



Kingdom of Bahrain  
Ministry of Health  
Public Health Directorate  
Disease Control Section -EPI

# Vaccination Educational Guide & Diseases Targeted



*Complete Your Vaccination for Community Protection*

**This booklet might be used to raise the awareness of parents, caregivers  
and community about vaccines and vaccine preventable diseases**

**2<sup>nd</sup> Edition  
2017**



H.M. King Hamad Bin Isa Al Khalifa  
The King of Kingdom of Bahrain



H.R.H. Prince Khalifa Bin Salman Al Khalifa  
The Prime Minister



H.R.H. Prince Salman Bin Hamad Al-Khalifa  
The Crown Prince and Deputy Supreme  
Commander of the Bahrain Defence Force

**2<sup>nd</sup> Edition**  
**2017**

**This work was accomplished through the team work:**

Dr Adel AISayyad  
Chief of Diseases Control Section

Dr Jaleela S.Jawad  
Head of Immunization Group

Dr Basma AISaffar  
Public Health Consultant

Dr Kubra S. Nasser  
Head of Communicable Diseases Group

Ms. khulood Fakhroo  
Senior Public Health Specialist

Ms. Fakhriya Janahi  
Senior Public Health Specialist

Mr Ali Almawali  
Research Specialist

**Edited and reviewed by:**

Dr. Mariam E.A. AL Hajeri  
Assistant undersecretary for Primary  
Healthcare and Public Health

Dr Adel AISayyad  
Acting Director of Public Health  
Directorate,  
Chief of Diseases Control Section  
Dr Basma AISaffar  
Public Health Consultant

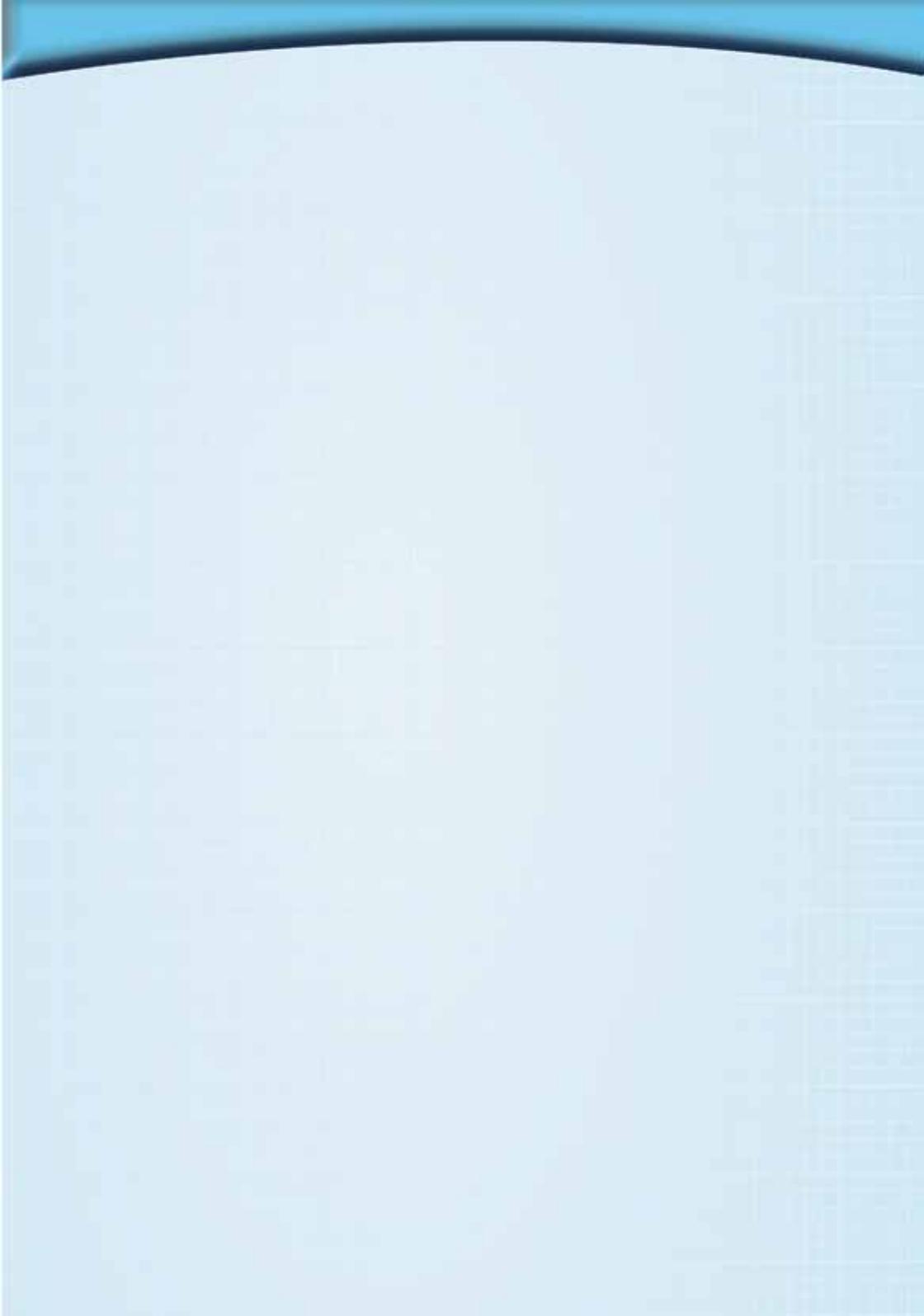
Dr Jaleela S.Jawad  
Head of Immunization Group

**Approved by:**

Dr. Mariam E.A. AL Hajeri

**Designed by:**

Mr. Ali AIMawali



## Table of content:

- Recommended Immunization Schedule in the kingdom of Bahrain.
- Some vaccine preventable disease and its related complications.
- The importance of vaccination.
  
- Vaccine Preventable Diseases :
  - Poliomyelitis
  - Measles
  - Mumps
  - Rubella
  - Hepatitis B
  - Hepatitis A
  - Rota virus
  - Pneumococcal disease
  - Haemophilus influenza type b
  - Whooping cough (Pertussis)
  - Tetanus
  - Diphtheria
  - Varicella (Chicken pox)
  - Seasonal influenza (Flu)
  - Typhoid
  - Yellow fever
  - Rabies
  - Tuberculosis
  - Meningococcal Meningitis

## Recommended Immunization Schedule in the Kingdom of Bahrain

AGE	VACCINE	DOSE
<b>At birth</b>	BCG for newborns born to parents originally from endemic countries	Single Dose
	Hepatitis B	Birth Dose
<b>2 months</b>	DaPT (Diphtheria, Pertussis, Tetanus), Hepatitis B, Haemophilus Influenza Type B (Hib) + Inactivated Polio ( as Hexavalent)	1 <sup>st</sup> Dose
	Pneumococcal Conjugate (PCV)	1 <sup>st</sup> Dose
	Rota vaccine (oral)	1 <sup>st</sup> Dose
<b>4 months</b>	DaPT (Diphtheria, Pertussis, Tetanus), Hepatitis B, Haemophilus Influenza Type B (Hib) + Inactivated Polio ( as Hexavalent)	2 <sup>nd</sup> Dose
	Oral Polio Vaccine (OPV)	2 <sup>nd</sup> Dose
	Pneumococcal Conjugate (PCV)	2 <sup>nd</sup> Dose
	Rota vaccine (oral)	2 <sup>nd</sup> Dose
<b>6 months</b>	DwPT, Hepatitis B+ Hib (Pentavalent)	3 <sup>rd</sup> Dose
	Oral Polio Vaccine (OPV)	3 <sup>rd</sup> Dose
<b>12 months</b>	MMR (Measles, Mumps, Rubella)	1 <sup>st</sup> Dose
	Varicella	1 <sup>st</sup> Dose
<b>15 months</b>	Pneumococcal Conjugate (PCV)	Booster
	Hepatitis A	1 <sup>st</sup> Dose
<b>18 months</b>	MMR (Measles, Mumps, Rubella)	2 <sup>nd</sup> Dose
	DPT, Haemophilus Influenza Type B (Hib) (tetravalent) or Pentavalent according to availability	Booster
	Oral Polio Vaccine (OPV)	1 <sup>st</sup> Booster
<b>2 years</b>	Meningococcal Conjugate (ACYW)	Single Dose
	Hepatitis A	2 <sup>nd</sup> Dose
<b>3 years</b>	Varicella	2 <sup>nd</sup> Dose
<b>4-5 years</b>	DTaP-IPV (Diphtheria, Tetanus, Pertussis, Inactivated Polio)	2 <sup>nd</sup> Booster
	Oral Polio Vaccine (OPV)	2 <sup>nd</sup> Booster
	MMR (Measles, Mumps, Rubella) if no document of 2 valid doses MMR vaccination previously	2 <sup>nd</sup> Dose
<b>ADOLESCENTS</b>		
<b>13 years</b>	Tdap (Tetanus, Diphtheria, Pertussis)	Booster

### FOR PREVIOUSLY UNIMMUNISED WOMEN

<b>Tetanus diphtheria (Td)</b>	At first contact	Td1
	At least 4 weeks after Td1	Td2
	At least 6 months after Td2	Td3
	1 year after Td3	Td 1 <sup>st</sup> booster
	1 year after 1 <sup>st</sup> Td booster	Td 2 <sup>nd</sup> booster

## Recommended Immunization Schedule in the Kingdom of Bahrain (contd)

### ADULT, ELDERLY AND HIGH RISK GROUPS

<b>Pneumococcal Conjugate (PCV)</b>	Single dose for adults ≥ 50 years and single dose for adolescent , adult & elderly from high risk groups.
<b>Pneumococcal Polysaccharide (PPSV23)</b>	Single dose for ≥ 65 years and for high risk groups ≥ 2 -64 years. Revaccination dose after 5 years is recommended for certain high risk groups (Sickle cell disease/other hemaglobinopathies, congenital or acquired asplenia, congenital or acquired immuno-deficiencies, chronic renal failure, nephrotic syndrome, malignancy, leukemia, lymphoma, iatrogenic immunosuppression, solid organ transplant).
<b>Tdap</b>	Single dose
<b>Seasonal Influenza</b>	Annually for each season for any person (≥ 6 months of age) and for adults ≥ 50 years and for high risk groups.
<b>Chickenpox (varicella)</b>	For high risk group without documented infection or vaccination. Two doses, 3 months apart from 1 -12 years of age. 2 doses 4-6 weeks apart for ≥ 13 years of age
<b>Meningococcal conjugate ACWY</b>	1-2 doses for sickle cell disease, certain hemoglobinopathies, congenital or acquired asplenia, pre-splenectomy, terminal complement deficiency, post bone marrow transplant & certain cancer after completion of treatment.
<b>Haemophilus Influenza Type B (Hib)</b>	Single dose for >5 years for sickle cell disease, anatomical and/or surgical asplenia, post bone marrow transplant & certain cancer after completion of treatment

### HAJIs

<b>Meningococcal conjugate (ACWY)</b>	Single dose
<b>Seasonal Influenza</b>	Annually for each season

### OTHER VACCINES

<b>Travelers</b>	Yellow Fever	Single dose
	Typhoid	Single dose (repeated after 3 years if indicated)
	Hepatitis A	2 doses
	Meningococcal conjugate ACWY	Single dose for traveler to certain countries including holy places and meningitis belt.
	OPV/IPV	Booster dose for traveler to certain countries (polio endemic countries)
<b>Post exposure prophylaxis</b>	Rabies	4-5 doses plus RIG (single)
<b>Contacts</b>	Hepatitis B	3 doses
	Hepatitis A	2 doses
<b>Immune-compromised &amp; their household contacts</b>	Inactivated Polio(killed polio)	5 doses

**\* Other vaccines for high risk/ special groups determined by risk category**

## Some Vaccine Preventable Diseases & Its Related Complications

<b>Disease</b>	<b>Possible risk and complication</b>
Poliomyelitis	Meningitis, paralysis of the limbs.
Measles	Pneumonia, convulsion, encephalitis, death.
Mumps	Painful swelling of the testicles or ovaries, encephalitis, meningitis and deafness.
Rubella	Pregnant women may have miscarriage or stillbirth. babies may be born deaf or blind, or with heart disease, or brain damage
Hepatitis B	Liver disease, liver cancer, death.
Hepatitis A	Severe hepatitis and death.
Rota virus	Severe diarrhea and death
Pneumococcal disease	Blood infection, pneumonia, infection in the middle ear.
Haemophilus influenzae bacteria type B	bloodstream infections, lung infection, infection of the covering of the brain and spinal cord, swelling in throat causing difficulty in breathing.
Pertussis	Pneumonia, seizures and encephalopathy, pneumothorax, epistaxis, subdural hematomas, hernia and rectal prolapse.
Tetanus	Difficulty in breathing, paralysis, severe muscle spasms and death.
Diphtheria	Difficulty in swallowing and breathing, heart failure, death.
Varicella	Infection in the brain, pneumonia.
Meningococcal meningitis	Hearing loss, neurologic damage, loss of a limb and death.

## Importance of Vaccination

- Vaccines provide safeguard against infectious diseases.
- Many infectious diseases are not seen these days, due to the protection provided by vaccination of children, adolescents, adults and elderly.
- Vaccination provides protection to vaccine recipients and indirect protection to the community, especially for people who cannot receive their vaccines due to medical reasons.
- Vaccinations are generally safe. The risks from diseases are much greater than the risks from vaccines.
- The vaccine is cost effective preventive measures. If the person got the infection, the cost of hospitalization, doctor visit and absence from work is high.

## Common questions about vaccine safety

- **What is vaccination?**

It is the process through which the body is exposed to either a considerably weakened or killed form of bacterium or virus or part of the microbe that causes the disease. When the immune system is exposed to these killed or weakened microorganisms, it will produce immune response to resist the infection if the body is exposed to it in the future.

- **Are the vaccines safe?**

Generally vaccines are safe and their benefits outweighing the risks. Moreover the risk of diseases are higher than the risk from adverse events following vaccination. Currently, clinical trials and studies are conducted prior to licensure of vaccines to ensure efficacy and safety. These include laboratory and clinical studies and testing, are undertaken during a vaccine's development. Moreover, post licensure of vaccines when the vaccine is used still these are monitored in different population.

- **Are there procedures for monitoring of vaccines in kingdom of Bahrain?**

In Kingdom of Bahrain, national health regulatory authority is responsible for vaccine licensing and the procedures related to their registrations. Furthermore, vaccine shipments are checked upon arrival to ministry of health – vaccine store before distribution to ensure reliability and safety of vaccines. Quarterly visits are conducted to all health facilities providing vaccination services to ensure compliance with cold chain and storage standards. Additionally, periodic immunization monitoring instructive field visits are conducted taking in to consideration adverse events following immunization (AEFI) reporting, monitors, knowledge and compliance with standard operating procedures and data quality and accuracy assessment by using the WHO Data Quality Assessment (DQS) tool. In addition, the ministry of health establishes an electronic program that includes contraindication, reasons of vaccine exclusion, screening questionnaire for fitness prior to vaccination and adverse events following immunization and also a hotline to provide guidance and support.

- **What are the common side effects that could happen after injection?**

The side effects might include local reactions such as redness, swelling or tenderness. Also fever might occur. These typically are self-limiting and resolve spontaneously or with simple analgesia.

## Common questions about vaccine safety (contd.)

- **Why some times paracetamol is prescribed by health care providers when attending vaccination session?**

After certain vaccination, giving paracetamol might reduce the risk of fever and discomfort, however if fever is not resolved seeking medical care is advisable.

- **Are febrile seizure are caused by the vaccine?**

Seizure might be a presentation of several illnesses with or without fever during the early five years of life; febrile convulsion is common cause of seizure that is associated with fever irrespective of the underlying fever cause. After vaccination with some vaccines, fever might occur and this might be followed by a febrile seizure in a susceptible child and usually they will recover. If a person has seizure or develops seizure after vaccination it is advisable to inform health care provider prior to vaccination.

- **Is having an allergy a contraindication for vaccination?**

Severe allergy to the vaccine component or to previous dose are contraindication for vaccination, however asthma, eczema, hay fever are generally not contraindications.

## Poliomyelitis

Poliomyelitis is a highly infectious disease caused by a virus that affects the nervous system.

- **Transmission:**

The virus is present in saliva and stool of infected individuals. It enters through the mouth, multiplies in the intestine and excreted in the stool.

- **Symptoms:**

Initially fever, fatigue, headache, vomiting, stiffness in the neck and pain in the limbs. Paralysis and death might occur when breathing muscles affected.

- **People most at risk:**

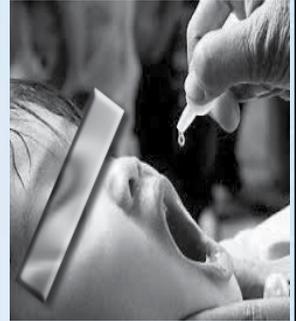
Polioviruses mainly affect children under five years of age but might occur at any age. Risk of paralysis following infection is increased in some cases such as immune compromised, pregnant, and others.

- **Prevention via vaccination:**

Polio vaccine is given several times during childhood to provide long term protection. The vaccine administered either orally or via injection. It is recommended for all children to receive at least one or two doses as injectable (inactivated) form of the poliovirus to cover three type of polio viruses, while the live oral polio vaccine given to provide better intestinal immunity and for added community protection. Immune-compromised individuals and their household are given only the inactivated form of the polio vaccine. The vaccine is also recommended for the travelers to polio endemic countries. There is no cure for poliomyelitis, it can only be prevented.

- **Vaccine side effects:**

Vaccines are generally safe, however rare serious problems, such as severe allergic reaction might happen. **Inactivated** Polio Vaccine (IPV) might cause soreness at the site of injection. Although the risk for vaccine-associated paralytic poliomyelitis following oral polio vaccine (OPV) is low. Injectable form (**Inactivated** Polio Vaccine) is administered to decrease the risk of vaccine-associated paralytic poliomyelitis.



## Measles

Measles is highly infectious viral disease. It is responsible for severe illness and death among children below 5 years of age worldwide. However, measles might affect any age.



- **Transmission:**

The virus spread by coughing, sneezing and respiratory secretion. Also, it might spread through direct contact with infected person or infected nasal or throat secretions. Infected individuals can transmit the virus 4 days before the appearance of rash to 4 days after the rash onset.

- **Symptoms:**

Typically, it starts with fever, runny nose, cough and red eyes. Then the rash starts in the face, upper neck and spreads all over the body. Measles infection might cause ear infection, blindness, brain infection, lung infection and increase frequency of bowel motion (diarrhea).

- **People most at risk:**

Measles commonly affects non-immune young children; however any adult without immunity by previous infection or previous vaccination might be infected. Serious measles infection can occur in malnourished children and in those living in overcrowded areas with poor health infrastructure.

- **Prevention via vaccination:**

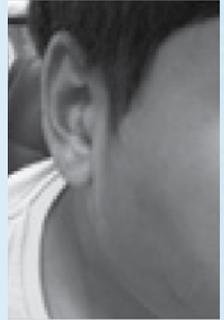
Two doses of measles vaccine are given for long term protection. The combined Measles, Mumps and Rubella Vaccine (MMR) are given routinely to children at the age of one year and a second dose is given at 18 months of age. Also it can be given to any one at risk of acquiring infection. MMR is live attenuated vaccine, so it should not to be administered to immune deficient and those on immunosuppressive medications until their immunity is regained and not to be administered during pregnancy. After administration of this vaccine to women at reproductive age group, contraception methods is advisable to be used for at least 4 weeks after vaccination.

- **Vaccine side effects:**

MMR vaccine is generally safe, but rarely some severe reactions might occur e.g. severe allergy to any of the vaccine components. Pain and redness may occur at the site of injection. Rash may occur temporarily in 2% of vaccine recipient and resolve by itself.

## Mumps

Mumps is a mild childhood viral infection of the salivary glands commonly affecting children aged 5-9 years. However, other age categories also can be affected.



- **Transmission:**

The virus mainly spread by direct contact with infected individuals or by airborne droplets from the respiratory tract secretions. Infected people usually can transmit the infection from 2 days before the onset of the swelling to 9 days after.

- **Symptoms:**

The infection starts with non-specific symptoms including low-grade fever, muscle pain and headache. Then unilateral or bilateral parotid gland swelling occurs. Complication of mumps includes brain infection, deafness and inflammation of the testicles.

- **People most at risk:**

Mumps usually affects non-immune young children, adolescent and adult without history of immunity by infection or previous vaccination.

- **Prevention via vaccination:**

Mumps vaccine is usually given to children through the MMR vaccine that is given routinely to children at the age of one year and repeated at 18 months of age. The vaccine is given to any one at risk of acquiring the infection.

MMR is live attenuated vaccine, so it should not to be administered to immune deficient and those on immunosuppressive medications until their immunity is regained and during pregnancy. After administration of this vaccine to women at reproductive age group, contraception methods is advisable to be used for at least 4weeks after vaccination.

- **Vaccine side effects:**

MMR vaccine is generally safe, but some severe allergic reaction to vaccine component might occur. Pain and swelling at injection site can occur as well as low grade fever and mild inflammation of parotid gland.

## Rubella

Rubella is a viral infection affecting susceptible children and adults. The virus might cause abnormalities in the newborn if it infects pregnant women in early stage of pregnancy.



- **Transmission:**

The virus is mainly transmitted through the respiratory secretions of infected persons. Also, the virus can be transmitted from infected people that have no symptoms.

- **Symptoms:**

Rash, fever, swelling of lymph nodes and inflammation of the joints (mostly in women). If a woman gets rubella while she is pregnant, she may have a miscarriage or her baby might be born with birth defects.

- **People most at risk:**

Rubella affects non-immune young children, adolescent and adult without history of previous vaccination or infection.

- **Prevention via vaccination:**

Rubella vaccine is given routinely to children as part of MMR vaccine at the age of one year and repeated at 18 months of age. Also the vaccine is given for rubella non immune women found during premarital counseling and after delivery for woman found to be non-immune during antenatal care. The vaccine is given to any one at risk of acquiring infection.

MMR is live attenuated vaccine, so it should not to be administered to immune deficient and those on immunosuppressive medications until their immunity is regained. Also, it should not be given during pregnancy. After administration of this vaccine to women at reproductive age group, contraception methods advised to be used for at least 4 weeks after vaccination.

- **Vaccine side effects:**

MMR vaccine is generally safe, but some severe allergic reactions to vaccine components might occur. Injection site pain and swelling can occur as well as low grade fever and rash.

## Hepatitis B

Hepatitis B is a viral infection that infects and can cause inflammation of the liver. It can lead to chronic liver disease and puts people at risk of death from cirrhosis and liver cancer.



- **Transmission:**

The virus is transmitted through contact with the blood or other body fluids of an infected person.

- **Symptoms:**

It causes yellowish discoloration of the skin and eyes, dark urine, fatigue, nausea, vomiting and abdominal pain. It might be asymptomatic, however it can cause chronic liver disease and death.

- **People most at risk:**

Hepatitis B infection of mother make her newborn at risk of infection. Also, unsafe injection practices, unsafe blood transfusions and unsafe sex puts the person at risk of acquiring the infection.

- **Prevention via vaccination:**

Three to four doses of Hepatitis B vaccine is given routinely to children at birth (within 12-24 hours of the birth) and at ages of 2, 4 and 6 months. The vaccine is recommended to children and adolescents who are not vaccinated previously. Also, it is recommended for adults and older age people belonging to high risk groups such as contact of hepatitis B patient, patient with hepatitis C, patient on frequent blood transfusion, diabetics younger than 60 years of age, multiple sexual partners and others. Hepatitis B vaccine is the first available vaccine against a cancer.

- **Vaccine side effects:**

Hepatitis B vaccine is generally safe and effective in preventing infection and its chronic consequences, but some severe allergic reactions to vaccine component might occur. Injection site pain and swelling can occur.

## Hepatitis A

Hepatitis A is a viral infection that can cause inflammation of liver and mild to severe illness.



- **Transmission:**

The virus is passed out in the feces of the infected person when they have a bowel movement. The virus is transmitted through eating food or drinking water contaminated with a small amount of infected feces. Casual contact among people does not spread the virus.

- **Symptoms:**

It causes fever, malaise, loss of appetite, diarrhea, nausea, abdominal discomfort, yellowing of the skin and eyes.

- **People most at risk:**

People using unsafe water or living with a person infected with hepatitis A or travellers to area with poor hygiene. Also, non-immune travellers to area of high infection rate.

- **Prevention via vaccination:**

Hepatitis A vaccine is given routinely in two doses for children and adolescents who are not vaccinated previously. Also, it is recommended for travelers to hepatitis A high burden countries.

- **Vaccine side effects:**

Hepatitis A vaccine is generally safe, but some severe allergic reactions to vaccine components might occur. Pain at injection site and tiredness also might follow vaccination.

## Rotavirus

Rotavirus is the most common cause of severe gastroenteritis in infants and young children worldwide. It might lead to death as a result of severe dehydration especially among children aged less than 5 years old.



- **Transmission:**

The virus is present in the stool (feces) of infected people. It spreads by contaminated hands even with a small amount of the stool on them, especially if the caregivers did not pay attention to proper hand washing after changing diapers. Also, the contaminated hands might pass the virus to the objects such as toys or door knobs and can infect others thereafter.



- **Symptoms:**

It causes fever and vomiting followed by diarrhea that might lead to dehydration which might require hospitalization.

- **People most at risk:**

Rotavirus is transmitted among siblings and in other settings where infants and young children have close contact such as nursery and child care centers.

- **Prevention via vaccination:**

Rota virus vaccine is given routinely to infants according to the routine vaccination schedule in order to protect them against moderate to severe disease.

- **Vaccine side effects:**

The vaccine is generally safe, but infants might become irritable, or have mild, temporary diarrhea or vomiting after getting a dose of rotavirus vaccine. (Some studies have shown to increase the risk of bowel blockage within 31 days of rotavirus vaccine that might need to be treated in a hospital).

## Pneumococcal diseases

Pneumococcal disease is caused by infection with *Streptococcus pneumoniae* bacteria that can cause death or severe illness especially among children aged less than 5 years old as well as elderly. Pneumococcal infection might lead to infection of the brain covering (pneumococcal meningitis) and lung infection (pneumococcal pneumonia). Also, it can cause complication among patients with chronic diseases and it might result in blood and ear infection.



- **Transmission:**

Pneumococcal bacteria is transmitted from person to person through close contact. It spreads via coughing, sneezing, or contact with respiratory secretions.

- **Symptoms:**

It might cause fever, cough, breathing difficulty and chest pain. In addition, an infected person can have joint pain and chills if blood infection occurs. Additionally, if infection of the brain covering (meningitis) happened, the symptoms of meningitis include neck stiffness, drowsiness and visual sensitivity to light. Also, it might cause hearing loss, blindness and seizures.

- **People most at risk:**

Extreme of age (children <2 years and elderly) and individuals with one of the following are at higher risk: sickle cell disease, congenital or acquired immune-deficiencies, diabetes, cancer, HIV/AIDS or patients on medications that affect the immune system, (such as chemotherapy or steroids), chronic heart or lung or liver diseases, or renal diseases including nephrotic syndrome, post splenectomy or asplenia, cochlear implant and those with cerebrospinal fluid leaks.

- **Prevention via vaccination:**

***Two types of pneumococcal vaccines are available:***

- 1 - **Pneumococcal conjugate vaccine:** is recommended for all children. It is given routinely to infants at 2, 4 and 12-15 months of age and for adults at age of 50 years or more. Also, this vaccine is recommended for certain high risk groups.
- 2 - **Pneumococcal polysaccharide vaccine:** is recommended as a single dose to children aged more than 24 months who are at high risk of pneumococcal disease and adults with certain medical conditions. The vaccine might be repeated after 5 years of the first dose if indicated for certain at risk categories such as sickle cell diseases and chronic renal disease and dialysis. Moreover, a single dose of this vaccine is administered routinely for those at the age of 65 years and above. Certain time frame between the two pneumococcal vaccines is recommended.

- **Vaccine side effects:**

Both vaccines are generally safe, but some severe allergic reactions to vaccine component might occur. Infants might become drowsy after getting a dose of the vaccine or lose their appetite temporary. Redness and swelling at injection site. Fever also might follow vaccination at any age.

## Haemophilus influenzae type B

Haemophilus influenzae type B bacteria can result in joint infections, bloodstream infections, lung infection, infection of the brain covering and spinal cord and swelling in throat causing difficulty in breathing.



- **Transmission:**

Haemophilus influenzae type B bacteria transmitted from person to person through close contact. It spreads via coughing, sneezing, or contact with respiratory secretions.

- **Symptoms:**

It might cause fever, cough, breathing difficulty, and chest pain. In addition, joint pain and chills if blood infection occurs. If infection of the brain covering (meningitis) happened, it might cause hearing loss, blindness, and seizures. The symptoms of meningitis include neck stiffness, drowsiness, and visual sensitivity to light. The symptoms of ear infection typically include ear pain, fever and irritability.

- **People most at risk:**

Children below 5 years are generally at risk of infection, however ages between 3 and 18 months are mostly at risk. Also, individuals with one of the following conditions might be at higher risk including: sickle cell disease, patient with cancer and those with damaged spleen or no spleen.

- **Prevention via vaccination:**

Haemophilus influenzae type B vaccine (Hib) is recommended routinely in several doses for children younger than 5 years old. It is not given routinely after the age of 5 years unless they have certain health condition such as: sickle cell disease, damaged spleen or no spleen, post bone marrow transplant, and/or for certain cancer patients after treatment.

- **Vaccine side effects:**

The vaccine is generally safe, but some severe allergic reactions to vaccine component might occur. Infants might develop fever or injection site redness and swelling following vaccination.

## Whooping Cough (Pertussis)

Whooping Cough (Pertussis) is a bacterial infection that result in respiratory tract infection.

- **Transmission:**

It spread from person to person through coughing, or sneezing and respiratory secretion.

- **Symptoms:**

It starts with symptoms of common cold with runny nose, sneezing and maybe fever and mild cough, which changes to severe cough after 1–2 weeks. This cough comes in attacks of severe coughing worsen during inhalation and accompanied by a loud whooping like sound. The attacks of cough might be followed by vomiting or turning blue.

In older age groups, symptoms might vary and the patients can be presented with chronic cough.

- **People most at risk:**

Infants might be infected from older parents, grandparents or caregivers even without knowing that they have the disease.

- **Prevention via vaccination:**

Pertussis vaccines are recommended for all children. Several doses routinely and booster doses given for preschool children, adolescents, older age group and for those at risk of infection.

- **Vaccine side effects:**

The vaccine is generally safe, but serious reactions might occur rarely including some severe allergic reaction to vaccine component. Fussiness, tiredness, non-stop crying, jerking, high fever which need physician consultation. Other mild adverse reactions include injection site redness and swelling.

## Tetanus (lockjaw)

Tetanus is a serious disease of the nervous system that might lead to death. It causes painful tightening of the muscles, usually all over the body. It can lead to "locking" of the jaw so the infected person cannot open his mouth or swallow.



- **Transmission:**

The bacteria enter the body through a break in the skin. It also infects wounds and the newborns umbilical stump.

- **Symptoms:**

Lockjaw, neck and abdominal stiffness, severe muscle spasms, difficulty swallowing and jerking movement.

- **People most at risk:**

Newborn children and mothers following unclean deliveries and poor postnatal hygiene. Also following injuries of the skin (dirty wound) to children and adults.

- **Prevention via vaccination:**

Tetanus vaccines are recommended for all children routinely as several doses. Booster doses also might be given for adolescents and older age group. The vaccine is also recommended after injury. Delivery in hospital setting decreases the risk of neonatal and maternal tetanus, however vaccine administration to pregnant women is among the most important measures to minimize the risk of neonatal tetanus.

- **Vaccine side effects:**

The vaccine is generally safe, but serious reactions might occur rarely including some severe allergic reaction to vaccine component. Redness and swelling at injection site, also might follow vaccination.

## Diphtheria

Diphtheria is a respiratory disease caused by corynebacterium diphtheria . It affects the throat. The toxins secreted by the bacteria might cause heart failure and death.

- **Transmission:**

Spreads when an infected person coughs or sneezes.

- **Symptoms:**

Gradual onset of sore throat and low-grade fever. Also, it might cause thick covering of the throat or back of the nose. It might progress to breathing problems, heart failure, coma, and death.

- **People most at risk:**

Non-immunized individual.

- **Prevention via vaccination:**

Diphtheria vaccines are recommended routinely as several doses for all children. Booster doses might be given for adolescents and older age group. Also, it is given for those at risk of infection.

- **Vaccine side effects:**

The vaccine is generally safe, but serious reactions might occur rarely including some severe allergic reaction to vaccine component. Redness and swelling at injection site, also might follow vaccination.

## Varicella (chickenpox)

It is a viral infection that usually cause mild childhood disease, however severe infection might occur in adult. Severe disease and death also might be the result of infection in neonates and immunocompromised individuals.



- **Transmission:**

The infection spreads easily through the air when an infected person coughs or sneezes. Also, it can be transmitted by touching fluid from skin eruptions. It can infects other persons from a few days before start of the rash until the rash has crusted over.

- **Symptoms:**

Fever, malaise and itchy rash with fluid-filled eruptions (vesicles), the rash typically starts on the scalp and face, gradually spreads to the chest, abdomen and extremities. The eruptions dry out at different time as it erupts at different stages. Newborn and immunosuppressed might develop lung and brain infection. It generally takes about 7–10 days for all crusts to disappear.

- **People most at risk:**

The infection remains inactive and might return to affect the person later on life especially in older age group or if the immune system is suppressed.

- **Prevention via vaccination:**

The chickenpox vaccine is given routinely as two doses. It is used to protect people who are most at risk of serious complications from chickenpox infection. Also, it can be used to protect people who might pass the infection on to someone who are at risk and people in close contact with someone who has a weak immune system.

Varicella vaccination is given routinely in 2 doses for children, however it can be administered to non-immune adolescent and adults at risk. It is a live attenuated vaccine, so it should not be administered during pregnancy and contraception to be used for one month after vaccination. Also, should not be administered to immune deficient and those on medications that affect the immunity until their immunity is regained.

- **Vaccine side effects:**

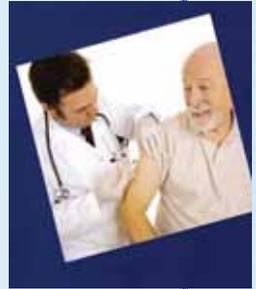
The vaccine is generally safe, but serious reactions might occur rarely including some severe allergic reaction to vaccine component. Fever and redness at injection site also might follow vaccination. Mild chickenpox- like disease with rash within 4 weeks of vaccination might occur in a few cases (<5%).

## Seasonal Influenza (Flu)

Seasonal Influenza is a viral infection that can affect any age group. It peaks during the winter season.

- **Transmission:**

The virus spreads easily from person to person especially during winter. It spreads by coughing and sneezing from infected person. Also, it spreads through hands contaminated with influenza viruses to other people.



- **Symptoms:**

Fever, headache, sore throat and cough, general aches, muscle and joint pain.

- **People most at risk:**

In general, children under 2 years of age and adults at age of 65 years or more are considered at risk of the infection. Additionally, pregnant woman, persons with certain health condition such as diabetes, chronic heart disease, lung disease, blood disease, kidney disease, liver disease and people with weakened immune systems due to diseases or medications are at risk.

- **Prevention via vaccination:**

The vaccine is recommended annually to protect against the most common influenza viruses circulating during the season. It is given just prior to the season, however if not administered early, it can be given at any time during the season. The vaccine efficacy range from 70-97% based on age category, the underlying medical condition of the vaccine's recipient and the matching between the vaccine viruses and circulating influenza viruses.

The vaccine is recommended for the following categories as priority:

- ◆ Children  $\geq$  6 months up to 5 years
- ◆ People  $\geq$  65 years of age
- ◆ Pregnant women.
- ◆ People with chronic medical conditions
- ◆ Health care workers.

- **Vaccine side effects:**

Influenza vaccine is generally safe. Local injection reaction such as soreness, redness, or swelling at injection site might occur transiently. Serious adverse events is rare. Influenza vaccine is contraindicated in cases of severe allergic reaction after a previous dose or to a vaccine component.

## Typhoid

Typhoid fever is an infection caused by bacteria that might cause complication and death if not treated.

- **Transmission:**

The bacteria can spread throughout the body and passed out in the feces of the infected person when they have a bowel movement. The bacteria are transmitted through eating food or drinking water contaminated even with a small amount of infected faeces.

- **Symptoms:**

Fever, abdominal pain, vomiting, headache, constipation (cannot empty the bowels easily or completely) or foul-smelling, yellow–green diarrhea (passing loose or watery faeces more frequently), loss of appetite, tiredness and confusion.

- **People most at risk:**

Mostly transmitted in developing world, in areas with poor hygiene levels and limited access to clean water. In these areas it affects mostly school children and young adult.

- **Prevention via vaccination:**

In the kingdom of Bahrain, typhoid vaccine is recommended for anyone above 2 years who is planning to travel to any part of the world where the typhoid is widely spread. Travelers are also advised to follow food and drinking safety precautions such as drinking clean and safe (bottled) water and eating adequately cooked food as the vaccine provides only limited protection.

- **Vaccine side effects:**

The vaccine is generally safe. If adverse events happened, it is mostly minor side effects. These include: pain, redness, or swelling at injection site, however allergic reaction might rarely occur.

## Yellow fever

Yellow fever is an acute viral disease. The "yellow" in the name refers to the yellowish discoloration (jaundice) of the skin and the white area of the eye that affects some patients.

- **Transmission:**

It is transmitted by bite of infected mosquitoes in part of Africa and Latin America.

- **Symptoms:**

Fever, muscle pain, backache, headache, shivers, decreased appetite, and nausea or vomiting. These symptoms might improve and disappear after 3 to 4 days or worsen with high fever, abdominal pain with vomiting, yellowish discoloration of the eye (jaundice), worsening of kidney function and bleeding can occur from the mouth, nose, eyes or stomach and appears in the vomit and faeces.

- **People most at risk:**

Non-immune travelers heading to countries where the mosquitoes that transmit the disease are present/ established, especially those who are at risk of mosquito bites through their activities during travel.

- **Prevention via vaccination:**

There is no treatment for this disease, but it can be prevented by vaccination. In the kingdom of Bahrain Yellow fever vaccine is recommended to anyone above 9 months who is planning to travel to certain areas in Africa and Latin America. It is live attenuated vaccine, so it is not to be administered during pregnancy and not to be administered to immune suppressed individual. Also, to those with severe egg allergy. Yellow fever vaccination should be documented in vaccination certificate indicating that the vaccine is given at least 10 days before travel to and from certain countries in Africa and Latin America. This vaccine is given at Shaikh Sabah Health Center.

- **Vaccine side effects:**

The vaccine is generally safe but allergic reactions might occur. Also, mild adverse events may follow vaccination such as headache, muscle pain, pain at injection site. Severe side effects are very rare and mainly associated with a neurological disease. The danger of death from yellow fever is far more than the risks of vaccine side effects.

## Rabies

Rabies is a very serious viral infection that affects the brain and nervous system. It spreads from animals to humans.

- **Transmission:**

The disease spreads to people through close contact with infected saliva from bites or scratches of infected domestic and wild animals.

- **Symptoms:**

The first symptoms are flue like symptoms including overall weakness, fever, or headache, pain, tingling or itchy feeling at the bite site, progressing within days to central nervous system causing inflammation of the brain and spinal cord. Some people experience anxiety, seeing or hearing things that are not real, unreasonable fear of water, abnormal behavior and decrease or lack of sleeping. Infection might lead to death.

- **People most at risk:**

Individuals working in occupations exposing them to risk of acquiring rabies virus such as people who work with rabies in laboratory settings or veterinary are at increased risk. Also, travelers to rabies-affected areas especially if their activities during travel involve dealing with infected animals.

- **Prevention via vaccination:**

Based on available reported data of rabies, the Kingdom of Bahrain might be considered as rabies low risk country. Rabies vaccine available at governmental hospitals and Public Health Directorate to be administered as post-exposure vaccination. Any returned traveler with history of exposure (bites or scratch) from dogs, bats, and other animals in rabies-affected areas might require to receive his vaccination or complete them if initiated during his trip.

- **Vaccine side effects:**

The vaccine is generally safe but serious reactions rarely occurs. Most of the adverse events following vaccination are mild such as fever, dizziness, headache, pain, redness and swelling at injection site.

## Tuberculosis (TB)

Tuberculosis (TB) infection usually affects the lungs, but can attack any part of the body such as the kidney, spine and brain.

- **Transmission:**

It is spread by the air. When a person with active lung TB disease coughs, sneezes, or even speaks or sings, the infection can be passed on to another person.

- **Symptoms:**

Fever, sweating at night, cough for 3 weeks or more with or without sputum and sometime coughing up blood, chest pain, tiredness, weight loss and decreased appetite. If the disease was not treated properly, it might lead to death.

- **People most at risk:**

Persons who have been TB infected in the last 2 years or those who had TB in the past, TB infected person who didn't receive adequate or correct treatment, certain health conditions such as diabetes and HIV infection.

- **Prevention via vaccination:**

BCG (Bacille Calmette-Guerin) is a vaccine for tuberculosis (TB) disease, but it does not always protect against getting it. Many foreign-born persons have received BCG-vaccine at birth. BCG is used in many countries reporting high occurrence of TB disease in order to prevent severe childhood TB infection, however countries with low risk might decide to give the vaccine to selective newborns and infants. In Bahrain, BCG is given to selective newborn who are at higher risk of getting severe childhood infection.

- **Vaccine side effects:**

The vaccine generally safe, but serious reactions rarely occurs. Most of the adverse events following vaccination are mild such as fever, dizziness, headache, pain, redness and swelling at injection site. BCG vaccination should not be given to persons who are immunosuppressed (e.g. persons who are HIV infected).

## Meningococcal meningitis

It is an infection of the membranes covering the brain and the spinal cord. It is caused by bacteria called Neisseria Meningitides.



- **Transmission:**

The infection spreads from carriers of the infection through respiratory or throats secretions. Also, this infection can be easily transmitted by close contacts for long time (sharing eating and drinking utensils with an infected person or through kissing, sneezing, or coughing).

- **Symptoms:**

The infection starts with fever, headache and stiffness in the neck. Other symptoms include nausea, vomiting, not tolerating lights and confusion.

- **People most at risk:**

It infects infants, adolescent and young adults. Also, it can occur among college students, those who underwent surgical removal of their spleen or their spleen is poorly functioning because of certain diseases. Travelers to countries with high infection rate are also at risk.

- **Prevention via vaccination:**

Meningococcal ACYW vaccine is recommended routinely for children. Also, this vaccine is given to Hajj pilgrims and to those traveling to high infection rate countries.

- **Vaccine side effects:**

The vaccine is generally safe, but mild side effects can occur including: redness and pain at the injection site and sometime fever. Rarely serious allergic reactions might occur.

## Human papillomavirus (HPV)

It is the most common viral infection of the reproductive tract. HPV infection might cause changes in the genital tract that may progress in to cancer. Persistent infections with specific types of the HPV virus such as 16, 18 may progress to cervical cancer. This progression might takes many years. There is evidence linking HPV with cancers of the genital tract.

- **Transmission:**

Cervical cancer is by far the most common HPV-related disease. Nearly all cases of cervical cancer can be attributable to HPV infection. The virus is sexually transmitted. Also it can be transmitted by direct skin-to-skin genital contact.

- **Symptoms:**

Most HPV infections do not cause symptoms and it resolves spontaneously. However, symptoms of cervical cancer may appear after the cancer has reached an advanced stage and it may include: abnormal vaginal bleeding after sexual intercourse; irregular periods; back or pelvic pain, fatigue, weight loss and loss of appetite.

- **People most at risk:**

HPV is transmitted mainly through sexual intercourse. The presence of multiple sexual partners and immune –suppressive conditions increased the risk of transmission.

- **Prevention via vaccination:**

Two types of vaccines are licensed currently in the kingdom of Bahrain: a Quadrivalent vaccine and a Bivalent vaccine. HPV vaccines are directed against the cancerous genotypes of the virus. Both types of the vaccine recommended preferably to be administered before the onset of sexual activity, i.e. before first exposure to HPV infection; however it might be administered after to protect against HPV that the female is not exposed to.

1. Quadrivalent HPV vaccine (has 4 HPV types 16, 18, 6, 11): It might be given for girls and boys aged 9–13 years in 2-dose schedule and as 3 doses for girls and boys 14 years of age and older.

2. Bivalent HPV vaccine (has 2 HPV types 16, 18): It might be given for girls aged 9–14 years a 2-dose schedule. If the age at the time of the first dose is >14 years, 3 doses are recommended.

- **Vaccine side effects:**

Both vaccines are generally safe, but reactions might include pain, redness and swelling can occur. Systemic reactions including fever, headache, dizziness, myalgia, arthralgia, and gastrointestinal symptoms (nausea, vomiting, abdominal pain) also may occur.