

Immunization in Adults: Priority



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In Lebanon, immunization of adults does not have the same priority when compared to the immunization of children. Over the last decade, renewed emphasis has been established to achieve better awareness on the role of vaccination and primary prevention. In addition, morbidity and mortality in adults secondary to vaccine preventable diseases is considered to be high. When compared to the pediatric population, adult immunization preventable death rates are 200-fold higher.

This article will shed the light on the newest recommendations by the U.S. Centers for Disease Control and prevention (CDC) for adult immunization along with immunizations in selected high risk group.

Type of Immunization

Immunization is the process of artificially inducing immunity in a host before exposing to natural infection. We have two types of immunization, the active and the passive form.

Active immunization:

The principal aim of active immunization, known as vaccination, is to stimulate the immunity system, of the host receiving the vaccine, so that the body will be able to produce the proper primary immune response. This immune response will lead to the production of antibodies and immune memory cells that will be used in the prevention of the disease when exposed to. This response is expected to be durable with long-term protection against

disease. In some cases, boosters' vaccine may be needed to maintain this immunity against infection.

Passive immunization:

Passive immunization consists of administration of exogenously produced antibody. This will lead to a transient and non-durable immunity. It is used when immediate immunity is needed or when the host is not able to produce immunity response following vaccination like in immunocompromised patients.

Vaccinations in Adults

1- Influenza vaccine:

Influenza is an acute respiratory illness and one of the most common causes of hospitalization especially in winter season and predominantly in elderly population. It can be of high fatality rate mainly when it exacerbates underlying cardiac or pulmonary conditions.

There are 3 types of influenza viruses: type A, B and C. Influenza A is the most common among all, it affects all age groups and causes more severe illness compared to others. Among the influenza A we can note H1N1, H3N2 and H1N2 that are the most common circulating strain in flu season. Influenza B primarily affects children and presents with milder disease. Influenza C is rarely reported in human and does not cause significant clinical symptoms.

Prevention of influenza is essential and can be done by vaccination or with chemoprophylaxis. To Note that vaccination remains the preventive method of choice. Studies have shown that vaccination can prevent influenza up to 90% in healthy individual less the 65 years. (1)

Nowadays all adults are recommended to receive annual vaccination against influenza. There are two types of vaccine, the Inactivated Influenza Vaccine (IIV) and the Live Attenuated Influenza Vaccine (LAIV) with different indications. (2) The IIV is usually given to all adults including pregnant women and patients with chronic medical conditions as diabetes, lung or heart disease. LAIV can only be given to healthy, non-pregnant and immunocompetent adults aged 19 to 49 years only. (3)

2- Pneumococcal vaccine:

Along with influenza vaccine, the pneumococcal vaccine has also shown to prevent high rates of mortality. Streptococcus pneumonia is the principal bacteria causing pneumonia worldwide in addition to causing otitis media and sinusitis.(4)

Pneumococcal infection can become so serious and can be a major cause of mortality especially in populations at higher risk. People with non-functional spleen, patients who are immunocompromised, smokers, people with chronic cardiovascular or pulmonary disorders and elderly above 65 years of age are the most vulnerable group to this infection and vaccination is highly recommended.(5)

There are two types of pneumococcal vaccine, the Pneumococcal Conjugate Vaccine PCV13 that contains 13 of the most virulent strains of pneumococcus and that is more immunogenic, and the Pneumococcal Polysaccharide Vaccine PPSV23 that contains 23 of the most common serotypes that frequently causes the infection.

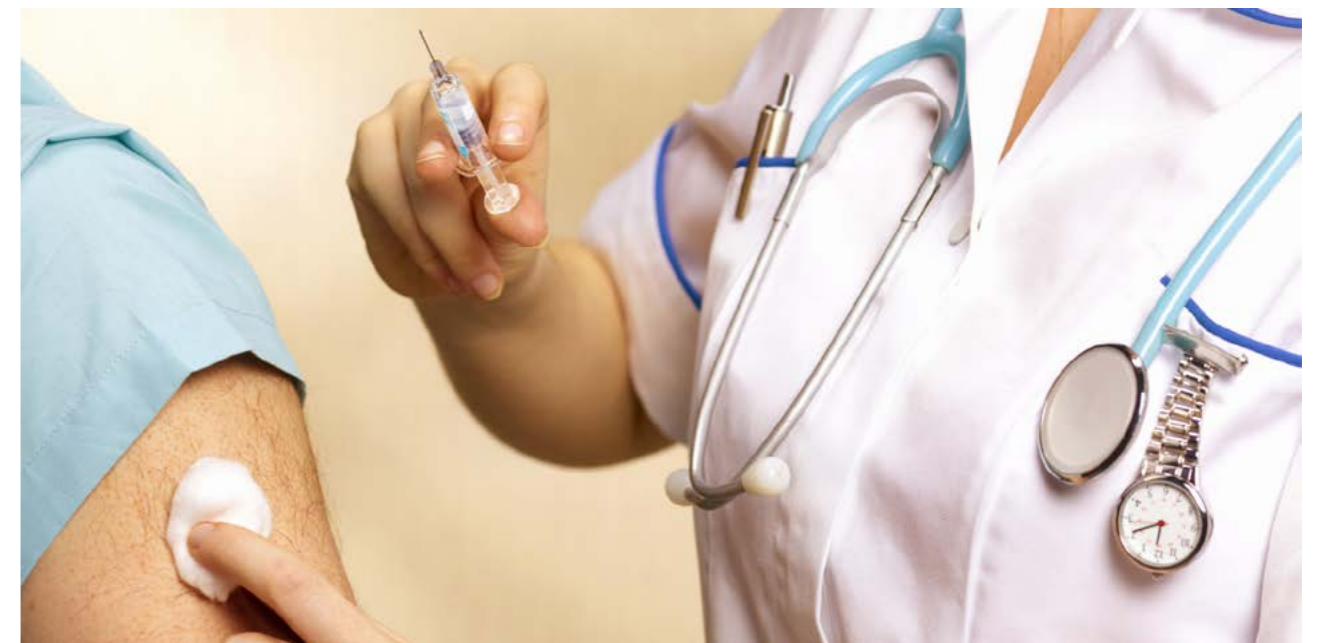
Vaccination should be done in the following sequence; for patients younger than 65 years old, PCV13 should be given first followed by the PPSV23 with an interval of at least 8weeks. For people older than 65 years old, the same sequence should be given but with an interval of time at least of one year for better immunization. To note that in some cases when patients are at very high-risk and who are younger than 65, PPSV23 can be repeated after 5 years of the initial dose.(6)

3- Tetanus immunization:

Tetanus infection affects the nervous system and present with severe muscle spasm and rigidity. It is caused by the toxin tetanospasmin produced by an anaerobic gram positive bacillus found in the soil, Clostridium tetani. Any skin laceration or puncture wound can be a port of entry if it gets contaminated with soil, feces or saliva. Since clostridium tetani cannot be eliminated from the environment and due to its high rate of fatality, vaccination is crucial for prevention and immunization.

Most of the people are immunized since childhood, especially in developed country. The tetanus toxoid vaccine exist in 2 formulations: Diphtheria Toxoid (Td) and Diphtheria Toxoid with acellular pertussis (Tdap).(7) Primary immunization schedule is given at childhood usually and 3 doses are required to complete the immunization. First dose is given at time zero, second dose is given after 4 weeks and the third dose is give at interval of 6 to 12 months after it. In this setting, Td is used in two out of the three doses and Tdap is used once. However, in case an adult present with no record of immunization against tetanus, the 3 doses should be given at same sequence.

A single dose of Tdap is also recommended for all adults once in their adulthood, replacing a planned vaccination with Td. As well, it is recommended in all pregnant women with each pregnancy, preferably in their last trimester, to reduce the burden of pertussis in newborns. After receiving



the primary immunization, a booster doses is required for maintain immunization. The recommendations include administration of the vaccine at 10-year intervals following the primary series given in infancy. In addition, a booster dose should also be given in case a wound get in contact with a suspected tetanus contaminated are and if more than 5 years have passed since the last dose.

4- Measles Mumps Rubella vaccine (MMR) :

The MMR vaccine is a combination of three live attenuated viruses: Measles, Mumps and Rubella. It is usually given in childhood. In case there is no documentation of childhood immunization, a vaccine should be given at adult age especially at high risk populations. So the recommendation is that any adult born after the year 1957 should receive the vaccine unless there was prior infection with Mumps or Measles. To note that all adults born before the year 1957 are not required having the vaccine since they are considered to be immunized due to the prevalence of the disease back then. A second dose of the MMR vaccine is also recommended in patients who are at higher risk, as healthcare worker, patient planning to travel internationally, in case of measles exposure in endemic settings or if the patient was previously vaccinated with a killed measles vaccine.

However, since MMR vaccine is a live attenuated vaccine, it is contraindicated in severe immunocompromised patients and in pregnant women or likely to be within the 4 weeks following vaccination. (8)

5- Human Papillomavirus vaccine :

Human papillomavirus (HPV) is a virus that affects the epithelium cells. It spreads through sexual intercourse and is mainly localized in genital area. This virus is responsible of genital warts development that can transform into malignant cells in rare cases. There are several serotypes of the HPV with different malignancy potential. The most commonly seen are the HPV 6 and 11 that causes mainly genital warts as well as the HPV 16 and 18 that can lead to cervical cancer in women and anal cancer in men.

For a better protection, HPV vaccine should be delivered at young age and preferably before becoming sexually active since it is acquired early after onset of sexual activity. For this reason, the recommendation is to vaccinate all females aged of 11 to 26 and preferably at age 11-12 if possible. Moreover, new recommendations have also implemented on the importance of vaccinating male with HPV vaccine to decrease the risk of anal warts and cancer. The

recommendation consists of vaccinating all male patient aged 9-21 and if at higher risk (Immunocompromised, HIV, and who have sex with men) extend till the age of 26.(9)

Conclusion

As we can conclude, vaccination decreases the rate of complications among adults. It can go from simply decreasing the rate of hospitalization, to decreasing the prevalence of cancer and even mortality rate. For this reason, vaccination provides benefits not only to the patients but also to the health system. Although vaccination rate among adults is still not as it is expected to be, we as physicians should feel responsible to ensure that patients receive all necessary information regarding vaccination, and should aim for a better immunization among adults.

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