



OLR RESEARCH REPORT

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CHICKEN POX VACCINE

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You asked for information about the chickenpox (varicella) vaccine including state requirements concerning the vaccine, protocols, data justifying the vaccine mandate, concerns about its effectiveness, and other relevant information.

SUMMARY

Chickenpox, also called varicella, is a common childhood disease that is usually mild, but can be serious, especially in young infants and adults. A vaccine for chickenpox (varicella vaccine) is available, with 41 of the 50 states (including Connecticut), requiring the vaccine for children attending school.

Recently, the CDC has revised its recommendations for varicella vaccination of infants and young children. Instead of a single dose of varicella-containing vaccine administered at 12-15 months, it now recommends supplementing the initial vaccination with a second dose at 4-6 years of age. The Connecticut Department of Public Health is considering implementing a two dose requirement for kindergarten and seventh grade entry into school, beginning in 2009.

Issues have been raised about the effectiveness of the vaccine over time.

BACKGROUND

Chickenpox is caused by a virus, the varicella virus. It spreads from person to person by direct contact or through the air by coughing or sneezing. It is highly contagious and can also be spread through direct contact with the fluid from a blister of a person infected with chickenpox, or form direct contact with a sore from a person with shingles. It takes from 10-21 days to develop symptoms after being exposed to a person infected with chickenpox, with the usual time period from 14-16 days.

The most common symptoms of chickenpox are rash, fever, coughing, fussiness, headache, and loss of appetite. The rash usually develops on the scalp and body, and then spreads to the face, arms, and legs. The rash usually forms numerous itchy blisters in several successive crops. The illness lasts about 5-10 days.

Many cases of chickenpox are mild, but deaths from it can occur. Before vaccine development for chickenpox, about 100 people died every year in the United States from chickenpox. It also accounted for about 11,000 hospitalizations each year. The most common complication from chickenpox is bacterial infection of the skin or other parts of the body including the bones, lungs, joints, and blood. The virus can also lead to pneumonia or infection of the brain. These complications are rare but serious. Complications are more common in infants, adults, and persons with weakened immune systems.

(For more information see Fact Sheet: *Chickenpox*, Connecticut Department of Public Health (DPH), attached.)

STATE REQUIREMENTS

State law provides that “the standard of care for immunization of the children of this state shall be the recommended schedule for active immunization for normal infants and children published by the committee on infectious diseases of the American Academy of Pediatrics or the schedule published by the National Immunization Practices Advisory Committee, as determined by the Commissioner of Public health” (CGS § 19a-7f). The committee, officially known as the Advisory Committee on Immunization Practices (ACIP), consists of a number of advisors to the Centers for Disease Control and Prevention (CDC) to provide advice and guidance on the most effective means to prevent diseases through nationwide vaccination efforts. The committee develops written statements that are official federal recommendations for the use of vaccines and immune globulins in the United States and are published by CDC.

Under state law, each local or regional board of education, or similar body governing a nonpublic school or schools, must require each child to be adequately immunized against diphtheria, pertussis, tetanus, poliomyelitis, measles, mumps, rubella, hemophilus influenzae type B and any other vaccine required by the schedule for active immunization adopted according to CGS § 19a-7f before the child can enroll (CGS § 10-204a). The varicella vaccine is required by that schedule.

DPH regulations specify that an individual is considered adequately protected against varicella if that person:

1. was born January 1, 1997 or later and was immunized with one dose of varicella vaccine on or after that individual's first birthday and before his thirteenth birthday or two doses of the vaccine given at least four weeks apart if the first dose was given on or after his thirteenth birthday;
2. was born before January 1, 1997 and is enrolled in seventh grade in August 2000 or later and was immunized with one dose of the vaccine on or after his first birthday and before his thirteenth birthday or two doses of vaccine given at least four weeks apart if the first dose was given on or on after his thirteenth birthday;
3. has a written statement signed and dated by a physician, physician assistant, or advanced practice registered nurse indicating that the person has already had varicella based on family or medical history; or
4. has had protection against varicella confirmed in writing by specific blood testing

conducted by a certified laboratory. (DPH Regs. § 10-204a-2a(h)).

Any person whose parents or guardian presents a statement that such immunization is contrary to the child's religious beliefs is exempt from the immunization requirements (DPH Regs. § 10-204a-2a(i)).

PROPOSED NEW SCHOOL IMMUNIZATION REQUIREMENTS

In June 2006, ACIP voted to recommend a second dose of varicella-containing vaccine for children 4 to 6 years of age to improve primary and long-term protection against chickenpox. The ACIP also recommended that children, adolescents, and young adults who previously received a single dose of vaccine be given a second dose to assure full and lasting protection and to minimize the potential for sustained transmission in school settings. The ACIP also recommended that all school-aged children up to 18 years of age who have only had a single dose of varicella vaccine be vaccinated with a second dose.

As a result, DPH's immunization program manager, in a June 7, 2007 memo to "all users of state supplied vaccines," wrote that "We are considering implementing a two-dose requirement for varicella -containing vaccine for kindergarten and seventh grade beginning in August of 2009" (memo attached).

A February 28, 2007 DPH memo on "Updated Guidelines for Chickenpox Outbreak Prevention and Control for School and Childcare Settings" (attached) states that "Experience over the past 10 years has shown that, while a single dose of varicella vaccine protects greater than 95% of the children against a severe infection of chickenpox disease, it is only 80-85% effective at protecting against active infection and does not prevent sustained outbreaks of chickenpox from occurring in schools and does not provide a fully adequate buffer for those who cannot be vaccinated. Most importantly, there is now accumulating evidence that vaccine-induced immunity may begin to wane after 10 years. Given the new recommendations to move to a population vaccinated with two doses of varicella vaccine, an updated approach to chickenpox outbreaks in schools is needed. "

DPH reports that between 20 and 40 chickenpox outbreaks continue to occur in school settings each year among vaccinated children in the state. During these outbreaks, up to 17% of children vaccinated with a single dose of varicella-containing vaccine may develop chickenpox. Chickenpox in vaccinated children is usually mild according to DPH, but the children are contagious and can transmit the virus to others including parents and persons who are ineligible for vaccination and at higher risk of severe disease (see February 28, 2007 memo).

VARICELLA VACCINE EFFECTIVENESS

Concerns about the effectiveness of the varicella vaccine over time have arisen. In 2004, Yale researchers found a significant decrease in the effectiveness of the vaccine after the first year of vaccination, but it was still found to be very effective overall. The study, published in the February 18, 2004 issue of the Journal of the American Medical Association (JAMA) found that the vaccine's effectiveness dropped from 99% the first year after vaccination to 84% two to eight years after vaccination. But after eight years, the overall effectiveness was 87%. The seven year study addressed concerns about varicella outbreaks in highly immunized groups that raised issues about the effectiveness of the

vaccine. The researchers assessed whether the effectiveness of the vaccine is affected either by time since vaccination or age at the time of vaccination. The study included 339 children aged 13 months and older who were clinically diagnosed with chicken pox after they had been vaccinated. (The JAMA study is attached.)

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