months and over .*
- *A second dose is offered at the time of the pre-school booster, if not before .*
- *The vaccine is very effective and after 2 doses almost 100% of people are protected*
- *The dose is: 0.5 ml, subcutaneously, at right arm*

Hepatitis B vaccine

- *This liquid vaccine requires three doses intramuscularly, at least four weeks apart. Dose :0.5 ml.*

- *It must not be frozen.*

- *If transmission of the disease is mainly perinatal (e.g. South East Asia) the earlier schedule is recommended.*

otherwise

- *The vaccine is given at the same time as each dose of DTP.*

Hepatitis B vaccine

- **Two kinds of vaccine are available:**
  - an inactivated plasma-derived vaccine (available since 1981)
  - and a more expensive genetically engineered (DNA recombinant) vaccine (on the market since1986).

Hepatitis B vaccine

- *Hepatitis B vaccine is the first vaccine to be developed against a form of cancer (liver cancer)*
- *More than 2 billion people alive today have at some time in their lives been infected with hepatitis B virus (HBV).*
- *Of these, about 350 million remain chronically infected carriers - a ticking time bomb that can transmit the disease for many years before going on to develop cirrhosis of the liver or liver cancer.*
- *Every year there are about 4 million acute clinical cases of hepatitis B and about a million deaths.*
- *Primary liver cancer caused by hepatitis B is now one of the principal causes of cancer death in many parts of Africa, Asia, and the Pacific Basin.*

Vitamin A deficiency

- Within immunization programs,
  - vitamin A can be given to mothers immediately after birth (to enrich breast milk),
  - to young children receiving routine immunization or during campaigns,
  - and as part of treatment of measles cases.
- Vitamin A supplement, as part of EPI , is given along with measles vaccine
- Two doses of vitamin A (100,000 IU) are usually administered at 9^{th} and 18^{th} months of age

Vitamin A deficiency

- *By combining vitamin A with measles vaccine, WHO aims to benefit children in two ways.*

[1] By offering two interventions instead of one: the service is more efficient, is seen to be more attractive, and vaccine coverage rises - thus further reducing the incidence of measles.

[2] By raising the vitamin A status of high risk infants: not only does the measles case fatality rate fall, but there is a reduction in overall mortality.

Immunization schedule recommended

by WHO "EPI"

Age	*Vaccines*	*Hepatitis B (Hep B) vaccine **** *Scheme A*	*Scheme B*
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Mothers	Vitamin A – 1 dose at delivery or within 6-8 weeks of delivery		
Women of childbearing age, and especially pregnant women	TT1 – as soon as possible in pregnancy or as early as possible in childbearing years		
	TT2 – at least 4 weeks after TT1		
	TT3 – at least 6 months after TT2		
	TT4 and TT5 – at least one year after the previous TT dose		

HepB vaccination schedule

Age	*# of Doses*	*Schedule*	*Dose Recombivax HB**	*Dose Energix-B***
Infants with HBsAg-negative mother	*3*	*0 to 2, 1 to 4, and 6 to 18 months*	*5.0 µg (0.5 mL)*	*10 µg (0.5 mL)*
Infants with HBsAg-positive mother	*3*	*Hepatitis B immune globulin and vaccination within 12 hours of birth, then vaccine at 1 to 2 and 6 months*	*5.0 µg (0.5 mL)*	*10 µg (0.5 mL)*

Vaccine Contraindications

Notes to be considered in Immunization schedule

1

All EPI antigens are safe and effective when administered simultaneously

but at different sites

Notes to be considered in Immunization schedule

2

Doses of the vaccine at less than the recommended 4 weeks interval may lessen the antibody response.

They should not be counted as part of the primary series

Notes to be considered in Immunization schedule

3

Lengthening the interval between the doses of the same vaccine leads to higher antibody levels

However it is important to complete the primary series early on before the age of high risk of infection

Notes to be considered in Immunization schedule

4

Live attenuated vaccines generally produce long lasting immunity through a single dose

(e.g. 95% of recipients will respond to a single dose of measles; a second dose of MMR assumes 100% protection)

Notes to be considered in Immunization schedule

5

In Inactivated and killed vaccines, the first dose does not provide protection. The protective immune level develops after the 2^{nd} or 3^{rd} dose.

Periodic boosting is required

Notes to be considered in Immunization schedule

6

Children with HIV infection should not receive live attenuated vaccines

(However, Measles vaccine must be given)

Notes to be considered in Immunization schedule

7

Tetanus immunoglubulin (250IU) must be given to babies:

- Born outside hospitals
- Seen within 10 days of delivery
- Whose mothers were not given at least two documented doses of tetanus toxoid during pregnancy

Absolute contraindicatios to immunizations

1

History of anaphylactic reaction following ingestion of eggs is a contraindication to vaccines prepared in hen's eggs (e.g. yellow fever and influenza vaccines

Absolute contraindicatios to immunizations

2

Subsequent doses of pertussis vaccine are absolutely contraindicated if:

1. ***The child Suffers from fever of 40.5 degree Celsius not due to other causes (within 48 hours)***
2. ***Collapse or shock***
3. ***Convulsions with or without fever within 3 hours of vaccination***

Absolute contraindicatios to immunizations

3

HIV infection is an absolute contraindication to administration of live attenuated vaccine

(However, routine vaccination with measles vaccine is a must as early as possible (6 month of age), in addition to the scheduled dose at nine months)

Temporary contraindications to immunizations

1

Pregnancy:

The only vaccine that can be administered during pregnancy is TT

Temporary contraindications to immunizations

2

Severe illness that needs hospitalization

Temporary contraindications to immunizations

3

Immuno-suppression

Live attenuated vaccines should not be given during intake of immunosuppressant therapy, leukamia, lymphoma, or cancer

Temporary contraindications to immunizations

4

Recent receipt of blood as it contains antibodies that neutralize the vaccine antigens

It is recommended to postpone vaccination 14-21 days after the receipt of blood

The strategy for vaccine delivery

1. **The static immunization strategy**

   Immunization services are provided through PHC centers, hospitals, and vaccine qualified clinics

2. **The national immunization days (NIDs)**

   This is a periodic immunization of all the eligible targets in a defined age group over a large geographic area, and within a short period of time

   (e.g 2 doses of polio during 1-3 days to be repeated after 4-6 weeks)

3. **The outreach immunization service**

   The health team identify the risk areas in order to vaccinate the targets at their residence

False contraindications to immunization

1. Minor ilnesses e.g. URT or diarrhoea with low fever
2. Allergy e.g. asthma, hay fever, …etc
3. Premature or small for date infants
4. Malnutrition
5. Child being breast fed
6. Family history of convulsions
7. Treatment with antibiotics
8. Dermatosis, or localized skin lesion
9. Chronic disease of the heart, lungs, kidneys or liver
10 Stable neurological condition e.g. Down's syndrome
11. History of Jaundice at birth