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Expanded Program on Immunization Workers' Guideline

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Chapter One

(Routine Vaccination Guide)

Introduction

Using vaccines is one of the key interventions that contributed in improving public health of communities through preventing communicable diseases and reducing morbidity and mortality among all community groups, especially children. The positive impaction of vaccination and its significant outcomes comes in line with two other key interventions; provision of safe water and using antibiotics.

In 1796, English Scientist Edward Jenner noticed that milkmaids infected with Cowpox in the form of blisters on hands' fingers do not get infected with the smallpox; the fatal disease at that time. He scraped pus from cowpox blisters and inoculated a boy named James Phipps by two long cuts in the skin of the his arm. About six weeks later Jenner inoculated the boy with smallpox which had no effect, and concluded that he now had complete protection against smallpox. The term 'vaccination' was derived from the Latin name of cowpox 'Vaccinia'. Edward Jenner's experiment was considered a breakthrough and starting point in the concepts of preventive medicine.

In 1885 French Scientist Louis Pasteur was able to discover rabies vaccine and save lives of people infected with this disease.

History of vaccine production:

- Diphtheria vaccine was produced in 1923
- Pertussis vaccine was produced in 1926
- Polio (IPV dead Salk) vaccine was produced in 1955
- Polio (Oral Sabin) vaccine was produced in 1960
- Measles vaccine was produced in 1964

There had been more achievements in producing vaccines against other diseases or improving quality of those already used. Smallpox was eradicated worldwide in 1979, and now all countries seek to eradicate and control other communicable diseases through government health programs and cooperation and collaboration with the international organizations such as WHO and UNICEF.

Immunization

Any intervention or means aims to provide advance immunity and protection against diseases and their symptoms and complications that could cause disability or death.

Vaccine

A substance administered to humans in order to stimulate the immune system to confront and eliminate the causative agent of diseases or their poisons when they entered into the human body.

Vaccine could be:

1. **Bacteria**
   - live, attenuated (weakened)
   - Inactivated/killed
   - Subunit/part of the bacteria, e.g. the external wall which is polysaccharide
   - Toxin, chemically processed to prevent toxic effect and keep immune effect. It is called Toxoid.
2. **Virus**
   - live, attenuated (weakened)
   - Inactivated/killed
3. **Genetic technology (genetic engineering)**

   It is the process of cultivating the virus in a yeast cell. After the virus grows and multiplies the pathogen is extracted.
4. **Reproduction**

   A process of mating that takes place between viruses through blending existing viruses in the human body with viruses found in animals to produce a second generation carries a mix of human and animal virus specifications.

Vaccines also contain:

- **Preservatives:**
  To ensure vaccine stability from date of production till expiry date.

- **Immunostimulants:**
  To boost immune system response to the vaccine and prolong immunostimulation, such as aluminum salts.

- **Antibiotics:**
  Such as neomycin to prevent the growth of bacteria in the vaccine or its liquid.

- **Water or any other liquid**

- **Various salts according to vaccine type**

- **Stabilizes:**
  Such as lactose to ensure vaccine stability until it is used.

Vaccine specifications

Vaccine should have the following specifications:

1. Does not cause infection to the recipient or the contacts.
2. Can be produced, easily and safely administered.
3. Gives effective and long-lasting immunity.
4. Free of any toxin or pollution, with little or no side effects as possible. Localized; does not affect the whole body.

Important scientific fact

Using vaccines will directly reduce infection with the diseases listed in the vaccination table, thus reducing antibiotics used to treat a given disease and its complications and reducing growth of bacterial patterns that resist antibiotics as this has been a big threat in dealing with bacterial infections worldwide due to the excessive use and sometimes not based on transplant and sensitivity tests, which led to create new types of bacteria that resist many antibiotics.

Purpose of vaccination

To make direct contact between immune system of the vaccinated person and the weakened or killed virus or its toxoids in a way that does not cause any disease or complications. It should be enough to stimulate the immunological memory to protect the human body against the real virus and its toxins hence prevent the disease and any complications.

Types of vaccines

1. **Live, weakened vaccines**

   By weakening activity of the virus or bacteria in a way that does not cause medical symptoms but stimulates immunological memory to produce antibodies that protect human body when a disease causative agent gets into it.

   A. **Viral live, weakened vaccines**

      Oral polio vaccine, measles vaccine, MMRV vaccine and yellow fever vaccine

   B. **Bacterial live, weakened vaccines**

      BCG vaccine

2. **Killed vaccines**

   By killing the disease causative virus so it doesn't cause any disease when it gets into the human body but it stimulates the immunological memory.

   A. **Killed virus**

      Injectable polio vaccine, rabies vaccine, seasonal flu vaccine and Hepatitis B vaccine

   B. **Killed bacteria**

      Pertussis vaccine and Typhoid vaccine

Two types of human acquired immune

1. **Active immunity**

   Human body has a specific immunological memory against disease causative agents and it lasts for a long time. It is acquired in 2 conditions:

   A. **After being infected with a given disease**

   B. **After being vaccinated**

2. **Passive immunity**

   It is acquired without stimulating human immune system; it comes through:

   - Mother: through the placenta or breast feeding milk
   - Injecting human body with a serum containing antigens created in an infected person's serum or from animal source. It is temporal and less effective than active immunity.

Note:
The more the vaccine is similar to the disease causative agent the more effective it is in stimulating active immunity.

Poliomyelitis disease

A viral disease that leads to muscle paralysis

- Causative virus: poliovirus, and it is of 3 serotypes (1, 2, 3)
- Methods of infection:
- The virus gets into the human body through the mouth with water or food polluted with the virus. This is the most common method. It enters through respiratory system as well.
- After entering human body, the virus moves from the intestine to the blood, to the nerves then to the motor cortex responsible of movement and to the spinal cord, causing cell damages that could lead to paralysis in voluntary movements of muscles, especially those of the lower limbs as well as the upper limbs and respiratory system which in turn could lead to respiratory deficit then death.
- In most cases, polio has no symptoms or has symptoms similar to the common cold, and sometimes it causes muscle paralysis in a way that leads to a permanent disability or death in the case of respiratory muscles' paralysis.
- There is no cure for polio, but there is an effective vaccine to prevent it.
- There is no animal reservoir for the virus.
- The virus cannot live for a long time at high temperatures.
- Infection with a serous form of the virus does not give immunity against another form; i.e. infection with serous from 1 does not give immunity against infection with form 2 or 3.
- All age groups are vulnerable to this disease.

Polio vaccine

Two types are currently available:

1. **Injectable Polio Vaccine (IPV):**

   It was developed by Scientist Salk. It is the polio virus in its 3 forms and it is chemically killed. The vaccine is administered by subcutaneous or intramuscular injection in 4 doses. This is the vaccine used in USA and other developed countries. In Iraq, using this kind of vaccine is currently limited to HIV cases among children resulted from various tumor diseases such as leukemia or when cortisone is used for long periods of time.

   This vaccine will be introduced and used within the routine schedule of vaccination in Iraq in the future.

2. Oral Polio Vaccine (OPV):

Developed by Scientist Sabin, It is the polio virus in its 3 forms, live and weakened. It is given orally in 2 drops. This is the vaccine currently used in Iraq through routine vaccinations and national campaigns. The proper way to administer this vaccine is done by holding the vaccine vial diagonally while giving the first drop, then holding it again in the vertical position, filling the dropper with the vaccine and pressing it to drop the second drop completely. If OPV is not administered this way, it is likely to have incomplete or small, bubbled drops, thus we cannot ensure that a child has received the proper dose.

OPV is administered in 6 doses:

- A dose at birth or during the first week after birth. It is called 'zero dose'.
- Dose 1 at age of 2 months
- Dose 2 at age of 4 months
- Dose 3 at age of 6 months
- Dose 4 at age of 18 months (booster dose 1)
- Dose 5 at age of 4 – 6 years (booster dose 2)

** Dose 1 administered at age of 2 months will be stopped in 2016.

Vaccine shall be kept in 2 ~ 8 ° C temperature up in the vertical refrigerator, or down if it is a horizontal refrigerator.

Scientific paradox:
When a child is infected with polio virus, he/she shows symptoms similar to those of cold with fever. The physician might prescribe an antibiotic injection without knowing he/she is dealing with a polio case. In such a case and after few days of being injected, the child shows polio signs in the lower limb in where the injection was given. That's why people refuse to have their fevered children injected with any kind of injection.

TB Vaccine (BCG)

BCG acronym is mad of the initials of Bacilli Calmette-Guerin.

- Bacillus Calmette-Guerin are the two scientists who discovered this bacilli species that causes tuberculosis, while the TB causative bacillus was first discovered by Scientist Koch.
- The vaccine is a live, weakened and freeze-dried bacillus, so the vaccine comes in form of white powder.
- TB is one of the dangerous and fatal diseases spread almost all over the world. It is endemic in many countries including Iraq. It is transmitted via droplets of or contact with infected patient. TB affects all tissues of the body, and it negatively affects health of the infected person. It could cause disability or death.
- Purpose of using this vaccine is not to prevent infection with TB but to prevent its serious complications when a child is infected with TB during first year of age.
  It includes:
  A. Tuberculous meningitis
  B. Tuberculous miliary pneumonitis

- Administered in a (0.05 cc) dose intradermal, not subcutaneous (after dissolving vaccine powder) at the top of left arm muscle where it is attached to the left shoulder bone.

- Dissolved vaccine must not be used after the vaccination session ends or after six hours of dissolving the vaccine (dissolved vaccine should be discarded after the vaccination session ends or after six hours of dissolving whichever comes first).
- Vaccine will cause a small red swelling that may appear few days after vaccination, and then it turns into a purulent swelling which then explodes leaving a visible scar on top of the left arm muscle.
- If no red swelling appears within 8 – 12 weeks after vaccination, the same dose is to be administered once again.
- Policy of vaccinating children who have no scar at age of 6 years upon school admission as there's no scientifically reasonable grounds for such a measure.

Vaccine shall be kept in 2 ~ 8 ° C temperature up in the vertical refrigerator, or down if it is a horizontal refrigerator.

Hepatitis B Vaccine

Hepatitis B is a viral disease transmitted to the human body when the disease causative virus enters via contaminated fluids such as blood and blood products whether by transfusion or by being punctured with needles contaminated with hepatitis B virus as it happens to medical and health staffs or patients in operation rooms, dialysis units dental clinics and barbershops.

Hepatitis B is one of the most dangerous and fatal diseases that could infect children at birth or after birth. The earlier the child is infected the higher the rate of serious complications that may lead to liver chronic inflammation, cirrhosis or cancer, especially if the pregnant mother is infected with a carrier of this virus. The most dangerous stage is when the newborn gets infected during labor.

- The vaccine used the surface gene of the disease causative virus, produced by the genetic engineering method (gene technology); i.e. cultivating the virus in a yeast cell. After the virus grows and multiplies, the surface gene is extracted and purified to avoid any chance of infection because of the vaccine. So it doesn't contain the disease causative virus as the common false belief that some medical and health staffs have.

- The vaccine is administered in a 0.5 cc dose deep in the right thigh muscle of the anterior lateral side.

  It is administered in 3 doses:

  Dose 1 = during first 24 hours after birth, before taking the child out of the hospital.

  Dose 2 = at age of 2 months

  Dose 3 = at age of 6 months

- In case the child is premature or weighs less than 2 kg at birth, vaccine dose 1 is to be delayed until he/she completes a whole month as the chance that immune system responses to Hepatitis B vaccine is very little.
- If the mother is HepBsAg plus, her child is given the vaccine and serum within 12 hours of birth regardless of weight. Three additional doses are to be administered. Dose 1 is to be administered a month after birth.
- If the mother is HepBsAg minus, and her child weighs less than 2 kg, the vaccine shall be administered a month after birth.
- If mother HepBsAg is unknown, vaccine shall be administered within the first 24 hours of birth.
- Hepatitis B vaccine could be damaged in -2 ~ 1 ° C temperatures.
- If vaccine is administered on the right side of the body then the serum should be on the left.

Vaccine shall be kept in 2 ~ 8 °C temperature down in the vertical refrigerator, or up if it is a horizontal refrigerator. It should be placed away from the condenser as it is freeze-sensitive.

Doses of Hepatitis B Vaccine

Dose 1:

It should be administered within first 24 hours of birth. Otherwise, it should be administered at the first visit to the PHC clinic.

Interval between dose 1 and dose 2 must be at least one month, dose 2 and dose 3 at least 2 months, and interval between dose 1 and dose 3 must be at least 4 months.

- Hepatitis B Vaccine for adults –contains 20 microgram- is given to groups highly vulnerable to be infected with this virus at age of 16 and above who had not been vaccinated as children with 3 doses of HBV for children (10 microgram). They are:
  1. Medical and health staffs such as surgeons, paramedics, nurses and service workers working in minor and major operation rooms, emergency rooms, dialysis units and workers in the laboratory and blood bank centers.
  2. Dentists.
  3. Blood diseases patients who need blood transfusion directly and repeatedly, dialysis unit patients and Hemophilia patients.
  4. Service workers who are in contact with blood remnants of the service staffs working in operations and labor rooms where they likely to get punctured or injured.
  5. Residents of state houses, army recruits and prisoners.
  6. Barbershops.

- These groups should be vaccinated with Hepatitis B Vaccine for adults (20 microgram) (1 cc) in 3 doses as follows:
    - Dose 1 at the first visit of the client.
    - Dose 2 after one month of dose 1.
    - Dose 3 after 6 months of dose 1.
- Any person who has nothing to prove that he/she had received 3 doses of HBV vaccine and is susceptible to HBV infection has to receive 3 doses of the vaccine according to the mentioned dates.
- There's no booster dose for the HBV vaccine.
- There are no any proved damages so far in the event of giving more than 3 doses of HBV vaccine.
- There are special cases like renal failure in which the patient is given 4 doses of HBV vaccine with the doses doubled from 10 to 20 for children and 20 to 40 for adults.

Diphtheria

Acute bacterial disease resulted from symptoms and complications caused by Diphtheria bacteria toxin.

Symptoms of the disease include nasal secretions (containing mucus and pus) in case of nose infection.

It may infect the tonsils and pharynx area, and leads to mild fever, feeling tired, heartburn and a Gray - green membrane that could lead to suffocation and death.

Complications of diphtheria include:

- Carditis
- Neuritis

Rates of death due to diphtheria infection are ranging from 5% to 10%, while it rises up to 20% among under-5 children and adults over-40.

The vaccine: it is diphtheria toxoid; diphtheria toxin that has been chemically processed with formaldehyde to eliminate toxic features while retaining the immunological features. It means that when human body is injected with diphtheria toxoid, the immune system will respond by producing antigens against diphtheria toxin in case of infection with diphtheria Bacteria without causing any toxic effects.

Pertussis

Acute contagious bacterial disease caused by infection with Pertussis bacteria which is transmitted by droplets from the patient. It was called "100 days cough", which means that the cough lasts at least for three months in spite of all treatments available.

Pertussis infection has 3 stages of clinical symptoms:

1. **Catarrhal**
   Symptoms similar to those of common cold: runny nose, sneezing, fever and cough. This stage lasts for 1-2 weeks.
2. **Paroxysmal**
   Characterized by paroxysms of numerous, rapid coughs due to difficulty expelling thick mucus from the tracheobronchial tree. Paroxysms end with difficult inhalation with a cock crowing-like voice. Sometimes they end with vomiting, and this stage lasts for six or maybe 10 weeks.
3. **Convalescent**
   Less persistent, paroxysmal coughs that disappear in 3 weeks

- Pertussis may cause death due to complications like pneumonia and neurological complications like convulsions (seizures) as a result of lack of oxygen during the paroxysms of coughs or because of cerebral hemorrhage caused by high pressure of the brain as a result of coughing.

Tetanus

Acute and often fatal disease because of the toxins of Clostridium Tetani bacteria. It causes general sclerosis and skeletal muscle spasm with nervous convulsions (epileptic attacks).

Clostridium Tetani bacteria reside in soil and intestines of human, horses, chickens, dogs, cats, pigs, sheep and cows. Such infections are dangerous because they get into the human body through wounds, multiply and excrete toxin that causes symptoms of the disease, which often ends with death of a person who does not have immunity against this disease.

Vaccine:

A tetanus toxoid yielded by processing toxin produced by Clostridium Tetani bacteria with formaldehyde.

- Tetanus vaccine is given within the DPT vaccine.

Vaccine shall be kept in 2 ~ 8 °C temperature down in the vertical refrigerator, or up if it is a horizontal refrigerator, along with the quadruple, pentavalent and hexavaccine (in future) vaccines.

Neonatal tetanus

When a child is born the umbilical cord must be cut with a sterilized tool as the umbilical cord in this time is considered the most dangerous and easier method for germs to get into the bloodstream of the newborn child leading to toxemia and certain death.

In some communities the umbilical cord is cut with unsterilized tools like a razor or a sharp iron piece or unsterilized even ordinary scissors. In some cases, navel is healed with a dressing contaminated with bacteria and other germs that may include Clostridium Tetani. Such cases occur often when deliveries done outside the hospital, especially in villages and rural areas.

The child is born in a good and stable condition, can normally suckle in the early days, but after tetanus incubation period which lasts for 3 days to 4 weeks, the child health status gets worse; the child suffers feeding difficulty, stiff muscles, general spasm, back spasm and possibly convulsive seizures with stiff jaw and cheek muscles that lead to a phenomenon called (closed locked jaw); when a child is unable to open his/her jaws and suckle. Stiff cheek muscles also cause a phenomenon called (Evil laugh), and these altogether are the symptoms of neonatal tetanus.

The seriousness of neonatal tetanus is that more than 80% of the cases end with death, and the shorter the incubation period is the higher death rate.

Neonatal tetanus Prevention

1. Vaccinate all women of reproductive age with at least three doses of the tetanus toxoid vaccine, provided that the period between the last pregnancy and third dose does not exceed five years, therefore we emphasize that women should receive five doses of tetanus toxoid on time and thereby we guarantee more than 15 years of protection.
2. Vaccinate pregnant women with two doses during the first pregnancy if they were not vaccinated before marriage. The first dose should be in the fourth month of pregnancy, while the second dose a month after, provided they complete the schedule after delivery as the first dose does not provide protection for the newborn, and the second dose provides protection for no more than three years from the date of the second dose. The third dose after birth gives protection for five years, the fourth dose, administered one year after third dose, gives protection for ten years while fifth dose, administered one year after the fourth dose gives protection for more than fifteen years.
3. Ensure safe and clean delivery for the pregnant mother in the hospital under supervision of well-trained staff, with emphasis on:

- Labor room is clean and sterile.
- All tools used during the pregnant woman examination or delivery are sterilized.
- Cut the umbilical cord with sterilized tool.
- Take care of the child's umbilical cord hygiene until all remains of the umbilical cord dropped, possibly apply iodine sterilizer.
- Emphasis for the parents that is necessary not to put any substance on the child's navel, as some communities usually put eyeliner, Zaraqyon, henna or animal feces on the child's navel, which almost leads to contaminating the navel with tetanus.

4. Provide health education for the family on vaccination during pregnancy and completion of tetanus vaccinations.

Vaccine shall be kept in 2 ~ 8 °C temperature down in the vertical refrigerator, or up if it is a horizontal refrigerator.

Tetanus Toxoid Vaccination schedule for pregnant women

dose	Timing	Protection duration
Dose 1	the fourth month of pregnancy	Dose not provide any protection
Dose 2	the fifth month of pregnancy	Provides 3 years of protection
Dose 3	6 months after dose 2	Provides 5 years of protection
Dose 4	One year after dose 3	Provides 10 years of protection
Dose 5	One year after dose 4	Provides 15 years of protection

Tetanus Toxoid Vaccination schedule for women of reproductive age (15 – 45 years)

dose	Timing	Protection duration
Dose 1	At the first visit to the PHCC	Dose not provide any protection
Dose 2	One month after dose 1	Provides 3 years of protection
Dose 3	6 months after dose 2	Provides 5 years of protection
Dose 4	One year after dose 3	Provides 10 years of protection
Dose 5	One year after dose 4	Provides 15 years of protection

There are special cases we may face in dealing with pregnant women, like when a pregnant woman for the second or third time, have already been vaccinated in the previous pregnancy but did not complete all doses of vaccination. Such a case is handled as follows, taking into account the general rule of vaccinations; the sequence of doses and the interval time between them.

1. In case the pregnant has a vaccination card that proves the number of doses she has received, we should continue from the last dose. For example, if she has received two doses of tetanus toxoid vaccine in the first pregnancy then she should be given the third dose and informed that dose 4 is after one year from now and dose 5 is after one year of dose 4.

2. If the pregnant doesn't have a vaccination card, we count on the lesser number; i.e. if we doubt whether she has received 2 or 3 doses, we consider she has received 2 doses and administer dose 3. Similarly if we doubt whether she has received 3 or 4 does, we consider she has received 3 doses.

3. If there's no vaccination card or anything to prove how many doses she has received then it is safe to start vaccination from dose 1.

4. Tetanus toxoid is one of the excellent vaccines for the immune system to respond to. If dose 1 was administered at any given time and one year or more was elapsed before administering dose 2, the immune system will still respond well for the second dose, even if it was months after the scheduled date. But let's not forget the fact that dose 1 does not give protection and doses 2 and 3 give protection only for few years.

5. Intervals between doses of tetanus toxoid vaccine for women of reproductive age and pregnant women are crucial to specify the dose number, not how many doses previously administered. we currently receive women who received more than 4, 5 or even 6 doses of vaccine during their first, second and maybe third pregnancy, but checking the intervals we find that active doses to which the immune system responded are not more than 2 or 3 doses as intervals were shorter than those scientifically required to ensure the immune system's proper response.

Examples from the field

1. A woman, who's pregnant for the second time, had received 2 doses during the fourth and fifth months of her first pregnancy, and it has been six months since the end of her first pregnancy. In this case, she should be given one dose of tetanus toxoid vaccine during this pregnancy starting from the fourth month and it is considered the third dose of vaccination schedule because the immunological memory had responded to the first and second doses. She's to be informed that the fourth dose is after one year from now and the fifth dose is one year after dose 4.

However, what really happens now, which has no scientific basis, is that the vaccination staff administers 2 doses in the woman's second pregnancy one again and considers them as doses 1 and 2 or 3 and 4. This will deprive the mother and her child from full protection against tetanus in addition to make unnecessary punctuations for the mother.

2. A woman, who's pregnant for the second time, had received 3 doses; dose 1 in the fourth month of her first pregnancy, the second dose in the fifth month while the third dose was given after the end of pregnancy. In this case, one dose is given and it is considered as dose 4, provided that interval between this dose and the third dose of the first pregnancy is nothing less than one year, with informing her that dose 5 is one year after dose 4.

The National vaccination schedule in Iraq was first adopted in 1985, meaning that females born in that year and after had received doses of the DPT vaccine, which contains Tetanus Toxoid vaccine, during childhood. Many could wonder how to deal with these cases, and the answer is:

A. The first three doses of DPT vaccine, which were given during the first six months of the female's age are to be considered the first and second doses of Tetanus Toxoid vaccinations schedule (i.e., three doses of DPT vaccine that contains tetanus vaccine in the childhood are equal to 2 doses of tetanus toxoid vaccine at reproductive age).

B. Each booster dose (the first at age of one year and a half and the second at age of 4 - 6 years) is considered equivalent to a single dose of tetanus toxoid vaccine schedule. for more clarification we give the following example:
   - A pregnant woman has a vaccination card proves that she had received five doses of DPT vaccine during her childhood. In this case we say 5 – 1 = 4. In this case we give her one dose and consider it dose 5 of tetanus toxoid vaccine. Thus she completes all doses required and there is no need to give any other additional dose during this pregnancy or any subsequent pregnancy.

- A pregnant woman has a vaccination card proves that she had received three doses of DPT vaccine at age of 2, 4, and 6 month respectively, and the first booster dose at age of one year and a half. She did not receive a second booster dose. Thus sums up four doses of DPT administered during childhood. In this case we say 4 – 1 = 3. So we consider that she needs 2 more doses of tetanus toxoid vaccine to complete the planned five doses. she's to be given one dose in this pregnancy and considered dose 4, and informed that the final dose 5 is to be given a year this dose.

- A pregnant woman has something to prove that she had received three doses of DPT vaccine during childhood. In this case we say 3- -1 = 2, so we give her one dose of tetanus toxoid vaccine to be considered dose 3 and inform her that dose 4 is given after one year from now while dose 5 is a year after dose 4.

- If a pregnant woman doesn't remember exactly how many DPT doses she had received, we build upon the least number of doses and follow the same rules previously mentioned. For example, if a pregnant woman doesn't remember whether she had received three or four doses during childhood, we take the least number which is three, the say 3 – 1 =2, so she should receive dose 3, dose 4 after one year and one more year before dose 5.

- If a pregnant woman does not have a vaccination card and does not remember how many DPT doses she had received as it was a long time ago, she then should be revaccinated; all 5 doses of tetanus toxoid are to be administered according to the schedule.

Haemophilus Influenzae Type B (Hib)

Bacteria infect humans causing bacterial diseases such as meningitis, swollen uvula, pneumonia, arthritis and living tissue inflammation.

Haemophilus Influenzae Bacteria has six serotypes: (a, b, c, d, e, and f). Type B is responsible for more than (90%) of infections. it is called Haemophilus because the bacteria live on the coagulation factors, and influenzae because its symptoms are similar to those of flu (common cold) (the Arabic literal translation). We will use the term Haemophilus Influenzae Type B when referring to the vaccine just to avoid any confusion or mixing due to the multiplicity of names. Most of the Haemophilus Influenzae Type B infections occur under the age of five years.

The vaccine:

- Haemophilus Influenzae Type B polysaccharide vaccine
- Haemophilus Influenzae Type B conjugated vaccine

This vaccine is used within the first quadruple, first pentavalent, second pentavalent and hexavaccine.

Measles

Acute viral disease transmitted by droplets from an infected patient and affects people of all ages who do not have immunity against this disease whether it is natural, acquired after previous infection or immunity through vaccination. The disease is characterized by three stages after the incubation period:

1. **Influenzae symptoms stage:** lasts for 2 – 4 days, begins with temperature that increases gradually, with a cough, sneeze and conjunctivitis.
2. **Rash stage:** lasts for 5 – 6 days, begins with the appearance of facial red rash slightly raised above the skin surface and looks like red sand, gradually begins to spread to the neck and belly down to the limbs.
3. **Rash disappearance and skin peels stage:** lasts for 3 – 4 days, rash disappears in the same pace of appearance; i.e. from the face down to the feet.

Measles is a serious disease that could lead to serious complications such as diarrhea, otitis media, pneumonia and encephalitis, and it could lead to death.

The vaccine:

It is the measles virus, weakened and put in a powder dried by freezing, dissolved in its special solvent and injected with (0.5 cc) subcutaneous or in the left arm muscle. Subcutaneous injection is preferable to reduce possible side effects after vaccination.

The vaccine is sensitive to heat and light. It is given at the age of 9 months as its effectiveness in this age is 85%, i.e. in each 100 children vaccinated with measles vaccine at the age of 9 months there's possibility 15 children do not have immunity, so the measles vaccine is given once again within the MMR vaccine, which is administered at the age of 15 months and 4 – 6 years to ensure raising effectiveness of the vaccine to more than 95%. In some cases like disasters as earthquakes, floods or outbreaks it is possible to conduct measles vaccination campaigns and vaccinate children aged six months and older although the effectiveness of the vaccine will be 60%. Yet it is of significant impact on reducing the effects and spread of measles disease, provided that

the dose is to be administered once again at age 9 months with at least one month interval between doses.

Vaccine shall be kept in 2 ~ 8 ° C temperature up in the vertical refrigerator, or down if it is a horizontal refrigerator.

Mumps

Acute viral disease characterized by inflammation of the salivary glands, especially the parotid glands under the ear flap and above the jaw, with the possibility of inflammation of other body parts such as testicles, meningitis, heart muscle and pancreas. This disease is transmitted through droplets of an infected person.

Symptoms: a parotid salivary gland inflammation. It may be unilateral or bilateral, and swelling can be seen above jaw with a raised lobe compared to the other side if it is a unilateral inflammation.

The vaccine

Mumps virus weakened and put in a powder dried by freezing. In Iraq, the MMR vaccine is used which contains measles, mumps and rubella live, weakened viruses. Dissolved in its special solvent, the vaccine is injected subcutaneous or in the left arm muscle. Subcutaneous injection is preferable to reduce possible side effects.

Vaccine shall be kept in 2 ~ 8 ° C temperature up in the vertical refrigerator, or down if it is a horizontal refrigerator.

Rubella

Acute viral disease transmitted through droplets of an infected person. It is characterized by mild fever with rash and enlarged lymph glands behind the ear, back neck area and under the cranium skull area. The rash is pale compared to the measles rash, and accompanied by arthritis pain or arthritis.

Seriousness of Rubella disease lies in getting the pregnant woman infected during first 3 months of pregnancy as it causes fetus congenital deformities called congenital rubella syndrome. So when a woman of reproductive age is receives a vaccine that contains rubella virus she must make ensure not to get pregnant for at least after vaccination (i.e. making sure that the woman vaccinated with rubella vaccine is not pregnant at the time of vaccination and will not get pregnant for a period of no less than one month from the date of vaccine administration).

MMR Vaccine

Rubella vaccine is the rubella virus, live, weakened and put in a powder dried by freezing. The vaccine used in Iraq is the MMR vaccine which contains viruses of measles, mumps and rubella and is given by injecting (0.5 cc) of the vaccine after dissolving the powder in its special solvent subcutaneous or in the left arm muscle. Subcutaneous injection is preferable to reduce possible side effects as MMR vaccine has 2 doses: the first is at age of 15 months and the second at age of 4 – 6 years. It will be preponed in future to be administered at age of 18 months.

Vaccine shall be kept in 2 ~ 8 ° C temperature up in the vertical refrigerator, or down if it is a horizontal refrigerator.

Rota Virus

A virus infects humans, especially under-5 children, and causes diarrhea episodes that lead to at least (500,000) deaths annually worldwide. This virus is responsible for at least 45% of diarrhea cases among children.

The virus enters the human body through the mouth. It is called rotavirus because it looks under the electronic microscope like a wheel – a car wheel - (the Latin word “Rota” means wheel).

The vaccine

There are two types of the vaccine:

- Monovalent rotavirus vaccine (contains 1 type of rotavirus), administered in 2 oral doses; dose 1 at age of 2 months, while dose 2 at age of 4 months or not to exceed 6 months of age.
- Pentavalent rotavirus vaccine (contains 5 types of rotavirus), administered in 3 doses; at month 2, 4, 6 of age respectively with the 3rd dose not to exceed 8 months of age by all means.
- If a child has been older than 3 months of age without receiving and dose of rotavirus vaccine then he/she should not be given this vaccine, i.e. we don’t start the series of 3 doses of vaccination after 3 months of age.
- If a child received 1 or 2 doses of rotavirus vaccine and he/she was aged 240 days (8 months) when the second or third dose was administered then he/she should not be given any more doses or rotavirus vaccine, meaning that the oldest age to give the vaccine at is (240 days), not even 1 day after at all.

DT vaccine for children

A vaccine contains diphtheria and tetanus toxoid vaccines only. It is given to children who suffered a vasogenic shock or nerve infections from a previous DPT vaccine dose containing pertussis vaccine in which diphtheria exceeds (20 IU).

Td vaccine for adults

Similar to DT children vaccine; it contains diphtheria and tetanus toxoid vaccines, but with the diphtheria vaccine dose too small not to exceed (10 IU) to avoid the occurrence of side effects, as diphtheria toxoid dose DT children vaccine causes severe side effects if given to people aged 7 years or older. Therefore, people aged 7 years or older should be given Td vaccine for adults only. People previously vaccinated with DPT vaccine during childhood can be given a booster dose of Td vaccine for adults every ten years.

Combination vaccines

Combination vaccines; those containing more than 3 combined vaccines, have been being used worldwide. In 2012, the first quadruple and first pentavalent vaccines were used in Iraq's national vaccination schedule.

First quadruple vaccine used since 2012:

It is a combination vaccine containing diphtheria, tetanus, pertussis, and Haemophilus influenzae B vaccines. DPT vaccine (liquid) is mixed with Haemophilus influenzae B vaccine (powder) and administered in three doses; the first at age of 4 months, the second at age of 18 months and (the first booster dose) and the third dose is given at age of 4 – 6 years (second booster dose).

First pentavalent vaccine used since 2012:

It is a combination of diphtheria, tetanus, pertussis, hepatitis B and Haemophilus influenzae B vaccines, i.e. five vaccines in one bottle (liquid). It is given within the national vaccination schedule with the first dose at age of 2 months while the second dose is given at age of 6 months.

Second pentavalent vaccine

It is a combination vaccine that contains diphtheria, tetanus, acellular pertussis, Haemophilus influenzae B and injectable polio vaccines.

Second quadruple vaccine

It is a combination vaccine that contains diphtheria, tetanus, acellular pertussis, and injectable polio vaccines (DTap + IVP), and it will be used in 2015.

Hexavaccine

It is a combination vaccine that contains diphtheria, tetanus, acellular pertussis, Haemophilus influenzae B, Hepatitis B and injectable polio vaccines (DTap + Hib + Hep B + IVP)

General information on vaccines

Vaccine	Type	Temp. to keep in	Administration method	Administration Place
BCG	Live bacteria	2 ~ 8 °C	Injection	Intradermal up in the left arm muscle
Hepatitis B	Genetic technology for the virus	2 ~ 8 °C	Injection	Right thigh muscle
Measles	Weakened virus	2 ~ 8 °C	Injection	Subcutaneous in left arm muscle
Quadruple (diphtheria, tetanus, pertussis, Haemophilus influenzae B)	Toxoid Killed bacteria Toxoid conjugated polysaccharide	2 ~ 8 °C	Injection	left thigh muscle
OPV	Weakened virus	2 ~ 8 °C	Drops	Oral
IPV	Killed virus	2 ~ 8 °C	Injection	Thigh muscle
MMR (measles, mumps, rubella)	Attenuated virus Attenuated virus Attenuated virus		Injection	Subcutaneous
Rotavirus	Weakened virus	2 ~ 8 °C	Drops	Oral
Second pentavalent			Ampule	Right thigh muscle
Hexavaccine				left thigh muscle
Pneumococci			Ampule	left thigh muscle

Seasonal Flu Vaccine

- It is the killed influenza virus vaccine.
- Administered as injection in the arm muscle.
- It gives no more than a single year of immunity.
- Administered annually 2 – 4 months before winter.
- The vaccine dose for children aged 6 – 35 months is half the dose given to those aged 36 months and older.
- Children aged 6 – 9 years who have not been given the seasonal flu vaccine are to be given doses of this vaccine with the minimum interval of one month, they then can be given one dose annually.
- People aged 9 years and older are to be given one dose annually.
- It is recommended to give this vaccine at age of 6 months to 18 years in case there's a chronic disease.
- It is given for people aged more than 65 years even if they have no chronic diseases.
- if there's a chronic disease at age 6 months or older, the vaccine is given annually in the following cases:

    1. People taking Aspirin (or any medicine from the same family like ibuprofen, voltaren or ponstan) for a long time as in the cases of rheumatic fever or arthritis.
    2. Pulmonary diseases such as asthma and chronic bronchitis.
    3. Heart disease, such as congestive (infarctoid) heart failure.
    4. Diabetes mellitus patients.

5. Patients with chronic kidney diseases, renal failure and kidney nephrotic syndrome.
6. Patients with blood diseases like sickle cell anemia and thalassemia.

7. Immune deficiency for any reason such as splenectomy or taking cortisone for a long time.
8. Any neurological diseases that may affect the respiratory tract such as epileptic seizures, spinal cord infections or cerebral palsy.
9. Medical and health staffs and communities like prisons and detention centers, state houses residents, pilgrims and army recruits.
10. Pregnant women, especially in winter months.
11. Flu vaccine should not be given to a person who's allergic to any of the vaccine's components or to eggs.

Vaccine shall be kept in 2 ~ 8 ° C temperature up in the vertical refrigerator, or down if it is a horizontal refrigerator.

Meningitis

Acute and serious disease that may lead to disability and permanent neurological damages and sometimes death due to inflammation of the brain's three membranes: dura mater, arachnoid and pia mater.

Meningitis could be caused by:

A. viruses
B. TB Bacteria
C. Different types of bacteria, and most dangerous one is called (Neisseria). Most infections are transmitted by droplets.

There are two vaccines for the prevention of infection with Neisseria bacteria, especially its four serological types (A-C-Y-W-135)

1. **Meningococcal polysaccharide quadruple vaccine:**

   - Given in 0.5 cc subcutaneous.
   - If given to under-4 children, another dose is preferably given after 3 – 5 years.
   - Immunity acquired 7 – 10 days after vaccine administration.
   - There's no immunological benefit to repeat the doses.
2. **Meningococcal conjugated quadruple vaccine**

- It is the meningococcal quadruple vaccine chemically conjugated with the protein of diphtheria toxoid or tetanus toxoid.
- Meningococcal conjugated quadruple vaccine gives 4 times the immunity acquired by meningococcal polysaccharide quadruple vaccine, with a higher level of immunity when doses are repeated, unlike meningococcal polysaccharide quadruple vaccine.
- Given in 0.5 cc intramuscular at age of 2 years and older.
- Given specially to:
    A. Pilgrims, for possible transmission of the disease from pilgrims coming from meningitis belt countries; the central African countries from Ethiopia in the east to Senegal in the west.
    B. Vaccinating the pilgrims with meningitis quadruple vaccine is a mandatory requirement by the Saudi authorities for all pilgrims from all over the world, while the rest of the vaccinations are optional depending on the epidemiological situation of each country.
    C. Communities like state houses residents, army recruits and prisoners.
    D. People who have immune deficiency such as thalassemia, sickle-cell anemia, bleeding patients, splenectomy patients for any medical reason or spleen is dysfunctional as is the case in patients with sickle cell anemia.
    E. Patients with kidney nephrotic syndrome.
    F. Medical and health staffs working in bacteria labs.

This vaccine can be given to any person aged 2 years or older, and the dose can be repeated 3 times to ensure complete immunity according to a schedule to be adopted in future after conducting epidemical researches.

Vaccine shall be kept in 2 ~ 8 ° C temperature down in the vertical refrigerator, or up if it is a horizontal refrigerator.

Hepatitis A

It is one of the viruses that cause hepatitis. The vaccine is Hepatitis A killed virus, administered intramuscular for people aged 2 years and older.

1. The dose is 0.5 cc containing 720 IU. The first does is given to people aged 2 – 19 years followed by a second dose after 6 – 12 months.
2. People aged 19 years or older are given 0.5 cc dose containing 1440 IU. The first does is given in the arm muscle followed by a second dose after 6 – 12 months.

Hepatitis A vaccine is given to:

1. Travelers to areas of high endemic and infection with hepatitis A virus.
2. Patients who have a defect in clotting factors.
3. People in the virus laboratories.
4. People who have chronic diseases.

Pneumococcal vaccine:

Pneumococci bacteria causes severe infections such as pneumonia. In case the bacteria gets into the blood it causes meningitis and acute otitis media. Infection with measles and flu may lead to secondary bacterial infections, particularly pneumococcal which lives naturally in the respiratory tract. The rate of deaths resulting from complications of pneumococcal infection may reach 5-7% and it is higher among adults.

There are more than 90 serotypes of pneumococcal bacteria.
Pneumococcal polysaccharide vaccine 23 contains 23 serotypes of pneumococcal bacterial, which is responsible for 88% of diseases due to the presence of the pneumococcal bacteria in blood. Vaccine is given in (0.5 CC) dose intramuscular or subcutaneous. Immunity acquired after 2 - 3 weeks of vaccination.

- The vaccine is not effective under the age of 2 years.
- The vaccine is very slightly effective in preventing or treating pneumonia caused by pneumococcus. Thus we should not call it "pneumonia vaccine".

The vaccine is given to:

A. Aged over 65 years.
B. Aged 2 years and older for those who have the following cases:

- Chronic heart diseases.
- Chronic lung diseases.
- Patients with diabetes mellitus.
- Liver cirrhosis.
- Alcoholics.
- People who have hearing aids.
- Immune deficiency, such as patients who have spleen disorders like sickle cell anemia or have surgical splenectomy for any reason, patients with chronic renal failure,

nephrotic syndrome and cancers of the lymph glands, or patients who are taking chemical treatments or medicine containing steroids for more than (14 days).

- In 2008, asthma patients and smokers aged 19 years and older have been added to the list of people who must be given pneumococcal vaccine. Current scientific information does not support the principle of giving the vaccine for smokers or patients with asthma under the age of 19 years so far.
- Pneumococcal conjugated vaccine is currently available, and it can be given to under-2 years children to protect them from serious pneumococcal infections. It is planned to list this vaccine in the national vaccination schedule in future to protect children aged 2 months and older from dangerous pneumococcal bacterial infections as there is currently pneumococcal conjugated vaccine (13) which contains (13) serotypes with the purpose to prevent diseases caused by pneumococcal bacteria such as bacterial blood poisoning and meningitis.

Vaccine shall be kept in 2 ~ 8 °C temperature down in the vertical refrigerator, or up if it is a horizontal refrigerator.

The vaccine will be given in the coming national vaccination schedule in Iraq in the left leg muscle with three doses at month 2, 4, 6 respectively.

General information for vaccinators and vaccination staffs in PHC clinics

- Make sure of the validity of vaccines and refrigerator temperature.
- Check the vaccine effectiveness monitor color.
- Use the solvent specified for vaccine to make sure that the temperatures of the solvent and the vaccine are equal.
- Heat-sensitive vaccines such as polio, measles MMR, BCG and rotavirus must be placed in the upper part of the refrigerator, while other vaccines such as DPT, Hepatitis B, quadruple, pentavalent and meningitis are to be placed in the bottom of the vertical refrigerator.
- In a horizontal refrigerator, sensitive vaccines such as OPV, rotavirus vaccine, measles, MMR, BCG, and tetanus toxoid are put in the bottom of the refrigerator, while DPT, quadruple, pentavalent, hepatitis and meningitis vaccines are put above.
- Do not place food, drinks or drugs in the vaccines refrigerator for two reasons:

A. Excess items affect the refrigerator temperature.
B. Some medicines, especially pure insulin, are similar to some vaccines or they are used as a solvent as happened in some countries and led to the death of children after vaccination.

- Be sure to minimize opening the refrigerator (less than three times a day) with a shortening time to open the refrigerator door to the minimum.
- Do not use a vaccine solvent to dissolve another vaccine ever.
- BCG Japanese strain vaccine dissolved in 1 cc solvent and 0.5 cc injected intradermal, meaning that one ampoule is enough to vaccinate 20 children.
- Each of MMR and measles vaccines is dissolved in its special solvent. Each one is dissolved in 5 cc and injected 0.5 cc subcutaneous, so each bottle is enough to vaccinate ten children.
- Some bottles of measles and MMR vaccines solvent are (6 cc); an extra (1 cc) solvent to avoid any waste of solvent when drown, therefore vaccination staff should pay attention to draw only (5 cc) and leave the extra (1 cc) as dissolving the vaccine in (6 cc) solvent would definitely weaken the vaccine effectiveness.

Misconceptions

It means false information or belief which is not based on a fact or sound scientific information. It could take root in the minds of families or medical staffs, thus lead to the omission or lack of commitment to vaccinate children with the necessary and required vaccines in time. The right information is that children can be given all these vaccines timely in all cases mentioned.

Among these cases:

1. Child's infection with neonatal jaundice, means yellow skin and eyes starting from the third day as a result of the decomposition of red blood cells naturally after birth. The child's body turns to get rid of the big mass of hemoglobin to cope with and adapt to the post-birth stage. There's no problem with vaccinating the children with any vaccine, even if they have neonatal jaundice which may last from the third day until the tenth day of age.
2. Response to a previous dose of quadruple or pentavalent vaccine such as high fever up to 40 °C with redness and swelling of the vaccination area.
3. Child's infection with a mild cold, runny nose or mild diarrhea.
4. Child's taking antibiotics for other diseases.

5. A child who must be given MMR vaccine dose and the mother is pregnant or in contact with another pregnant woman living in the same house like his/her aunt.
6. A history of febrile seizures, family history of epileptic seizures or a stable a stable neurological disease; without any deterioration or aggravation in symptoms like in as cerebral palsy.

Note: Premature baby: A child born weighing more than (2 kg) and did not complete (37) weeks in mother's womb out of total pregnancy duration of 40 weeks.

7. Premature baby (hepatitis B vaccine postponed until reaching the age of one month).
8. Child's infection with a contagious disease like typhoid.
9. Egg allergy (except seasonal flu vaccine as it is not given to those with egg allergy).
10. Penicillin allergy.
11. Child's taking local cortisone treatment such as skin ointments cortisone sprays for asthma attacks treatment.
12. A child who missed scheduled vaccinations.
13. A child who has asthma, Eczema, straw allergy or seasonal seed allergy.
14. Wasting: any child infected with wasting needs vaccination more than others because he/she is vulnerable to the diseases and their complications more than other children.

Based on the above, any of the cases mentioned should prevent or retard the family or medical staff from vaccinating children; they can be given all the vaccines without any possibility of vaccine side effects these cases.

Late vaccination

It is a term given to a child who received one or two doses of the routine vaccination schedule, then stopped for a long time and then the family visited the PHCC after that period, in this case is the following should be done:

1) If there is a verified vaccination card indicating the vaccination status then continue the vaccinations. For example, if the child has been given quadruple vaccine d1 and polio d2 which is given at age of 4 months, and this was indicated in the vaccination card and many months have passed since the last vaccination, the given dose 3 of OPV and dose 2 of pentavalent vaccine, In case the current visit coincides with the measles vaccine, it will be possible to give measles vaccine in the same day and then continue the routine schedule.
2) If there's no vaccination card indicating the child's vaccination status then it is possible to start vaccination schedule right from the current visit, taking into account that the zero dose of polio will not be considered, as zero dose is only counted until the child aged 40 days after birth, and when getting older than this age, the polio dose is considered d1. Similarly, BCG vaccination can be given until the child completes 1 year of age, after that BCG is not given as there's no scientific need to use this vaccine; which is preventing serious TB complications for children aged under one year.

Re-vaccination

It is a term given when there is a need for re-vaccination as it happens when there's a probability that the immune system fails to respond to any vaccine, and as it happens the child is given measles vaccine at age of 6 months the re-vaccinated at age of 9 months, or giving vaccines then eventually appears that they had already been given. In this case, there's no medical reason or a side effect that prevents re-giving any, and there's no worries to give the child repeated vaccines or several vaccines in a single session.

General rules

1. BCG vaccine is not administered for children aged older than one year.
2. Interval time between a dose of polio, pentavalent, quadruple or hexavaccine and another dose must be at least 6 - 8 weeks.
3. The interval time between hepatitis B d1 and d2 is at least four weeks, and at least 4 months between d1 and d3
4. Interval time between hepatitis d3 and d2 is at least two months.
5. Interval time between a measles or MMR vaccine dose and another dose of the same vaccine should be at least one month. In case a second dose is given within less than one month then it will be possible to cause side effects such as high temperatures after one - two weeks of vaccination date.
6. It is preferable to give MMR vaccine when a child completes the first year of age when brought to the PHCC and has missed measles vaccine dose at age of 9 months.
7. Any measles vaccine dose given to the child during the campaigns, for example, before the age of nine months shall be repeated upon reaching the age of nine months.

8. Hepatitis vaccine for children, given 10mcg until the age of 16 years, while those older than 16 years are given 20 mcg dose of hepatitis B vaccine for adults.
9. For children weigh less than (2 kg) at birth, hepatitis vaccine shall be postponed until they complete one month of age.

Contraindications to vaccination

In general, contraindications to vaccination are very limited, and the benefit expected from vaccination is always outweigh the fear of side effects.

General principle that includes all vaccines: the vaccine is not given if there was a medical sign of vascular trauma which is usually detected after giving a previous dose, so a second dose of this vaccine is not given and the vaccine component that is believed to be the cause of the vascular trauma should be eliminated as is the case when using diphtheria + tetanus vaccine for children instead of DPT (diphtheria, pertussis and tetanus) when there's a vascular trauma or neurological damage.

Vascular trauma

A medical condition that occurs as a result of a quick immune response because the body is allergic to a certain material (such as allergy from eggs, gelatin or neomycin). It includes general rash with or without itching with swelling of skin, tongue and soft palate, leadings to dyspnea and rapid breathing, hypotension with trauma (deterioration of the general health status) and consciousness deterioration that could end up unconsciousness).

First: Trauma medications available to be urgently used, which include:

1. Adrenaline ampoule with concentration 1/1000, given (0.1 cc) dose subcutaneous each year of age to speed up absorption.
2. Aged one month to one year, (0.1 cc) is the therapeutic dose.
3. From (1-2 years) (0.2 cc) is the therapeutic dose.
4. From (2-3 years) (0.3 cc) is the therapeutic dose.
5. From (3-4 years) (0.4 cc) is the therapeutic dose.
6. From (4-5 years) (0.5 cc), and this is the maximum dose.
7. The maximum is (0.5 cc) for any age after five years.

The prescribed dose is given then wait for (10-15 minutes). In case the child's health didn't get better, then the dose must be given again with (10-15) minutes interval until the patient gets better, otherwise a third dose is given after (10-15) minutes. Patients often get well after the first dose and rarely need a third dose. .

The maximum number of adrenaline doses is three, with at least (10-15 minutes) interval time between doses.

Second: **Breathing and respiratory aids (ambu bag + breathing tube rod) with a throat telescope to insert the breathing tube rod. In this case, stress on:**

A. In case the child is vaccinated at the PHCC, he/she should stay near the vaccination room for at least 15 minutes after vaccination in order to deal with any trauma cases. The mother is not allowed to leave unless after ensuring the child's safety (15-30) minutes after vaccination.
B. If vaccination is given in the field during immunization campaigns, the vaccination teams must be equipped with trauma medicines, particularly adrenaline, with notifying Emergency Ambulance Directorate to prepare ambulances to transport patients as soon as possible.

Cases in which routine vaccination postponed to a later date:

1. Temperature rise of more than 38.5 °C.
2. Child's acute infection.
3. Inpatient child for any reason, after consulting the treating physician.
4. The child had received blood or any of its derivatives, such as plasma, during at least one month of vaccination date, i.e. vaccination should be postponed until one month after receiving the blood.
5. Pregnant woman, except tetanus toxoid vaccine which is very safe vaccine and given to pregnant women starting from the fourth month.
6. In case the child was given a high dose (2 mg/kg of child weight) of steroid medicines like prednisolone or cortisone for more than fourteen days, vaccination is to be postponed three months after steroids taking is stopped to ensure the immune system response to the vaccine.

How to deal with the routine vaccination schedule dropouts:

AGE	DOSES GIVEN
from 16 - 41 Days	Given zero dose of polio vaccine + BCG +Hepatitis d1. After at least one month, given polio d1, Rota d1, pentavalent d1. Then continues with the new schedule according to the specified intervals between doses.
From the age of 42 days - 90 days (42 days - 3 months)	Given BCG + polio d1 + Rota d1 + pentavalent d1 Two months later, given quadruple + polio d2 + Rota d2 Two months later, given pentavalent d2 + polio d3 + Rota d3 At age of 9 months, given measles vaccine + hepatitis vaccine (solo) d3
From the age of 91 days -120 days (3> 4) months	Given BCG + polio d1 + pentavalent d1 only (Rota is not given). Rotavirus vaccine series shouldn't be started after the age of three months. Two months later, given quadruple + polio d2 Two months later, pentavalent d2 + polio d3 At age of 9 months, measles vaccine, and after at least 8 weeks of giving pentavalent d2, Hepatitis (solo) d3 is given.
Aged 121 - 150 days (4> 5) months	Given BCG + polio d1 + pentavalent d1 Two months later, given quadruple + polio d2 After two months, given pentavalent d2 + polio d3 + measles (if the child's age was 5 months when vaccination schedule began) If the child was aged less than 5 months when vaccination started, given measles vaccine ate age of 9 months. Two months after giving pentavalent vaccine d2, given hepatitis vaccine (solo) d3
From age 151-180 days (5>-6) months	Given BCG + polio d1 + pentavalent d1 Two months later, given quadruple + polio d2 Two months later, given pentavalent d2 + polio d3 + measles Two months after giving pentavalent vaccine d2, given hepatitis vaccine (solo) d3
Aged 181 - 210 days (6>-7) months	Given BCG + polio d1 + pentavalent d1 Two months later, given the quadruple + polio d2 + measles (if the child was aged seven months when vaccination schedule started).

	Two months later, given the pentavalent d2 + polio d3 + measles (if the child was aged less than seven months when vaccination schedule started). Two months after giving pentavalent vaccine d2, given hepatitis vaccine (solo) d3
Aged 211 - 240 days (7> -8) months	Given BCG + polio d1 + pentavalent d1 0 Two months later, given quadruple + polio d2 + measles Two months later, given pentavalent d2 + polio d3 At age of 15 months, given MMR + hepatitis d3 0
Aged 241 - 270 days (8> -9) months	Given BCG + polio d1 + pentavalent d1 + measles (if the child was aged 9 months when vaccination schedule began) Two months later, given the quadruple + polio d2 + measles (if the child was aged less than 9 months when vaccination schedule started). Two months later, given pentavalent d2 + polio d3 At age of 15 months, given MMR + polio d3
Aged 271 - 300 days (9> -10) months	Given BCG + polio d1 + pentavalent d1 + measles d0 Two months later, given quadruple + polio d2 Two months later, pentavalent d2 + polio d3 At the age of 15 months, given MMR + hepatitis d3 (if 2 months or more passed after giving pentavalent d2). If interval time between pentavalent d2 and the child being aged 15 months was less than two months, MMR vaccine is to be postponed to a date that ensures two months elapsed after the date of giving pentavalent d2 to give hepatitis and MMR vaccines.
Aged 301 - 330 days (10> -11) month	Given BCG + polio d1 + pentavalent d1 + measles d0 Two months later, given quadruple + polio d2 After two months, given c 2 pentavalent d2 + polio d3, and if happened the child is aged 15 months then given MMR d0 Two months after the date of giving pentavalent d2, given hepatitis d3 (solo) and measles if not given with pentavalent d2. Booster dose 1 is given after 6 months of the date of giving pentavalent d2.
Aged 331 - 360 days (11> -12) month	Given BCG + polio d1 + pentavalent d1 + measles d0 Two months later, given quadruple + polio d2 Two months later, given pentavalent d2 + polio d3 + MMR 0 Two months after giving pentavalent vaccine d2, given hepatitis vaccine (solo) d3

	Booster dose 1 is given after 6 months of the date of giving pentavalent d2.
Aged 361 - 390 days (12> -13) month	Given pentavalent d1 + polio d1 + MMR (BCG not given). Two months later, given quadruple + polio d2 Two months later, given pentavalent d2 + polio d3 Two months after giving pentavalent vaccine d2, given hepatitis vaccine (solo) d3 After 6 months from the date of giving pentavalent d2, given first booster dose.
Aged 391 - 420 days (13> -14) month	Given polio d1 + pentavalent d1 + MMR d0 Two months later, given quadruple + polio d2 Two months later, pentavalent d2 + polio d3 Two months later, given hepatitis d3 (solo) After 6 months from the date of giving pentavalent d2, given first booster dose.
Aged 421 - 450 days (14> -15) month	Given polio d1 + pentavalent d1 + MMR Two months later, given quadruple + polio d2 Two months later, pentavalent d2 + polio d3 Two months later, given hepatitis d3 (solo) After 6 months from the date of giving pentavalent d2, given first booster dose.
Aged 760 days	Given pentavalent d1 + polio d1 + MMR Two months later, given quadruple d1 + polio d2 Two months later, given pentavalent d2 + polio d3 After 12 - 18 months of giving pentavalent d2, given quadruple booster 1 + polio booster.
At age of 3 years	Given quadruple booster 2 + polio booster 2

Examples:

1. **2 years old child who did not receive any doses of vaccine:**

- Given the booster 1 of quadruple vaccine after 8 months - 1 year of the of pentavalent vaccine d2.
- Given normal DPT vaccine after at least three years from booster 1, i.e. at age of 5 - 6 years.

2. **A four years old Child who did not receive any vaccine doses:**

- Treated the same as the child aged 2 years with one exception; the quadruple vaccine booster 2 will be scheduled at the age of seven years. In this case, given Td vaccine for adults.

3. A child aged 7 years or older who did not receive any vaccine:

- Given three doses of OPV, Td vaccine for Adults and hepatitis B for children.
- Given two doses of MMR vaccine in no less than 1 month period of time.
- Given polio booster 1 and Td vaccines for adults at least 8 months after d3.
- Given hepatitis B vaccine for children, which contains 10 mcg and used up to 16 years of age.
- If older than 16 years, given hepatitis B vaccine for adults which contains 20 mcg and used for those aged 16 years and older.
- Important point Adin case the child is aged more than 2 years and did not receive any vaccine, he/she can be given a schedule with intervals between first three doses of DPT, quadruple or pentavalent vaccine less than 2 months, but no less than 4 weeks (like 4 - 6 weeks) with taking into account the intervals between doses of hepatitis B vaccine.

Vaccine injections are not given in the buttocks muscle for two reasons:

A. Possible infection of the sciatic nerve, which could cause leg paralysis.
B. Lipid in the buttocks muscle leads to lack of vaccine absorption, thus there will be no use of vaccination, and all the vaccines are included in this scientific fact.
Thus, any vaccine given to children should be in vastus lateralis muscle if they are under-1 year old, otherwise it is possible to inject the vaccine in the arm's muscle.

Lost opportunity

Namely, a child who has been in the PHCC with his/her mother for any reason and has a vaccine dose due but the opportunity wasn't taken, so the PHCC has lost a chance to raise vaccination coverage and the child has lost the chance to be given required vaccines.

Dropout Child

Any child who has a vaccine dose due and missed the proper date for more than one month.

Vaccines schedule 2011

Age	The vaccine
Postnatal	BCG vaccine, OPV zero dose , Hepatitis B vaccine d1 during the first 24 hours
2 Months	OPV d1, DPT d1, hepatitis B d2
4 months	OPV d2, DPT d2
6 months	OPV d3, hepatitis B d3
9 months	Measles vaccine 100,000 IU of vitamin A
15 months	MMR vaccine (measles + mumps + rubella vaccines)
18 months	, OPV booster 1, DPT booster 1 200,000 IU of vitamin A
4 - 6 years	OPV booster 2, DPT booster 2 MMR vaccine dose 2

Vaccines Schedule for 2012

Age	The vaccine
Postnatal	BCG vaccine, OPV zero dose , Hepatitis B vaccine d1 during the first 24 hours
2 Months	pentavalent vaccine (diphtheria, tetanus, pertussis, Haemophilus influenzae B, hepatitis B) Rotavirus vaccine dose 1 OPV dose 1
4 months	Quadruple vaccine (diphtheria, tetanus, pertussis, Haemophilus influenzae B) Rotavirus vaccine dose 2 OPV dose 2
6 months	pentavalent vaccine (diphtheria, tetanus, pertussis, Haemophilus influenzae B, hepatitis B) Rotavirus vaccine dose 3 OPV dose 3
9 months	Measles vaccine 100,000 IU of vitamin A
15 months	MMR vaccine (measles + mumps + rubella vaccines)
18 months	Quadruple vaccine (diphtheria, tetanus, pertussis, Haemophilus influenzae B) OPV booster 1 200,000 IU of vitamin A
4 - 6 years	Quadruple vaccine (diphtheria, tetanus, pertussis, Haemophilus influenzae B) OPV booster 2 MMR vaccine dose 2

Chapter Two

(Immunization campaigns guideline)

Introduction

The immunization program seeks to achieve the national objectives of the protection of all community groups from communicable Diseases by vaccines or serums, and respond to the global requirements agreed upon by world's countries of through the World Health Organization recommendations, such as the eradication of polio, measles, and congenital tetanus as well as preventing outbreaks of hepatitis B, meningitis and influenza.

Immunization program goals can be achieved through the application of the following strategies:

1. Routine immunization: through immunization outlets in PHCCs and other health facilities.
2. National campaigns: Through the implementation of a wide vaccination activity in specific days with a specific vaccine in a specific area. It could be a comprehensive national campaign that includes all provinces, an entire catchment area in one province, one District or several provinces according to the epidemic situation.
3. Health surveillance.
4. Strategy to access all the districts.

Immunization campaigns:

A wide vaccination activity conducted in specific days to give a specific vaccine and the campaign has a specific goal and purpose.

The goal of the campaign: - vaccinate all targeted in all the areas specified in the campaign's plan.

The purpose of the campaign: - increase community immunity to respond to the epidemic requirements.

Vaccination of groups targeted by the campaign and increasing community immunity will be achieved through:

1. Access to the targeted community members who are not vaccinated within routine events.
2. Vaccinating individuals from the group targeted by the campaign who had been vaccinated in the routine activities, and whose immune system response is negative or weak for different reasons, so the doses given in the campaign could be a factor to achieve or increase immune response.

The campaign events have other benefits such as:

1. Increase community awareness of the immunization program goals.
2. Increase and activate the capabilities of medical and health staffs through training and practical implementation.
3. Complete administrative and logistical supplies needed for the immunization program.

- **Stages of the campaign:**

A. Preparation period:

1. Plan development.
2. Preparation of supplies.
3. Training.
4. Media plan and Community mobilization.

B. Implementation period:

1. Vaccination.
2. Follow-up.
3. Supervision and monitoring.

C. Post-campaign period:

1. Evaluation and recommendations.
2. Preparing for the next campaign.

Types of campaigns:

1. Comprehensive national.
2. Local, includes a number of provinces.
3. A mop-up campaign, which means an activity within a specific catchment area.

A. Preparation period: -

Making a decision to implement a vaccination campaign is considered one of the important and vital processes in which the following must be taken into account:

1. Adequate epidemiological and scientific justifications to implement an immunization campaign.
2. All the administrative, financial and logistical requirements of implementing the campaign are available.
3. Government commitment to implement the campaign.
4. The appropriate timing for the campaign.

Activities of the preparation period at all central and terminal levels will be detailed later.

- **The central level:** Preparation of the plan: -

1. Directorate of Public Health/ Immunization Section:
    A. Hold a meeting with the CDC Center and Public Health Center Lab to determine the campaign's type (comprehensive national, local or mop-up).
    B. Determine type of the vaccine.
    C. Identifying the target age group.
2. Determine the initial dates of the campaign.
3. The Immunization Section determines the following:
    A. Quantities of vaccine required.
    B. Vaccination-related items and supplies (syringes, safety boxes, vaccine boxes, vaccine carriers, records, cards, etc... and cold chain supplies (refrigerators, freezers, ice cubes).
    C. Develop the logistic plan for the campaign, which includes the numbers of people targeted for each DoH with the numbers of fixed and mobile teams, vehicles and the number of central, local and field supervisors according to the contexts adopted regarding numbers of vehicles required in coordination with all provincial DoHs
    D. Set dates of the campaigns 3 months before the comprehensive national campaign.
    E. Develop an integrated training plan to train all medical staffs within the organizational structure of the campaign at all central, DoHs, Districts, and PHCCs levels.
    F. Develop a complete scientific paper on the campaign goal and purpose as well as everything related to the vaccine used in this campaign.
4. Hold a meeting for the managers of Public Health Departments, Immunization and CDC Sections to inform them of all details of the campaign and make use of their opinions, ideas and field experiences.
5. Hold a meeting with Health Promotion Section in order to develop a joint media plan where Immunization Section Manager gives the following details:
    A. Campaign's goal: number of targeted people in this vaccination campaign and targeted age groups.
    B. The purpose of the campaign: For example, to keep Iraq free of polio or increase community immunity to face any possible outbreak of measles or other diseases.
    C. Scheduled dates for the campaign.
    D. Campaign's implementation manner: Like from house to house, in PHCCs only or in schools, institutes and universities.
    E. Type of the vaccine with a detailed explanation of the characteristics and possible side effects.

6. Hold a meeting with managers of the main and DoHs vaccine stores to discuss the vaccine distribution plan and fully review the cold chain supplies including thermometers, vaccine boxes, vaccine Carriers, vaccine cold boxes and ice-lined refrigerators) conduct full inventory and fix those broken.
7. Immunization Section shall develop a complete plan that includes the campaign organizational structure after completing all scientific and logistic requirements, reviewing them with all DoHs, making necessary modifications, submitting them to the Minister of Health to get the official approval, and circulating the approval among all DoHs as well as opening a special folder for all administrative, financial and logistic aspects of the campaign and issuing administrative orders required for each activity.
8. Send official letters to all concerned directorates, ministries, governmental and non-governmental parties to inform them of the campaign's dates and their roles in facilitating and supporting vaccination teams' work.

- **DoH level:**

1. Hold a meeting chaired by Public Health Director General with presence of all concerned departments such as of Public Health Department, Director of Financial, Administrative & Legal affairs Department, Technical Affairs Department, Planning Department, Programs & Systems Section Manager, Immunization Unit Manager, Health Promotion Section

Manager, CDC Section Manager and Pharmacy Department Manager in order to develop the organizational structure for the campaign, identify key points of DoH plan and issue necessary orders.

2. Hold a meeting chaired by Public Health Director and attended by Programs & Systems section manager, immunization unit manager, Health Promotion section manager, Vaccines Store manager and District managers to develop the general plan of the DoH including specification of targeted populations within the Do's catchment area, the number of vaccination teams, the number of transportation vehicles, available quantities of the vaccine in the DoH's vaccines store and District stores, required vaccine quantities, the distribution plan, train local and field supervisors, define responsibilities of the campaign and discuss framework of the media plan.
3. Hold a meeting between Immunization Unit Manager and Districts and PHCCs Managers to develop the campaign's plan which includes determining the targeted catchment area for each district and PHCC, number of targeted people within each district and PHCC, numbers and types of vaccination teams and identification of high-risk areas, far and remote areas and the areas shared between districts and PHCCs.

- **Health District level:**

1. Hold a meeting chaired by District Manager and attended by the associated PHCCs' Managers to review the vaccine balance and required quantities as well as supplies of vaccination and cold chain, and numbers and types of vaccination teams required to work in the campaign to achieve the goal in addition to determining the number of targeted people within the district's catchment area, drawing maps for each PHCC and issuing the administrative orders related to the campaign's organizational structure which includes field supervisors and vaccination teams.
2. Develop a training plan for District staff who participate in the campaign.
3. Develop the community and media mobilization plan for the district to implement the campaign's steps.

- PHCC level:
- Hold a meeting chaired by the PHCC Manager for vaccination team members and pharmacy officials to put the details of implementation.
- Update catchment area of the PHCC.
- Determine number of targeted people and age groups.
- Determine the number and types of teams needed to achieve full coverage of the catchment area, vaccinate all those targeted and review all supplies of implementing the campaign including the vaccine, vaccine carrier and records, determine remote, terminal, difficult to access and high-risk areas, divide the catchment areas according to the implementation days, set teams' responsibilities and types to ensure full coverage for all areas, residences and targeted populations, and this process is called "Micro plan".
  It includes:

A. Population within the catchment area.
B. Number of people covered by the campaign and the target age group.
C. The number of houses within the catchment area.
D. Number of immunization teams required to implement and achieve the campaign's goal.
E. Types of immunization teams.
F. Terminal and border, difficult to access and high-risk areas.
G. Quantities of vaccine required.
H. Vaccination supplies including thermometers, vaccine carriers, safety boxes and records, while drawing the maps is called micro mapping. the purpose of mapping is:

1. Filling out information of micro planning on the maps
2. Guide and lead the teams in the field and ensure that they are moving in the right places and directions every working day.
3. Avoid having an empty space within the PHCC's catchment area (no man's land phenomena)
4. Enable field supervisors at all levels to follow up teams' movement in the field.

- Micro plan:

A. Determine the number of population within the PHCCs catchment area, and it can be determined through:

1. MoH Planning Department.
2. Information and data available from the census if available.
3. Information available from previous campaigns.

B. Determine the number of people targeted by the campaign from each age group, for example:

- Children under-1 year range (3.2% to 3.7%) of the total population in the area.
- Children (1-5 years old) make up 13% of the total population in the region.
- Children (birth date - 5 years old) make up 17% of the total population in the region.

Example/ number of the region's population is 5,000

If under-1 year children are 4%, they will be 200,
Identifying and calculating the teams: The teams participating in the immunization campaign are as follows:

1. Fixed teams: the teams that are responsible of vaccination inside the PHCC or in a fixed place like in a school, a mosque or a tribe sheikh's house.
2. Walking team: The team that vaccinate at least 120 children per day in a catchment area within no more than 2 km from the PHCC, i.e. the team will walk 2 km going forth and 2 km back to the PHCC in an area of at least 120 children.
3. Walking, vehicle-borne team: teams that vaccinate at least 120 children within a catchment area of more than 2 km from the PHCC. That's why they are using vehicles for transportation to reach a specific spot, get down and walk up to the houses to vaccinate the targeted then come back to the PHCC by the transportation vehicle.
4. Vehicle-based team: The team that vaccinates a campaign-targeted group in scattered areas far from the PHCC by moving among remote and scattered residences and villages using a transportation method like a car, a boat or a motorcycle. It can vaccinate no more than 75 targeted persons.

How to calculate the number of teams and determine their types:

A. Suppose that vaccination rate is (100) targeted persons per team.
B. If we consider it is a five-day campaign then each team can vaccinate (500) targeted persons during the campaign.
C. Divide the campaign's goal, supposedly 15000 children, on 500 children, so it will be 30 teams the PHCC needs to vaccinate all the targeted in the 5-day campaign.
D. Usually it is one fixed team, so the rest are 29 teams, and according to the international standards, vehicle-based teams should be 30% ~ 40% of the total number of teams. So here they will be 9 ~ 12 vehicle-based teams while walking and walking, vehicle-borne teams are 17 ~ 20 based on circumstances of each PHCC. These rates are possible to be less or more according to the PHCC place, population density, nature of the geographical area, districts and areas.

In light of the teams' number and types determined, they are to be distributed in the PHCC catchment area in way that ensures full coverage during the campaign's days.

E. Each team includes two staffs: a vaccinator and a registrar.
F. Calculate the vaccine quantity needed in light of the goal with additional 20% as a balance.

G. Calculate the number of records according to the number of teams.
Calculate other supplies such as syringes and cold chain requirements.

Micro mapping

1. Draw a map of the PHCC catchment area on which the following information should be stated:

A. The total population in the area.

B. The number of residential buildings. It can be known from the municipal department, the local council or the real estate brokers.

C. The number targeted people in the immunization campaign.

D. Terminal areas.

E. High-risk and difficult to access areas.

F. Adjacent areas to the PHCC catchment area, like these of another PHCC in the same District or of another District, another DoH or the neighboring countries (Iran, Turkey, Syria, Jordan, K.S.A and Kuwait) as in the DoHs of Basra, Muthanna, Maysan, Wasit, Diyala, Erbil, Duhok, Nainawa and Anbar.

G. Divide the PHCC catchment area based on the campaign's days, with stating the teams responsible of covering the area for each day.

H. Key and significant geo-tagging, such as the PHCC site within the catchment area, a mosque, a school a river, a government department or a mountain.

I. Draw a map on (A4) paper including the work area of each team for a given day, meaning that each team has its maps based on the campaign's days for the catchment area it covers.

For example, in the 5-day OPV vaccination campaign, each team will have 5 maps on A4 papers that include the catchment area and the team's directions for day 1, 2, 3, 4 and 5, and the combination of these maps which will represents the PHCC's catchment area.

J. The PHCC's catchment area should be reviewed by using the map to avoid the no man's land phenomenon, and variables should be updated on the ground like having new IDPs or nomads. Overlapping between adjacent areas should be solved by clarifying responsibilities of each PHCC a long time before the campaign starts.

- Issuing administrative orders for all campaign's events, which include the names of the participants, field supervisors and volunteers, if any.
- Develop a training plan that includes the number of sessions, number of participants, sessions' times, the scientific material utilized and lecturers based on the PHCC need.
- Develop the media and community mobilization plan, determine media communication channels and the messages directed to clarify the campaign's goals and purposes, determine civil society leaders such as clerics , tribe Sheikhs and local leaders like government and non-government department managers, explore areas of participation, cooperation and support to the PHCC's activities. for example, clerics and tribe Sheikhs' participation in delivering messages of the campaign and encouraging people to cooperate with the vaccination teams, facilitate their movement and provide them with information on where to find the campaign-targeted people in addition to distributing the flyers and banners of the campaign and attending the campaign's launch ceremony.

- Prepare the campaign's requirements: through precise, systematic and proper planning starting from the PHCC which is responsible of determining the quantity of vaccine and other supplies required to implement the campaign and reporting to the DoH which in turn reviews and unifies the reports of all Districts then submits them to the central ministry which in turn unifies and finalizes the status then provides the DoHs with the required vaccines and supplies accordingly for the campaign.
- **The implementation phase**

  It is of two events:

  A. Vaccination.

  Monitoring and supervision.
- The central level:

1. The Operations Room at the Ministry of Health / Directorate of Public Health shall follow up the activities of launching the campaign, starting vaccination and compiling the figures achieved and all pros and cons happening on the ground.
2. Central supervisors shall go down to the field in each DoH and visit Districts, PHCCs, fixed and mobile vaccination teams and vaccine stores, and follow up quality and adequacy of vaccination teams' work by visiting all targeted areas within their responsibility as well as the residences, review the registration records, attend the daily meeting after work for one of the Districts, then attend the evening meeting of the DoH operations room, take

all notes necessary to evaluate and assess the teams' daily performance and brief the Public Health Director General on pros and cons noticed during work, the adequate intervention to identify the obstacles that hinder the teams' work and find proper and practical solutions for them.

- DoH level:

1. Activate the DoH Operations room, which includes follow up details of the vaccination teams going out to the field, direct supervision, receive reports of work progress, solve problems and obstacles that may emerge in the field, effective intervene to provide the campaign's success requirements or apply the emergency plan or maneuver in the teams in case here's any security emergency or weather variables such as rain or sand storms.
2. Local supervisors go out to their Districts to be in the field, in the district centers and PHCCs, follow up the work of field supervisors responsible of the vaccination teams, effectively intervene to solve any obstacles or problems, attend the meeting of PHCCs' managers at the District, discuss work results and prepare a brief report on the daily work to be introduced upon attending the evening meeting of the operations room with the DoH DG.

- Health District level:

1. Activate the role of District operations room through following up the vaccination teams' work in the field and solving expected problems regarding teams' transportation vehicles.
2. District supervisors responsible of the field teams shall go out to follow up the vaccination teams' work in the field, provide scientific, practical and logistic assistance, solve the problems and obstacles in the field like when some families refuse to have their children vaccinated or a vaccination team's lack of commitment to the micro plan details developed and approved by the PHCC, follow up reception of the vaccine dedicated to the daily work according to the daily target of each vaccination team. they also follow up vaccine movement when being received and returned, wasting rate of each team, the process of discarding dispensed vaccine vials and other supplies, inspect medical documentation in the records and follow up cold chain supplies and other supplies like chalks, markers, ice cubes and vaccine carriers.
3. Hold an evening meeting for the PHCC managers after all teams come back, unify results of each District, discuss the daily events of the vaccination teams' work at the level of each PHCC, preview pros and cons happened in the field then prepare a full report the District manager introduces in the evening meeting of DoH operations room.

- **PHCC level:**

1. The PHCC manager with the field supervisors shall follow up providing the vaccination teams with the supplies every day's morning during the campaign, check vaccine quantities received by the team and compare it to the daily target of a given catchment area, avoid receiving quantities much more than the target by the team, check cold chain supplies and the record, and make sure that the vaccination team is fully aware of the campaign's goals and purposed and has a clear plan to move in the field within the catchment area fixed on the team's map of daily work.
2. The PHCC manager with field supervisors responsible of the vaccination teams shall directly supervise and continuously follow distribution of the vaccination teams' transportation and make sure they start early.
3. The PHCC manager follows up work of the fixed team in the PHCC then moves to the field to follow up field vaccination teams and field supervisors, accompanies the DoH local supervisor when he/she visits the PHCC and accompanies the MoH supervisor when he/she comes for field supervision.
4. Intervene effectively to solve any problems or obstacles that may hinder the vaccination teams' work progress and secure continuous and effective feedback with the District operations room.
5. Follow-up documentation in the campaign's records to ensure the quality and integrity of the information.
6. Hold a meeting with the field supervisors and vaccination team members after finishing the daily work and teams come back from the field to the PHCC to discuss the events and activities of that day and make sure that the teams have achieved their goals and are committed to cover all the areas within the map specified for each team.
7. The PHCC manager follow up the process of sending the vaccine back, wasting rate and discarding the dispensed vaccine vials and other supplies.
8. Discuss lessons learned from work of every day and get ready for the next day work.
9. Prepare a daily report that includes all details of the vaccination teams work, unify the results obtained and submit it to the District operations room in the evening meeting.

- **Field supervisor level:**

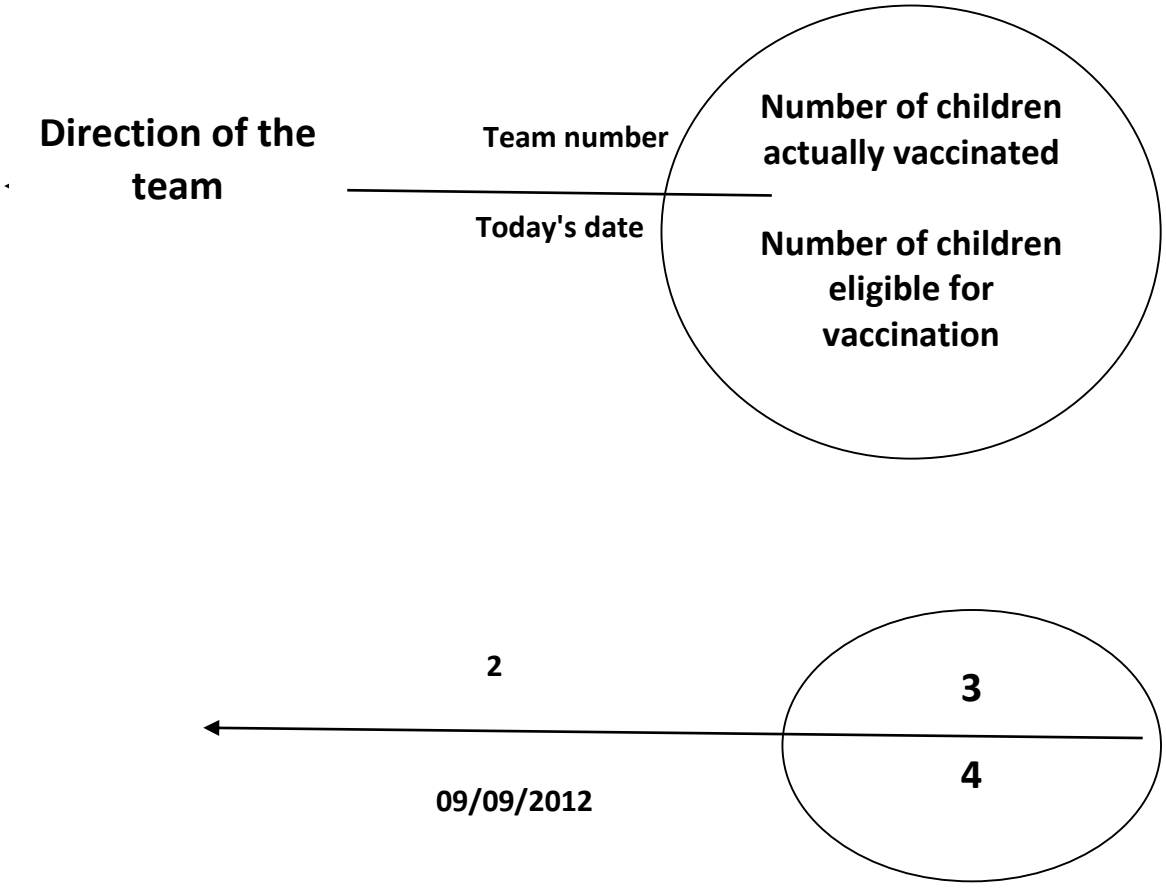
1. The field supervisor responsible of the vaccination teams shall hold morning meetings before they go out to make sure that all the teams are complete, all their supplies like vaccines, vaccine carriers, ice cubes, records, chalks and markers are available as well as the daily work map, and make quick review of the team's target, assembly area and how to move according to the map.
2. Go out to the filed to see and supervise the vaccination teams' work, make sure of safety and quality of vaccination, and commitment to vaccination safety and security measures regarding its three aspects: vaccine receiver's safety, vaccinator's safety and community safety, as well as checking quality and integration of documentation in the records and follow up the process of marking the visited houses with chalks and markers and identifying closed doors in order to be visited again in the next day.
3. The field supervisor intervenes to solve any problems or obstacles that field teams may encounter, and provides help and support to facilitate their work and fully complete of their duties.
4. The field supervisor accompanies the PHCC manager, local supervisor or central supervisor when they visit the vaccination team in the field.
5. Submit a report and feedback on the daily activity to the PHCC manager.
6. Hold a meeting with the vaccination teams within his/her responsibility to discuss the daily work events and find practical solutions required to overcome any obstacles emerged during the work in the next working day.

   Work of the field supervisor who's responsible of several teams in the micro planning, like 7 or 10 teams, is considered crucial and essential to have the vaccination teams succeed to achieve complete and high quality application of the campaign.

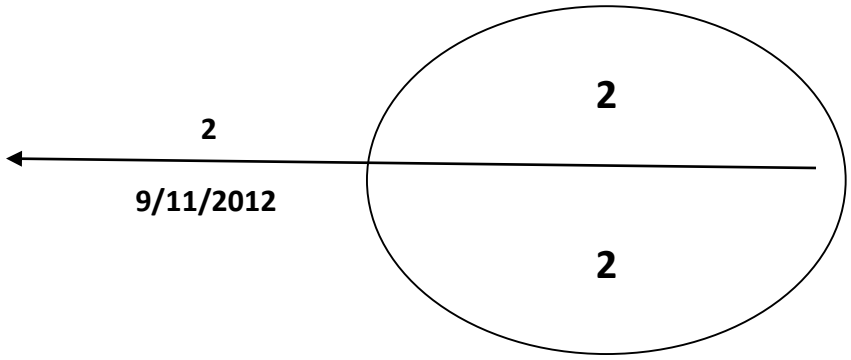
- **Immunization teams:**

1. The vaccination team finalizes procedures of receiving vaccine quantities adequate to cover the target according to the micro plan with additional 20% maximum of the daily target.
2. The vaccination team shall review and verify all its supplies of vaccination according to a check list specially developed for this purpose in order to ensure that nothing is mistakenly missed, which may trouble its work upon arriving to the field.
3. The vaccination team makes a final review with the field supervisor regarding the set goal and field movement plan according to the map and the targeted catchment area for that day.

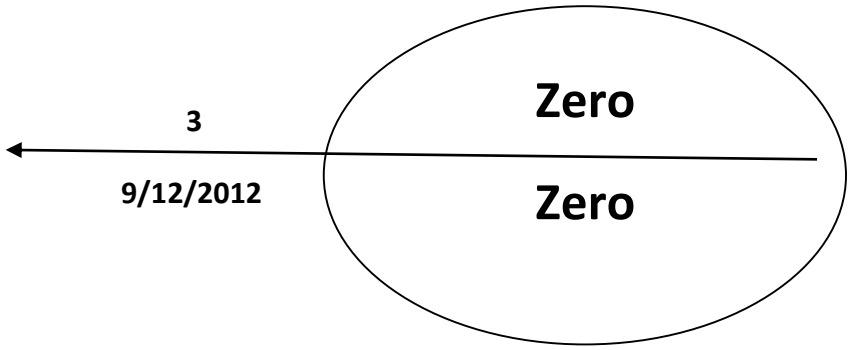
4. The vaccination team shall go out early and arrive to the field as soon as possible to move toward the houses and places where the targeted people are located, vaccinate them, document it in the records and mark the visited houses as follows:



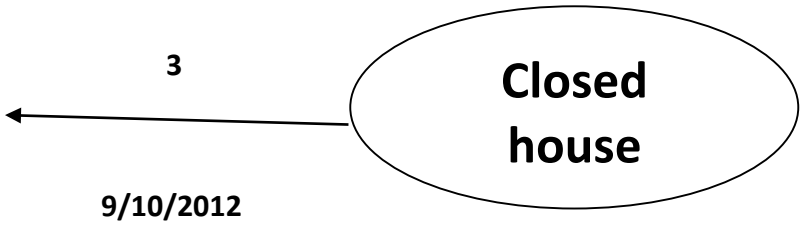
This means that there is a child targeted and eligible for vaccination but has not been vaccinated for any reason, such as illness or absence.



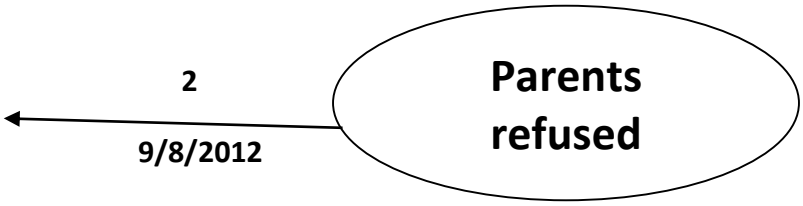
This means all targeted children in this house have been vaccinated.



This means there is no child targeted with vaccination.



Indicate in the record and inform the field supervisor to conduct an inventory of these houses and visit them in the coming days.



5. When doubted of a targeted child's age whether he/she is included in the central goal, i.e. in the targeted age group or not, the vaccination team shall ask to see the child's ID or birth certificate to know the actual age.
6. The vaccination team shall postpone vaccinating any child who may have contraindications or Precautions and immediately call and inform the field supervisor.
7. The vaccination team shall adopt the scientific methods of vaccination and recommendations on which they were trained during the training courses before the campaign.
8. When come back, the vaccination team shall hand over all the supplies to the pharmacy with conducting an inventory and review of the vaccine movement (received, dispensed and returned) and do the same with other supplies.
9. Brief the responsible field supervisor with a report that includes pros and cons and any obstacles at that working day, and work to overcome them for the next day.

- **Specifications of dangerous areas:**

1. Densely populated areas with low environmental sanitation.
2. Areas where the vaccination records confirm low coverage of the intended vaccine, for example, low coverage of OPV d3 or low coverage of measles vaccine.
3. Areas in which previous infections were reported, for example, areas where measles or polio was reported.
4. Districts that did not report any cases of acute flaccid paralysis for a whole year and the number of under-15 and older children.
5. Areas difficult to access and therefore there is a possibility of poor quality of immunization services provided to them, for example, Bedouin, mountains and marshland areas.
6. IDPs camps and communities where disease causative is easily transmitted like military camps, detention centers, state houses kindergartens and schools or densely populated areas in specific times like in pilgrims and religious events.

- Pre-campaign stage/ Preparation

1. Prepare and complete requirements of the administrative campaign
   Training: Central level

A. Develop a training plan at the central and terminal levels includes joint symposiums and workshops between Managers of Immunization Units, CDC Units and Health Promotion Sections in the provincial DoHs.
B. Attend some terminal courses implemented at the provincial DoHs in which the campaign's goals and purposes are explained, and experiences gained through previous campaigns are introduced in addition to presenting a scientific lecture on the vaccine and

disease causatives (viruses and bacteria) targeted in the vaccine to be used in the campaign.

C. Prepare a complete scientific material to be used in the training courses and introduce it to the provincial DoHs.

- DoH level:

1. Implement training courses for District and PHCC managers on all scientific aspects of the campaign with the presence of local supervisors.
2. Implement training courses in all districts for all associated PHCCs' managers with the presence of field supervisors along with the vaccination team members.
3. Implement training courses in the PHCCs for all personnel participating in the campaign with the presence of field supervisors.

Preparation of supplies:

- The central level:

Immunization Section at Directorate of Public Health (DoPH) shall finalize all measures to secure the vaccine needed as well as all other requirements within at least 3 months before the campaign starts, and develop a plan to distribute vaccine and all other supplies to DoHs within at least 2 months before the campaign starts.

- DoH level:

DoHs shall send authorized representatives to receive the vaccine and prepare the other supplies and distribute them to the Districts drugstores within at least 2 months before the campaign starts.

- Health Districts level: -

Health Districts receive the vaccine and complete the other vaccination supplies like syringes, safety boxes, records and cold chain stuffs and distribute them to the associated PHCCs within at least 1 month before the campaign starts.

- PHCCs level:

PHCCs receive the vaccine required for the campaign within at least 2 weeks before the campaign starts, and review and finalize the list of the other requirements before the campaign starts.

Community mobilization and media plan for the campaign:

DoPH Health Promotion Department coordinates with MoH Media Department to develop a media plan integrated with community mobilization events to ensure motivating and assisting all community and media activities at central and terminal levels such as holding forums and direct meetings with politic leaders, civil society leaders, clerics, municipal councils' chiefs, tribes and NGOs with providing all necessary media requirements like conducting Radio and TV interviews and spots to promote the campaign and raise community awareness in the campaign's goals as well as developing signboards, flyers and all other IEC materials.

Terminal Level:

- Each DoH and at all levels (District and PHCC) applies the terminal media plan as well as the additional events that fit the circumstances of each DoH, District and PHCC. The central goal is the announcement in due time all campaign-related activities of community mobilization towards supporting, assisting and evaluating the work of vaccination teams.

Post-campaign phase

It includes two events:

1. Assessment of what has been accomplished during the campaign.
2. Preparation for the second round of the next campaign.

Assessment: - Assessment process is made on all central and terminal levels through reviewing the events' performance for each vaccination team, all supervisors, all PHCCs, Health Districts, DoHs and the central operations room, documenting the results achieved and comparing them to the plan as well as conducting and previewing neutral field evaluation events carried out by neutral parties like the Red Crescent Society or districts

intersection and utilization of analysis of all reports coming from DoHs and central, local and field supervisors and sending feedback on the assessment results to all DoHs and Districts.

Prepare for the second round or the next campaign: - Through the implementation of immunization events and the steps taken during the pre-campaign period of preparation and documentation of all the events that had been conducted in line with the campaign. A lot of administrative, logistical and operational data will be compiled to be the platform to make all necessary interventions that promote and take advantage of everything positive, point out and eliminate everything negative, identify any defect points, locations and causes to be solved in order to raise performance and implementation quality for the next round or the next campaign with setting the responsibilities at the central and terminal levels.