

Immunizations for Children

The CIWEC Clinic Travel Medicine Center

The following is a recommended schedule for immunizing children. There is room for variation in the exact timing of the immunizations. In general, the dosing interval between vaccines should not be shortened, but the length of time between doses can be lengthened somewhat without compromising immunity. If you have not been following this exact schedule, you can discuss how to complete your child's immunization with any of the nurses or doctors at The CIWEC Clinic Travel Medicine Center.

Birth	Hepatitis B ¹
1 month	Hepatitis B ²
2 months	DTaP ¹ ; HIB ¹ ; PCV ¹ Polio ¹ (IPV or OPV ¹)
4 months	DTaP ² ; HIB ² ; PCV ² , IPV or OPV ²
6 months (consider 2 visits for completing injections)	DTaP ³ ; HIB ³ ; PCV ³ , IPV or OPV ³ ; Hepatitis B ³
12 months	MMR ¹ , Varicella ¹ Hepatitis A vaccine
15 months	DTaP ⁴ ; HIB ⁴ ; PCV ⁴ , OPV ⁴ (if IPV used, 4 th dose not needed at this age)
12-24 months	Consider Japanese Encephalitis vaccine (please read details on page 2)
24 months	Typhoid (Typhim Vi), Meningococcal meningitis vaccine
24 months to 36 months:	Consider Rabies Preimmunization
4-5 Years (pre-school) 2 visits suggested to complete immunizations	DTaP ⁵ ; MMR ² ; Varicella ² ; IPV or OPV booster Typhoid (Typhim Vi) booster Meningococcal meningitis booster PPD Skin test for tuberculosis (optional)
Adolescent girls (11-12 years)	Human Papillomavirus Vaccine (HPV) given as a 3 dose series (0,2 and 6mths)
Adolescents (11- 12 years)	Td or Tdap booster

Key to Abbreviations:

DTaP = Diphtheria, Tetanus and acellular Pertussis

HIB = Hemophilus Influenza type B

IPV= Inactivated Polio Vaccine, preferred over OPV for all doses*

MMR = Measles, Mumps, and Rubella

OPV= Oral Polio Vaccine

PCV=Pneumococcal Conjugate Vaccine

Varicella= Chicken Pox

Td=Tetnus and Diphtheria

Tdap= Tetanus, Diphtheria and acellular Pertussis

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DTaP: This combination vaccine with the acellular pertussis component has a remarkable record of efficacy and safety, with reduced side effects compared to the original DPT. The three vaccines given together induce a better protective response in your child than each one given separately. Please let the nurse know if your child has had a bad reaction to any of the doses of this vaccine.

Hepatitis A Vaccine: This inactivated vaccine against hepatitis A was first marketed in 1993. It is given as a series of 2 injections with long lasting immunity, at least 10 yrs or longer. The vaccine has been studied extensively in children 1 year of age or older and is safe to use in this group, therefore, we are recommending that it be included as part of routine childhood immunization anytime after age 1. This is now a routine childhood vaccine in USA. Currently, there are no recommendations for booster injections after the primary series.

Hepatitis B vaccine: It has become a routine childhood immunization. It is often given at birth, one month, and six months but it can be started at any time. Hepatitis B is potentially a fatal form of Hepatitis that can be acquired from mother to child transmission, non sterile needles, sexual activity, or blood transfusions that haven't been screened properly. We recommend this vaccine for all children.

HIB: Hemophilus Influenza: HIB is a bacteria which can cause meningitis or epiglottitis in children. Either infection can be fatal. Routine childhood immunization has drastically decreased the incidence of these diseases. If your child did not receive this vaccine according to the schedule above, it can still be given on the modified schedule shown here:

Starting Age 2-6 Months: As listed above.

Starting Age 7-11 Months: Two injections two months apart and a third injection at 15-18 months of age.

Starting Age 12-14 Months: Two injections 2-3 months apart.

Starting Age 15 Months to 5 years: One injection.

Japanese Encephalitis Vaccine: Japanese Encephalitis (JE) is a viral infection of the brain. Although many people get infected with the JE virus without becoming ill, among those who get the clinical disease, 1/3rd will recover, 1/3rd will die and 1/3rd will have some kind of permanent disability. The virus that causes JE is carried by culex mosquitoes which breed in flooded rice fields. Mosquitoes feed on infected pigs and wild birds and infected mosquitoes transmit JE virus to humans and animals while feeding. Since human infection is incidental, there is no person to person transmission. JE is endemic in the Terai and has been confirmed to occur in the Kathmandu valley since 1996. The highest risk months are August, September and early October.

We recommend this vaccine to persons who live in the Terai and people who will stay in the Kathmandu Valley in the high risk months of August – October. The vaccine that has been used until recently was the Inactivated Vaccine called Biken made in Japan but production of this vaccine has been phased out.

The currently available vaccine is the **Live Attenuated SA14-14-2 vaccine** produced by Chengdu Institute in China. It has an excellent safety profile and over 200 million doses have been used in the past 20 years. This vaccine is expected to obtain WHO licensure in 2009 and has not yet been used in the Western world. **Vero cell vaccines** of the SA 14-14-2 strain are expected to be available in 2009 in the West. We are starting to use the Live Attenuated SA 14-14-2 vaccine at our clinic. Side effects are minimal with the live

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vaccine and single dose can be protective for about 5 years although manufacturers are currently recommending 2 doses 1 year apart that could be started as early as 9 months of age. For immunizing your child, you could consider the live vaccine now or wait until next year when Vero cell JE vaccines should be available.

MMR: Measles, mumps, and rubella are all caused by viruses and each has the potential to cause a serious illness with complications, and rubella infection in a pregnant woman can cause serious birth defects. The vaccine utilizes live viruses that have been changed so that they induce immunity but can't cause disease themselves. 2 doses of the vaccine are recommended to induce long lasting immunity.

Meningococcal Meningitis: This is a very safe and highly effective vaccine against the bacteria *Neisseria meningitidis*, which can cause a severe brain infection, or a total body infection. The disease is acquired through the respiratory tract and can be rapidly fatal. Kathmandu valley experienced epidemics in 1983 and 1984. Widespread vaccination occurred in 1984, and helped stop the epidemic. The vaccine is a single shot that has to be repeated every two years in children under 5, then once every 3-5 years. We are currently stocking 2 kinds of meningitis vaccines, the A&C vaccine and also the quadrivalent vaccine **Menomune** which consists of A, C, Y and W135. For Nepal, A&C is sufficient. Quadrivalent vaccine is needed for the Hajj, travel to parts of Africa and in some colleges in USA.

Polio Vaccine: As polio is eradicated from most countries of the world, inactivated injectable polio vaccine (IPV) is replacing the use of oral polio vaccine (OPV) to abolish the extremely rare vaccine associated poliomyelitis (1 in 2.4 million doses used in the U.S). We are now recommending the inactivated polio vaccine for childhood immunization and stock few doses of the oral vaccine. Both vaccines can be interchangeably used.

Pneumococcal Conjugate Vaccine (Prevnar): This is a recommended vaccine that has been available at the CIWEC Clinic for a number of years. This vaccine has been found to protect against pneumococcal infections like pneumonia and meningitis in infants and children. It is given along with other childhood vaccines at 2, 4, 6 months of age and a 4th dose between 12-15 months. Mild pain and redness at the injection site or a low grade fever can occur in a small number of children receiving this vaccine.

Td and Tdap Vaccines: The Td vaccine has been used for many years. It protects against tetanus and diphtheria. Tdap was only licensed in 2005. It is the first vaccine for adolescents and adults that protects against all three diseases. The vaccine Tdap is recommended for adolescents who got DTaP or DPT as children and have not yet gotten a booster dose of Td. The preferred age is 11-12 for either vaccine. Adolescents who have already gotten a booster dose of Td may receive Tdap for protection against pertussis, although waiting at least 5 years between Td and Tdap is encouraged, but not required. Presently Td is available at the clinic.

Typhoid Vaccine: Typhoid Fever is an infection caused by bacteria *Salmonella typhi* and *paratyphi*. The disease is highly endemic in Nepal, and is acquired through eating contaminated food or water. Typhim Vi is a highly purified typhoid vaccine which can be given from age 2 in children. One injection is effective for 2 years, and side effects are minimal. This vaccine does not protect against *paratyphi* infections.

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Rabies Vaccine: Rabies vaccine can be given before one is bitten by a potentially rabid animal (pre-exposure immunization). This immunization offers some protection against unnoticed or--in the case of children--unreported exposures to rabid animals. Pre-exposure immunization also greatly simplifies the post-exposure treatment. Besides, there is a world-wide shortage of rabies immune globulin making rabies pre-immunization a necessity. We feel that all children should be pre-immunized with the rabies vaccine, because they may not always tell you when they have been around stray animals. The pre-immunization series consists of three injections on days 0, 7, and 28. We recommend beginning the series for children at around 24-36 months, when they are starting to be more independent of their parents. In children under 5 years, we recommend a booster in three years and boosters every ten years thereafter. The vaccine is highly purified, and is relatively free of side-effects.

Varicella (Chicken Pox): This is a highly contagious infection caused by a virus. It is usually a mild, short lived disease in small children but can be severe if it occurs in adolescents, adults or pregnant women. Varicella Vaccine is a live-virus vaccine that is given at one year of age at the same time as the MMR vaccine. Because 15% of children getting a single dose of varicella vaccine have come down with chicken-pox, 2 doses of this vaccine are now recommended for full protection. First dose is given at 12-15 months of age and second dose between 4-6 years. Side effects from the vaccine are very few and mild that my include redness or pain at injection site, low grade fever or rash.

Human Papillomavirus Vaccine (HPV): This is a new vaccine that is recommended for females aged 11-12 years as a 3 dose series at 0, 2 and 6 months. It can be started as early as 9 years and catch up vaccination is recommended for females ages 13-26 years of age who have previously not been immunized. 75% of cervical cancers in women are related to human papilloma viruses and this vaccine will help prevent cervical cancer by preventing infection. The vaccine is currently made available at CIWEC by prior request due to high cost of the vaccine. If you would like your children to receive this vaccine, please let the clinic nurse know so that we can bring the vaccine for these individuals.

About BCG: This vaccine is made from a harmless strain of Tuberculosis bacteria that can induce some immunity to TB without causing the disease. Its routine use in childhood has always been a matter of debate around the world, with European doctors favoring its use, and North American doctors arguing against it. We have chosen not to use it at CIWEC Clinic, although we realize that some of you would like to have it. Vaccination with BCG turns the familiar TB skin test positive but this reaction will gradually wane over the years. The incidence of TB among expatriates in Nepal is very low, despite the widespread prevalence of TB in Nepal. We prefer to screen children with the TB skin test (Mantoux) and offer treatment to those whose skin test turns from negative to positive.