Whooping cough returns as vaccine modified to reduce side-effects

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Hundreds of thousands of people in the U.S. - mostly babies and toddlers - were coming down with whooping cough each year when vaccines against "this menace," as one newspaper called it, were introduced in the 1930s and 1940s.

"Childhood Cough Is Given Knockout Blow," the Chicago Daily Tribune announced in 1940, and within the next 40 years reported cases of whooping cough would dwindle to about 1,000 nationwide. A childhood scourge for centuries, this sometimes fatal disease seemed destined to become little more than a memory in the U.S.

But in recent years, the number of reported cases of whooping cough, also known as pertussis, has resurged.

By the end of 2011, Illinois healthcare providers had reported nearly 1,400 cases of the illness, according to the Illinois Department of Public Health. A decade before, they had reported only 194 cases. Ten years before that, the number of reported cases was only 74.

The Chicago suburbs were particularly hard hit last year. The McHenry County health department reported more than 270 cases by Dec. 31, and the DuPage County Health Department and Cook County Department of Public Health, which covers much of suburban Cook, reported more than 250 cases each. The Chicago Department of Public Health reported 79 cases. All of these numbers likely underestimate how many people are being sickened by the disease.

In California, nearly 10,000 cases of whooping cough were reported in 2010, the most since the 1940s, according to the U.S. Centers for Disease Control and Prevention. Ten babies died. Ohio, Michigan and other states have also experienced outbreaks.

Why, at a time of high vaccination rates among schoolchildren, does whooping cough appear to be coming back? And why are the victims older, for the most part, than those who became ill in the pre-vaccine era?

Researchers say there is evidence that clusters of unvaccinated children play a role. Better diagnosis and heightened awareness also may have led to increased reporting of cases, said Dr. James Cherry, a pediatric infectious disease specialist at the University of California Los Angeles.

But another factor lies in the history of whooping cough vaccines.

The vaccine children receive today is different from the ones introduced 70 years ago. Some of the original immunizations were "whole-cell" vaccines, made from killed whole cells of the bacterium that causes whooping cough. Eventually, those old whole-cell vaccines led to the development of the diptheria-tetanus-pertussis shot, or DTP, which became a mainstay in the school immunization routine.

"That whole-cell vaccine works well at the beginning and it lasts and lasts and lasts," said Dr. Roger Baxter, co-director of the Kaiser Permanente Vaccine Study Center.

But, he added: "That fantastic immune response is accompanied by a, well, fantastic immune response."

In other words, the body's reaction to the vaccine sometimes included pain and fevers that could be, in extremely rare cases, high enough to

lead to seizures, he said. "This was terrifying to parents," Baxter said.

In a world with a lot of whooping cough, this was a tradeoff parents were willing to make. In 1934, a decade before the American Academy of Pediatrics recommended routine immunizations against the disease, there were more than 260,000 reported cases of whooping cough in the U.S., according to the CDC.

More than 36,000 people in the U.S. died of whooping-cough related deaths - many of them babies and children - between 1926 and 1930, Cherry reported in a 2007 paper published in the journal Microbe.

"As long as you can see the disease is really bad, you don't care if there are side effects of the vaccine. You are willing to put up with a little bit," Baxter said. "But once it disappears, and you don't have (whooping cough) anymore, well, forget it, that vaccine better be really safe."

By 1976, reported cases of whooping cough in the U.S. had dropped to just over 1,000. No longer haunted by the disease, parents began to express concerns about the side effects of the vaccine. In the 1980s, there were panics, magnified by the media, over rumors that the vaccine could cause brain damage. Some parents sued manufacturers for injuries they said were caused by the shots.

By the early 1990s, the U.S. Food and Drug Administration had approved new vaccines consisting of components of the whooping cough cell but not the whole thing. These "acellular" vaccines had much milder side effects, but researchers are learning that they also provoke an immune response that is less complete and wanes more quickly.

Baxter, whose team is completing a series of papers examining these issues, said researchers believe that these acellular vaccines trigger the body to make antibodies - defenses against the bacteria - but not a host

of other immune defenses that help the body hold on to that immunity.

Developing vaccines can be a balancing act, trying to trigger as good an immune response as possible in as many people as possible for as long as possible without also triggering unacceptable side effects.

"You can make a safer vaccine and people have better trust in it," said pediatrician Dr. Kathryn Edwards, director of the Vanderbilt University Vaccine Research Program, but the unwanted side effects - like fevers and pain - can be associated with better, longer-lasting protection.

Cherry said there is evidence that immunity to pertussis from any source - whole-cell vaccines, acellular vaccines or even from surviving whooping cough - wanes over time, and that the disease is circulating among teens and adults who come down with the disease but are rarely diagnosed.

Longer-lasting vaccines against whooping cough are not likely to be developed anytime soon, so public health officials and others are trying to find other ways to stem the outbreaks, and in particular to protect newborns. Infants too young to be vaccinated are among the most likely to become severely ill, be hospitalized or even die from the disease.

Illinois already requires young schoolchildren to receive a series of pertussis vaccinations unless they have a medical or religious exemption. Starting this fall, the state will begin requiring those entering sixth grade to show proof that they have received at least one dose of the tetanus-diphtheria-acellular-pertussis vaccine, known as Tdap. Those entering grades seven through 12 who have not already received a Tdap dose also will be required to receive it.

Public health officials are recommending that new parents and anyone else caring for newborns receive a booster. Some hospitals are offering

new moms a whooping cough vaccination in the hospital after delivery. At Dr. Anita Chandra-Puri's pediatric practice in Chicago, new fathers are offered a shot as well.

Chandra-Puri, who said she treated a baby who had to be hospitalized this fall because of the disease, said most were happy to get the vaccine as news spreads of the whooping cough cases in Illinois.

"It has been parents initiating the question," she said. "It seems like a no-brainer to get vaccinated."

WHOOPING COUGH FACTS

Serious disease often looks like common cold at the beginning

Whooping cough, or pertussis, infects babies, children and adults and looks a lot like the common cold at first - runny nose, sneezing and a mild cough or fever, according to the U.S. Centers for Disease Control and Prevention.

After one to two weeks, severe coughing episodes can begin and continue for weeks and even months. It is not for nothing this illness has been called the "100-day cough."

Coughing fits may be violent and can cause sharp inhalations with a distinctive "whoop" sound. Infants may turn blue during coughing periods. The severe coughing may interfere with a person's ability to eat, drink and sleep.

Infants are among the most vulnerable to dying from the disease. More than half of babies younger than a year with whooping cough are hospitalized.

Physicians recommend early diagnosis and treatment with antibiotics. Vaccines can help prevent the disease.