Mumps Outbreak Points to System Weaknesses

BY PATRICE WENDLING
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KANSAS CITY, MO. — The resurgence of mumps in 2006 was unexpected but provided the medical community with some valuable lessons, two infectious disease experts reported at the National Immunization Conference sponsored by the Centers for Disease Control and Prevention.

Particularly vexing was the presence of cases without the classical presentation of parotitis and the inability to rule out cases based on negative laboratory results, said Dr. Gustavo H. Dayan of the CDC's Division of Viral Diseases, and Measles, Mumps, and Rubella team leader.

In Iowa, the hardest hit state in the nation, 71 of 113 (63%) cases at two colleges presented without classic symptoms.

Laboratory diagnosis was very challenging because IgM response was usually absent and performance of different IgM assays was variable. Immunoglobulin G was present in many patients at the moment of diagnosis. Viral culture and polymerase chain reaction (PCR) had a low yield, especially when the specimens weren't taken early enough.

A viral shedding study using PCR assays in 31 consecutive Kansas cases resulted in only eight positive results. Seven of the eight samples were taken during the first 3 days after the onset of parotitis, Dr. Dayan said.

Surveillance was difficult because the new case-investigation report form was not adequate and different forms were being used by different states, he said. The Council of State and Territorial Epidemiologists clinical case definition of mumps does not include cases with classic complications of mumps without the presence of parotitis for 2 days.

"We really feel that some of the cases at the beginning of the outbreak may have been discarded based on the not very clear clinical symptoms and negative results," he said. "However, during the outbreak, some of the cases may have been overcounted because the surveillance system was very enhanced and cases without symptoms may have been counted."

What is known is that the outbreak primarily affected young non-Hispanic white adults, aged 18-24, as well as females and those living on college campuses.

A total of 45 states reported mumps cases in 2006, and 8 states in the Midwest were the most affected. Iowa had the highest incidence at 66/100,000, compared with Minnesota, which had the lowest incidence at 2.8/100,000. Available data from these eight states show that about 43% of the cases had received two doses of mumps vaccine, Dr. Dayan said in an interview.

Overall, 6,330 cases were reported to the National Notifiable Diseases Surveillance System in 2006, and approximately 120 new cases have been reported in 2007.

Few infants were affected, and no large school or day care outbreaks were reported. The outbreak did not spread to unvaccinated populations.

The source of the outbreak is not known. But the mumps strain in Iowa and other affected states has been identified as genotype G5, which is the same one that circulated in the United Kingdom throughout the 2004-2006 outbreaks. Virus genotyping in Virginia from a cluster in the latter part of the year isolated the G1 genotype, which suggests a different source of importation, he said.

Compliance with the mumps-isolation recommendation proved challenging. Compliance was 87% for isolation less than 4 days and just 66% for isolation 4 days or more among 133 Kansas students for whom data were available. Because of this and available viral shedding data, the CDC is expected to recommend in a memo to states that the isolation period for mumps be changed to 5 days, Dr. Dayan said.

Kansas changed its viral isolation recommendation to 4 days in early April 2006 but, later that month, reverted to 9 days, which is the period required by Kansas state law and recommended by the CDC, Ms. Jennifer Hill, an epidemiologist with the Kansas Department of Health and Environment, said in a separate presentation during the meeting.

Kansas was the second-hardest hit state in the United States, with 986 cases reported in late 2005-2006; 40% of these were among young adults (18-24 years old), 60% were among women and girls, and 30% were among college students.

Questions arose as to whether students should be isolated at home or at school, how long the isolation should last, and who was responsible for their follow-up compliance. Students were told not to go to school for 9 days, but officials received reports some students returned to class early, Ms. Hill said.

Kansas also vacillated between one and two doses of mumps vaccine as its definition of adequate protection before ultimately deciding that patients who receive one dose of measles-mumps-rubella (MMR) vaccine are adequately vaccinated. Separate guidelines and algorithms were established for health care workers and day care workers that rely on self-reported vaccination history data.

Immunization history available on 85% of cases revealed that 73% had received one dose of MMR vaccine and 7% were unvaccinated, and 64% of all vaccinated patients had a history of two doses.

Laboratories were able to communicate those results to clinicians, but at times, there weren't enough qualified workers or materials to perform the necessary testing. After the testing, it wasn't clear how to interpret negative results and how to convince local authorities that it was still mumps. ■

Vaccine Mix-Up Risk Rises With Greater Product Availability

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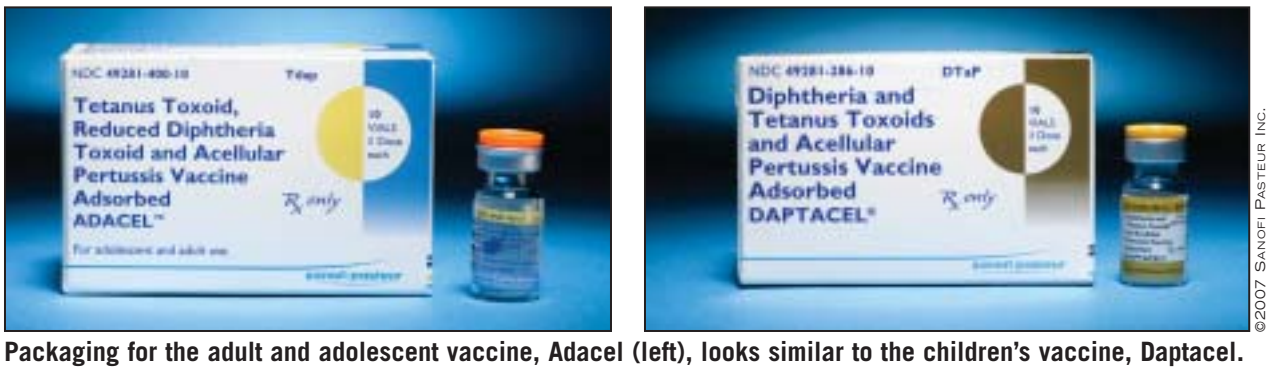

Packaging for the adult and adolescent vaccine, Adacel (left), looks similar to the children's vaccine, Daptacel.

MIAMI BEACH — Inadvertent misadministration can occur with several new vaccines that are commonly used, Dr. Larry Pickering said at the annual Masters of Pediatrics conference sponsored by the University of Miami.

Confusion has occurred with the administration of three vaccines: the newer tetravalent meningococcal conjugate (MCV4) vaccine; the recently licensed tetanus toxoid, diphtheria toxoid, and acellular pertussis (Tdap) vaccine; and the new adult zoster vaccine.

The meningococcal polysaccharide vaccine has been used subcutaneously for decades in the United States. But the newer MCV4 vaccine, licensed in the United States in January 2005, is for intramuscular use only.

The different routes of administration create an "automatic opportunity for confusion," said Dr. Pickering, professor of pediatrics at Emory University and senior advisor to the director of the National Center for Immunization and Respiratory Diseases at the Centers for Disease Control and Prevention, both in Atlanta.

Indeed, 101 people in seven states have reportedly received subcutaneous administration of the MCV4 vaccine, according to an investigation by the CDC (MMWR 2006;55:1016-17).

There were 12 nonserious adverse events, including 11 local reactions and a report of fever for 1 day among 54 people queried by providers as a result of the investigation.

Serology results from 38 people vaccinated by the subcutaneous route indicate that although their titers were lower than those of patients vaccinated by the intramuscular route, the subcutaneously vaccinated patients were sufficiently protected and didn't need revaccination.

A second kind of vaccine mix-up has been reported involving the two new Tdap vaccines licensed in 2005 for adolescents and adults, and the diphtheria, tetanus, and pertussis (DTaP) vaccine licensed in 1991 for children 6 weeks to 6 years of age.

Both the American Academy of Pediatrics and the CDC have received requests for guidance on what to do when an adolescent is given the infant dose and vice versa.

One of the reasons for the confusion is that the labeling and packaging are very similar for Adacel (Tdap) and Daptacel (DTaP), Dr. Pickering said.

Sanofi Pasteur, maker of Adacel and Daptacel, confirms it has received reports of misadministration, more commonly of adults being given the pediatric formulation, Donna K. Cary, director of public relations for Sanofi, said in an interview.

"For many years, DTaP was just a pediatric product, and it wasn't until just recently that we had Adacel for adults and adolescents, and GlaxoSmithKline has Boostrix," Ms. Cary said. "I think it's that there is a new vaccine. The packaging is actually quite different."

The company has started tracking reports of misadministration and is looking at ways to make the two products more distinct, such as noting on the label that Daptacel is for infants, she said. The Adacel label already states it is for adolescents and adults.

Until such changes are made, Dr. Pickering said, he keeps the two vaccines straight in his mind by remembering that Adacel and adult both begin with the letter A.

If an adolescent or adult inadvertently receives DTaP, the vaccine doesn't have to be repeated, although the patient may have increased reactions because the antigen contents are higher, Dr. Pickering said. If Tdap is given to an infant or child, the antigen contents are much lower and the dose will have to be repeated.

The Advisory Committee on Immunization Practices recently received reports of infants receiving the Zostavax vaccine used to prevent herpes zoster in adults 60 years of age or older, and of adults accidentally receiving the Varivax vaccine used to prevent the varicella zoster virus in patients 12 months of age and older.

Even though all varicella products are made from the same varicella-zoster bulk lots, the zoster vaccine concentration is 14 times higher than the varicella vaccine concentration, Dr. Pickering said.

If zoster vaccine is inadvertently given to a small child, reactions might be greater and could include local skin reactions, low-grade fever, and the development of vesicular lesions around the injection site. If the varicella vaccine is given to an adult, it might not work because of the lower vaccine content, he said. ■