

# Vaccination

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## Objectives

1. Students should be familiar with the main forms of immunization and the characteristics of each one
2. Students should take an idea about all vaccines that are included in Iraqi's immunization program

## **Significance of vaccination**

- \*Reduce the mortality and morbidity of infectious diseases
- \*Eradication of certain diseases, such as smallpox, polio
- \*Decreased transmission of other diseases such as pertussis, measles, hepatitis B
- \*Improvement in national economy – less health care cost caring for sick children, less time off work of parents

## Forms of immunization

### 1/ Active immunization

Development of sensitized lymphocytes and active antibodies by giving viral/ bacteria protein, killed viral particles, or changed virus/bacterial particles

Protects for many years

Examples – polio, tetanus, diphtheria, pertussis, measles

### 2/ Passive immunization

Giving preformed antibodies, from animal or human origin

Protects for short period, usually months only

Examples – gamma globulin for hepatitis or measles protection, tetanus Ig, rabies Ig

### 3/ Live virus immunization

Uses live, but modified, non pathogenic (attenuated) virus/bacterial particles

Generally must be refrigerated to preserve potency

Example – oral polio, measles, varicella, oral typhoid fever

The vaccine should be cooled from the time of production to the time of administration “cool chain”

### 4/ Toxoid immunization

Uses modified version of toxin that causes disease

Examples – tetanus, diphtheria

## Vaccines currently part of the national immunization program

### **BCG vaccine**

Protects against tuberculosis, primarily in children

Type – live attenuated bacterial vaccine

Given by intradermal injection in arm – usually produces an inflammatory reaction and small scar

60 – 80% effective in preventing TB in infants, but protection decreases significantly after 2-3 years. Much less effective in adults.

Adverse effects

Local reaction of inflammation

Regional lymphadenopathy

### **Triple vaccine - DPT**

Protects against diphtheria, tetanus and pertussis

Type – D toxoid, T toxoid, P inactivated bacterial antigen

Route of administration – intramuscular

Require minimum of three doses and one booster dose for full immunization

Efficacy – 90%

Adverse effects

Fever and malaise – up to 30% of children- rarely last for more than 48 hours

Swelling at injection site – can be minimized by deep IM injection

Rarely – convulsions, prolonged crying, unresponsiveness

### **Oral polio**

Protects against polio, given by oral administration

Live, attenuated (weakened) virus

Requires minimum of three doses and one booster dose for maximum public immunity

Efficacy – 95%

Adverse effects – very rare incidence of vaccine related polio (< 1 per million children)

### **Measles vaccine (also MMR)**

Protects against measles; MMR against measles, rubella, and mumps

Type – live attenuated virus

Route of administration - subcutaneous

Measles vaccine given in two doses, at 9-12 months, and again at 18 months

Revaccination is required at 4-12 years of age

Efficacy - 95%

Adverse effects-

Slight pain or swelling at injection site

Faint rash 5 – 8 days after injection, fever

## **Hepatitis B Vaccine**

Type- Inactivated vaccine (conjugate protein), the application of recombinant DNA methods

Route of administration - intramuscular

Requires total of 3 doses

Adverse effects- Mild fever and soreness at injection site

## **Hib Vaccine**

Polysaccharide-protein conjugate vaccine

Three to four doses are required (at age two, four, six and 12–15 months of age).

Route of administration -- intramuscular

Efficacy- more than 95%

Adverse events- uncommon. The most common reactions are local reactions at the injection site, fever

## **Rota virus vaccine**

- Indicated for the prevention of rotavirus gastroenteritis
- live attenuated vaccine
- given orally
- 2 or 3 doses are recommended at ages 2, 4, and 6 months.

The minimum age for dose 1 of rotavirus vaccine is 6 weeks; the maximum age for dose 1 is 14 weeks and 6 days.

- Efficacy- 85%-98% (against severe rota virus disease)

Side effects- A small increase in intussusception cases during the first week after the first dose. Stomach pain, vomiting, blood in the stool, weakness, irritability.

## **Injectable polio vaccine**

- inactivated poliovirus
- four doses at ages: 2 months, 4 months, 6-18 months, and a booster dose at 4-6 years.
- given intramuscularly
- Efficacy- 90% or more of individuals develop protective antibody after two doses, and at least 99% are immune to polio virus following three doses

## **Immunization contraindications & precautions**

### Contraindications that are general for all routine vaccines:

1. Anaphylactic reaction to a vaccine contraindicates further doses of that vaccine.
2. Anaphylactic reaction to a vaccine's constituent contraindicates the use of vaccines containing that substance.
3. Moderate or severe illness with or without a fever.
4. Immunodeficiency disease including AIDS.

### **BCG**

#### Contraindications

Immunodeficiency disease like AIDS

### **DtaP/DTP**

#### Contraindications

1. DTP should not be given to children older than six years of age.  
Instead of DTP Td or Ap are suitable for those children
2. Encephalopathy within 7 days of administration of previous dose

### Precautions.

1. Temp. of  $> 40.5$  C within 48 hr
2. Convulsions within 3 days
3. Persistent, inconsolable crying lasting  $> 3$  hr. within 48 hr.
4. guillian-Barre syndrome within 6 wk after a dose

### **OPV**

#### Contraindications

1. Infection with HIV or a household contact with HIV infection
2. Known immunodeficiency (hematologic and solid tumors; long-term immunosuppressive therapy)
3. Immunodeficient household contact

### **MMR**

#### Contraindications

1. Anaphylactic reaction to neomycin, eggs or gelatin
2. Pregnancy
3. Known immunodeficiency, immunosuppressive therapy, HIV infection

#### Precautions

1. Recent ( $< 11$  month) administration of a blood product or immune globulin preparation
2. Thrombocytopenia
3. History of thrombocytopenic purpura

## **Hepatitis B**

### Contraindications

1. Severe allergic reaction to previous dose.
2. Infant weighing < 2,000 grams
3. Moderate or severe acute illness with or without fever

## **Rota virus**

### Contraindications

1. Severe allergic reaction to a previous dose
2. Children younger than six weeks of age
3. Moderate or severe acute illness

## **Hib**

### Contraindications

1. Allergy after getting a dose of the vaccine
2. Immunodeficiency syndrome

## **IPV**

Is contraindicated if patient has developed severe adverse effect to its use in the past.

## **PCV**

### Contraindication

Severe allergic reaction after a previous dose