

The Importance of Childhood Hepatitis B Immunizations

A Public Briefing

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The Case for Childhood Vaccinations

Medical and public health experts strongly support universal vaccination against the hepatitis B virus, but many parents still don't think that their children need to be vaccinated. These parents mistakenly think that hepatitis B is basically a sexually transmitted disease. It is *not*. Though most adults in America are infected through sexual and drug behavior, children become infected by other means. It is in the best interest of any child to be vaccinated against hepatitis B at an early age.

Before vaccination against the hepatitis B virus became routine in the past decade, almost 16,000 American children younger than 12 were infected each year by person-to-person transmission. In the 1980s, public health experts saw 450,000 new infections each year; in 1999, there were fewer than 100,000 new cases of hepatitis B. Universal vaccination is a proven success.

More than half of new hepatitis B infections strike young adults; 8 percent occur in adolescents, 4 percent in children, and another 4 percent through perinatal transmission. If infants and children are vaccinated at an early age, they can essentially pre-empt acquiring an infection later in life.

Infected infants and children can appear healthy and can unknowingly infect others. By the time the infection is noticed, it is often too late to do anything about it. Those infected at an early age tend to develop chronic infection, leading to serious disability and premature death. Treatment for chronic infection is successful in only a half or a quarter of the cases, and there is no specific treatment for acute hepatitis B infection.

With no cure, the key to controlling the disease is preventing it, and that can be done through universal vaccination. The hepatitis B virus vaccine, developed in 1981, is the only guaranteed protection. A well-accepted and safe vaccine that's given in three doses, it has prevented the infection in thousands of children.

Infection with the hepatitis B virus is a significant public health concern. It's estimated that 1,000,000 to 1,250,000 Americans are chronically infected, and 100,000 more are infected each year. The virus is responsible for more than 11,000 hospitalizations each year for related illnesses, and 5,000 Americans die annually from its complications.

Below, we'll describe how the virus is transmitted and explain the consequences of becoming infected with it.

Transmission

The hepatitis B virus is 100 times more infectious than the HIV virus. Infection occurs when blood or body fluids from an infected person enter the body of a person who is not immune. The hepatitis B virus is in its most concentrated form in blood, but it's also found in saliva, tears, sweat, mucus, vomit, urine, and feces. The virus is extremely stable and can survive for up to a month on inanimate surfaces such as countertops and utensils.

Though direct contact with blood or sexual fluids is the most common route of infection, infants and children can encounter many opportunities for infection because of the highly infectious and resilient nature of the hepatitis B virus.

- *Perinatal Transmission*

Most infected babies get infected through perinatal transmission, or mother-to-infant transmission at birth or shortly after birth. Depending on the amount of virus in an infected mother's blood, she has a 20 percent to 90 percent chance of transmitting the disease to her newborn. Babies infected perinatally have the greatest risk of serious life-long consequences; 90 percent will become carriers and about 25 percent of these carriers will eventually die of liver failure.

Perinatal transmission can be averted by vaccinating the newborn. Each year, the vaccine prevents infection in about 9,500 infants.

Texas state law requires pregnant women to be tested for hepatitis B infection at their first prenatal visit and again at delivery. Testing has reduced perinatal transmission but, alone, it can't control the spread of hepatitis B among children, as they may still become infected later in life. To protect all children from infection, it's necessary to vaccinate them at the earliest possible age. In 1990, despite testing that showed no infection in their mothers, almost 9,000 U.S. children had acquired the infection by the age of 10.

- *Person-to-Person Transmission*

The hepatitis B virus can be transmitted to and from children through incidental contact with blood or body fluids, and such person-to-person transmission is responsible for thousands of new cases of infection annually. The normal play of young children can involve aggressive behavior such as biting or scratching, and rougher play can result in open, bleeding wounds. Young children are also notorious for unhygienic contact with each other.

Combine all of these elements, and one can see why instances of childhood infections have occurred in child-care settings, schools, homes, and playgrounds. Infection occurs through bites or contact with breaks in the skin caused by cuts, bruises, or scratches. In child-care centers, children may also become infected by coming into contact with the bloody stools of other children or the open sores on any infected child-care providers. A case of child-care transmission occurred in Washington, D.C., when a 4-year-old boy was bitten by an infected 2-year old with a history of aggressive behavior.

Children can also infect adult teachers and child-care providers. Consider the case of a New Hampshire elementary-school student who transmitted his infection to his teacher when he sneezed a large amount of mucus onto her dry, chapped (and thus vulnerable) hands. The teacher, who was pregnant at the time, in turn transmitted the infection to her newborn. In another situation, a child-care worker became infected after treating a scalp wound on a 2-year-old infected child.

Older children who play contact sports can also transmit the infection to each other. For example, a U.S. high school's sumo wrestler transmitted his infection to other members of his wrestling team. In Sweden, an outbreak of infection occurred after track runners shared the same water to clean their wounds. And in Japan, the virus was spread among members of an American football team who came into contact with each other's bleeding wounds.

Infection can also be transmitted in the homes of chronically infected people through the sharing of toothbrushes, razors, or eating utensils. Because the virus can live on surfaces for long periods of time, children with poor hygiene can infect their siblings and others in the household. One example of household transmission involved a teenage immigrant who infected his U.S.-born siblings by sharing and chewing the same pieces of gum.

Many thousands of American children are infected by the hepatitis B virus through person-to-person transmission. Since more than half display no signs or symptoms, it's difficult to know if a child is infected and unknowingly transmitting the infection to classmates, playmates, and family members. Since no state or federal laws exclude infected children from child-care centers and schools, the uninfected are potentially at risk on each and every school day.

A policy of vaccinating all children would assure parents that their children will not acquire infection through child-care, school, and home contacts.

Consequences of Infection

After an initial acute infection with the hepatitis B virus, some people can become chronic, life-long carriers. The younger a person is when infected, the greater the chance that the person will become chronically infected.

As mentioned above, the youngest victims, those infected during the perinatal period, face a 90 percent chance of becoming chronically infected. About 30 percent to 50 percent of acutely infected children between the ages of 1 and 5 develop chronic infection, compared to the 6 percent to 10 percent of older children and adults who progress from acute to chronic infection.

The majority of death and disability associated with hepatitis B infection is attributed to chronic infection, which can lead to cirrhosis, liver failure, and liver cancer. About 3,000 to 4,000 Americans die of hepatitis B-related cirrhosis annually; 100 to 300 die of hepatitis B-related liver failure; and 1,000 to 1,500 die from hepatitis B-related liver cancer.

Compared to healthy individuals, those with chronic hepatitis B infection are 12 to 300 times more likely to develop liver cancer, and those infected as children have a greater chance of developing liver cancer or cirrhosis than those infected as adults.

Up to 25 percent of infants and children infected by the hepatitis B virus will develop liver cancer or cirrhosis later in life, while only 15 percent of those infected as adolescents or young adults will develop these conditions.