

Guidelines Set on Vaccine Use in Mumps Outbreak

BY MIRIAM E. TUCKER
Senior Writer

All health care workers should receive two doses of the measles-mumps-rubella vaccine if they don't have evidence of immunity, the Advisory Committee on Immunization Practices of the Centers for Disease Control and Prevention voted during a special meeting held by telephone in response to the current multistate mumps outbreak

that began in Iowa late last year.

Between January 1 and May 2, 11 states reported 2,597 cases of mumps. Eight states (Illinois, Iowa, Kansas, Missouri, Nebraska, Pennsylvania, South Dakota, and Wisconsin) reported mumps outbreaks (5 or more outbreak-associated cases) with ongoing local transmission or clusters of cases; three states (Colorado, Minnesota, and Mississippi) reported cases associated with travel from an outbreak state.

The majority of mumps cases (1,487,

comprising 57%) were reported from Iowa; states with the next highest case totals were Kansas (371), Illinois (224), Nebraska (201), and Wisconsin (176). Of the 2,597 cases reported overall, 1,275 (49%) were classified as confirmed, 915 (35%) as probable, and 287 (11%) as suspect; for 120 (5%) cases, classification was unknown (MMWR 2006;55[Dispatch]:1-5).

To prevent mumps, ACIP has long recommended a two-dose MMR vaccination series for all children, with the first dose

administered at ages 12-15 months and the second dose at ages 4-6 years. Two doses of MMR vaccine are recommended for school and college entry unless the student has other evidence of immunity.

In the specially convened meeting—the results of which are considered interim—the committee redefined evidence of immunity to mumps through vaccination as follows: One dose of a live mumps virus vaccine for preschool children and adults not at high risk; two doses for children in grades kindergarten through 12 and adults at high risk (such as persons who work in health care facilities, international travelers, and students at post-high school educational institutions). Other criteria for evidence of immunity (such as birth before 1957, documentation of physician-diagnosed mumps, or laboratory evidence of immunity) remain unchanged.

Furthermore, health care facilities should consider recommending one dose of MMR vaccine to unvaccinated health care workers born before 1957 who do not have other evidence of mumps immunity.

During an outbreak and depending on the epidemiology of the outbreak (the age groups and/or institutions involved), a second dose of vaccine should be considered for adults and for children aged 1-4 years who have received one dose. The second dose should be administered as early as 28 days after the first dose, the minimum recommended interval between two MMR vaccine doses. In addition, during an outbreak, health care facilities should strongly consider recommending two doses of MMR vaccine to unvaccinated workers born before 1957 who do not have other evidence of mumps immunity.

Many Teenagers Ignorant of STD Risks of Oral Sex

More than one-quarter of teenagers in a recent survey did not know that sexually transmitted diseases can be passed through oral sex, reported Ms. Nicole Stone, at the Centre for Sexual Health Research, University of Southampton, England, and her associates.

In contrast, only 2% of the teens were unaware that sexually transmitted diseases (STDs) can be transmitted through “vaginal intercourse with ejaculation” (Perspect. Sex. Reprod. Health. 2006;38:6-12).

The study included a survey of more than 1,300 British teenagers and analysis of sexual event diaries of more than 100 of the teenagers. Knowledge of STD transmission improved among older girls. Only 5% of 18-year-old girls did not know that STDs could be transmitted during oral sex, compared with about 22% of 16-year-old girls.

“It is essential that those charged with teaching youth about sexual issues—whether in schools, in clinics or in homes—be encouraged to broaden the scope of their coverage,” the researchers wrote.

—Mary Ellen Schneider

PEDIARIX™ (Diphtheria and Tetanus Toxoids and Acellular Pertussis Adsorbed, Hepatitis B (Recombinant) and Inactivated Poliovirus Vaccine Combined)

The following is a brief summary only; see full prescribing information for complete product information.

CONTRAINDICATIONS: Hypersensitivity to any component of the vaccine, including yeast, neomycin, and polymyxin B, is a contraindication (see DESCRIPTION in complete prescribing information). Do not use PEDIARIX after a serious allergic reaction (e.g., anaphylaxis) temporally associated with a previous dose of this vaccine or with any component of this vaccine. Because of the uncertainty as to which component of the vaccine might be responsible, do not give further vaccination with any of these components; or, refer such individuals to an allergist for evaluation. The following events are contraindications to administration of PEDIARIX: encephalopathy (e.g., coma, decreased level of consciousness, prolonged seizures) within 7 days of administration of a previous dose of a pertussis-containing vaccine that is not attributable to another identifiable cause; progressive neurologic disorder, including infantile spasms, uncontrolled epilepsy, or progressive encephalopathy. Do not vaccinate individuals with such conditions until a treatment regimen has been established and the condition has stabilized. PEDIARIX is not contraindicated for use in individuals with HIV infection.

WARNINGS: Administration of PEDIARIX is associated with higher rates of fever relative to separately administered vaccines. In one study that evaluated medically attended fever after the first dose of PEDIARIX or separately administered vaccines, infants who received PEDIARIX had a higher rate of medical encounters for fever within the first 4 days following vaccination. In some infants, these encounters included the performance of diagnostic studies to evaluate other causes of fever (see ADVERSE REACTIONS). The vial stopper is latex-free. The tip cap and the rubber plunger of the needleless prefilled syring contain dry natural latex rubber that may cause allergic reactions in latex sensitive individuals. If any of the following events occur in temporal relation to receipt of whole-cell DTP or a vaccine containing an acellular pertussis component, consider carefully whether to give subsequent doses of PEDIARIX or any vaccine containing a pertussis component: temperature of $\geq 40.5^{\circ}\text{C}$ (105°F) within 48 hours not due to another identifiable cause; collapse or shock-like state (hypotonic-hyporesponsive episode) within 48 hours; persistent, inconsolable crying lasting ≥ 3 hours; occurring within 48 hours; seizures with or without fever occurring within 3 days; if Guillain-Barré syndrome occurs within 6 weeks of receipt of prior vaccine containing tetanus toxoid, the decision to give subsequent doses of PEDIARIX or any vaccine containing tetanus toxoid should be based on careful consideration of the potential benefits and possible risks. A committee of the Institute of Medicine (IOM) has concluded that evidence is consistent with a causal relationship between whole-cell DTP vaccine and acute neurologic illness, and under special circumstances, between whole-cell DTP vaccine and chronic neurologic disease in the context of the National Childhood Encephalopathy Study (NCES) report; however, evidence was insufficient to indicate whether or not whole-cell DTP vaccine increased the overall risk of chronic neurologic disease. Acute encephalopathy and permanent neurologic damage have not been reported causally linked or in temporal association with administration of PEDIARIX, but the experience with PEDIARIX is insufficient to rule this out. Encephalopathy has been reported following INFANRIX™ (Diphtheria and Tetanus Toxoids and Acellular Pertussis Vaccine Adsorbed) (see ADVERSE REACTIONS, Postmarketing Reports), but data are not sufficient to evaluate a causal relationship. The decision to administer a pertussis-containing vaccine to children with stable central nervous system (CNS) disorders must be made by the physician on an individual basis, with consideration of all relevant factors, and assessment of potential risks and benefits for that individual. Advise the parent or guardian of the potential increased risk involved (see PRECAUTIONS). A family history of seizures or other CNS disorders is not a contraindication to pertussis vaccine. For children at higher risk for seizures than the general population, an appropriate antipyretic may be administered at the time of vaccination and for the ensuing 24 hours according to the respective prescribing information recommended dosage to reduce the possibility of post-vaccination fever. Defer vaccination during the course of a moderate or severe illness with or without fever and vaccinate patients as soon as they have recovered from the acute phase of the illness. Do not give PEDIARIX to children on anticoagulant therapy or with other bleeding disorders unless the potential benefit clearly outweighs the risk of administration (see PRECAUTIONS in complete prescribing information).

PRECAUTIONS: Before the injection of any biological, the physician should take all reasonable precautions to prevent allergic or other adverse reactions. Epinephrine injection (1:1000) and other appropriate agents used for the control of immediate allergic reactions must be immediately available should an acute anaphylactic reaction occur. Immunosuppressed individuals, including those receiving immunosuppressive therapy, may not develop an adequate immune response. **Drug Interactions:** For information regarding concomitant administration with other vaccines, refer to DOSAGE AND ADMINISTRATION in complete prescribing information. Do not mix PEDIARIX with any other vaccine in the same syringe or vial. **Carcinogenicity, Mutagenesis, Impairment of Fertility:** PEDIARIX has not been evaluated for carcinogenic or mutagenic potential, or for impairment of fertility. **Pregnancy:** Category C. PEDIARIX is not indicated for women of child-bearing age. Animal reproduction studies have not been conducted with PEDIARIX. It is not known whether PEDIARIX can cause fetal harm when administered to a pregnant woman or if PEDIARIX can affect reproductive capacity. **Geriatric Use:** PEDIARIX is not indicated for use in adult populations. **Pediatric Use:** Safety and effectiveness of PEDIARIX in infants younger than 6 weeks of age have not been evaluated (see DOSAGE AND ADMINISTRATION in complete prescribing information). PEDIARIX is not recommended for persons 7 years of age or older. Tetanus and Diphtheria Toxoids Adsorbed (Td) For Adult Use, inactivated poliovirus vaccine (IPV), and Hepatitis B Vaccine (Recombinant) should be used in individuals 7 years of age or older.

ADVERSE REACTIONS: A total of 20,739 doses of PEDIARIX have been administered to 7,028 infants as a 3-dose primary series. The most common adverse reactions observed in clinical trials were local injection site reactions (pain, redness, or swelling), fever, and fussiness. In comparative studies, administration of PEDIARIX was associated with higher rates of fever relative to separately administered vaccines (see WARNINGS). The prevalence of fever was highest on the day of vaccination and the day following vaccination. More than 98% of episodes of fever resolved within the 4-day period following vaccination (i.e., the period including the day of vaccination and the next 3 days). Rates of most other solicited adverse events following PEDIARIX were comparable to rates observed following separately administered US-licensed vaccines. The adverse event information from clinical trials provides a basis for identifying adverse events that appear to be related to vaccine use and for approximating rates. However, because clinical trials are conducted under widely varying conditions, adverse event rates observed in the clinical trials of a vaccine cannot be directly compared to rates in the clinical trials of another vaccine, and may not reflect the rates observed in practice. A total of 5,472 infants were enrolled in a German safety study that was originally designed to compare the safety and reactogenicity of PEDIARIX administered concomitantly at separate sites with 1 of 4 *Haemophilus influenzae* type b (Hib) vaccines at 3, 4, and 5 months of age. After enrollment of 1,569 infants, the study was amended to include a control group that received INFANRIX, Hib vaccine, and oral poliovirus vaccine (OPV) separately. Infants in the separate administration group received one less antigen (hepatitis B) than the infants who received PEDIARIX. Safety data were available for 4,666 infants who received PEDIARIX administered concomitantly at separate sites with 1 of 4 Hib vaccines and for 768 infants in the control group that received separate vaccines. The primary end-point of the study was the percentage of infants with any grade 3 solicited symptom (redness or swelling ≥ 20 mm, fever $\geq 103.1^{\circ}\text{F}$, or crying, pain, vomiting, diarrhea, loss of appetite, or restlessness that prevented normal daily activities) over the 3-dose primary series in infants who received PEDIARIX (4 groups that received PEDIARIX and Hib vaccines pooled) compared to the group that received INFANRIX and Hib vaccine separately with OPV. Analysis for the primary end-point was performed on the according-to-protocol (ATP) cohort that included only those infants who were enrolled after the protocol amendment to include a control group. Of 3,772 infants in the ATP cohort for whom safety data were available, 16.2% (95% CI: 14.9% to 17.5%) of infants who received PEDIARIX and Hib vaccine compared to 20.3% (95% CI: 17.5% to 23.4%) of 744 infants who received separate vaccines were reported to have had at least one grade 3 solicited symptom within 4 days of vaccination (i.e., day of vaccination and the next 3 days). The difference between groups in the rate of grade 3 symptoms was 4.1% (90% CI: 1.4% to 7.1%). These were the rates for selected solicited symptoms within 4 days following each dose in a 3-dose primary series in infants who received PEDIARIX administered concomitantly with Hib vaccine and those who received separate concomitant administration of INFANRIX, Hib vaccine, and OPV for the intent-to-treat (ITT) cohort (includes all infants enrolled before and after the amendment who received the indicated vaccine and for whom at least one symptom sheet was completed).

Percentage of German Infants With Solicited Local Reactions or Selected Systemic Adverse Events Within 4 Days of Vaccination* (ITT Cohort)	PEDIARIX & Hib			INFANRIX, Hib, & OPV		
	Dose 1	Dose 2	Dose 3	Dose 1	Dose 2	Dose 3
N	4,666	4,619	4,574	768	757	750
Local†						
Pain, any	14.0	10.2	9.9	14.2	9.8	8.1
Pain, grade 2 or 3	2.9	1.2	1.5	3.6	1.7	1.1
Pain, grade 3	0.7	0.3	0.3	1.3	0.4	0.1
Redness, any	18.6	26.6	25.6	16.1	21.4	20.8
Redness, >5 mm	6.7	9.9	9.0	5.9	8.2	7.7
Redness, >20 mm	1.2	1.0	1.1	1.8	0.7	1.1
Swelling, any	12.7	18.5	18.4	9.6	12.9	13.6
Swelling, >5 mm	5.6	7.7	7.8	3.6	5.2	4.8
Swelling, >20 mm	1.2	1.6	1.5	1.3	1.1	1.2
Systemic						
Restlessness, any	41.4	32.0	26.7	46.4	35.0	27.6
Restlessness, grade 2 or 3	14.4	10.0	8.9	20.2	11.5	8.4
Restlessness, grade 3	3.0	1.5	1.6	5.7	3.0	1.7
Fever [‡] , $\geq 100.4^{\circ}\text{F}$	25.1	19.3	19.7	13.2	13.1	11.2
Fever [‡] , $>101.3^{\circ}\text{F}$	5.8	4.1	4.6	2.2	2.8	2.1
Fever [‡] , $>103.1^{\circ}\text{F}$	0.3	0.5	0.7	0.3	0.3	0.5
Unusual cry, any	24.9	16.5	13.1	36.5	19.7	14.3
Unusual cry, grade 2 or 3	12.7	7.1	5.7	20.8	10.0	5.7
Unusual cry, grade 3	3.9	1.7	1.4	6.8	2.1	1.1
Loss of appetite, any	17.9	13.3	12.5	19.1	16.2	11.3
Loss of appetite, grade 2 or 3	4.0	2.9	2.7	4.4	2.9	2.3
Loss of appetite, grade 3	0.6	0.5	0.4	0.5	0.7	0.0

Percentage of US Infants With Solicited Local Reactions or Selected Systemic Adverse Events Within 4 Days of Vaccination* (ITT Cohort)	PEDIARIX & Hib			INFANRIX, Hib, & OPV		
	Dose 1	Dose 2	Dose 3	Dose 1	Dose 2	Dose 3
N	482	469	466	482	469	466
Local†						
Pain, any	30.5	25.4	23.0	30.5	25.4	23.0
Pain, grade 2 or 3	6.2	5.5	3.6	6.2	5.5	3.6
Pain, grade 3	1.2	0.6	0.6	1.2	0.6	0.6
Redness, any	25.3	32.6	35.6	25.3	32.6	35.6
Redness, >5 mm	9.3	10.4	8.6	9.3	10.4	8.6
Redness, >20 mm	0.6	1.5	1.3	0.6	1.5	1.3
Swelling, any	15.1	16.6	22.3	15.1	16.6	22.3
Swelling, >5 mm	6.8	6.2	4.7	6.8	6.2	4.7
Swelling, >20 mm	1.0	1.3	1.3	1.0	1.3	1.3
Systemic						
Restlessness, any	28.8	30.3	28.5	28.8	30.3	28.5
Restlessness, grade 2 or 3	7.1	9.0	9.4	7.1	9.0	9.4
Restlessness, grade 3	1.0	1.1	0.6	1.0	1.1	0.6
Fever [‡] , $\geq 100.4^{\circ}\text{F}$	26.6	31.3	25.9	26.6	31.3	25.9
Fever [‡] , $>101.3^{\circ}\text{F}$	2.9	6.2	4.7	2.9	6.2	4.7
Fever [‡] , $>103.1^{\circ}\text{F}$	0.0	0.2	0.6	0.0	0.2	0.6
Fussiness, any	61.8	63.8	57.0	61.8	63.8	57.0
Fussiness, grade 2 or 3	14.9	21.5	17.1	14.9	21.5	17.1
Fussiness, grade 3	2.7	3.4	1.7	2.7	3.4	1.7
Loss of appetite, any	21.6	19.8	18.8	21.6	19.8	18.8
Loss of appetite, grade 2 or 3	3.1	3.2	2.4	3.1	3.2	2.4
Loss of appetite, grade 3	0.2	0.4	0.0	0.2	0.4	0.0
Sleeping more than usual, any	46.7	31.8	28.1	46.7	31.8	28.1
Sleeping more than usual, grade 2 or 3	10.2	6.0	4.7	10.2	6.0	4.7
Sleeping more than usual, grade 3	1.7	0.4	0.6	1.7	0.4	0.6

N = number of infants in the intent-to-treat (ITT) cohort. Grade 2 defined as sufficiently discomforting to interfere with daily activities. Grade 3 defined as preventing normal daily activities. * Within 4 days of vaccination defined as day of vaccination and the next 3 days. † Local reactions at the injection site for PEDIARIX or INFANRIX. ‡ Rectal temperatures. § Unusual cry lasting >1 hour.

In this study, infants were also monitored for unsolicited adverse events that occurred within 30 days following vaccination. Over the entire study period, 6 subjects in the group that received PEDIARIX reported seizures. Two of these subjects had a febrile seizure, 1 of whom also developed afebrile seizures. The remaining 4 subjects had afebrile seizures, including 2 with infantile spasms. Two subjects reported seizures within 7 days following vaccination (1 subject had both febrile and afebrile seizures, and 1 subject had afebrile seizures), corresponding to a rate of 0.22 seizures per 1,000 doses (febrile seizures 0.07 per 1,000 doses, afebrile seizures 0.14 per 1,000 doses). No subject who received concomitant INFANRIX, Hib vaccine, and OPV reported seizures. In a separate German study that evaluated the safety of INFANRIX in 22,505 infants who received 66,867 doses of INFANRIX administered as a 3-dose primary series, the rate of seizures within 7 days of vaccination with INFANRIX was 0.13 per 1,000 doses (febrile seizures 0.0 per 1,000 doses, afebrile seizures 0.13 per 1,000 doses). No cases of hypotonic-hyporesponsiveness, encephalopathy, or anaphylaxis were reported in the German study that evaluated the safety of PEDIARIX. Rates of serious adverse events that are less common than those reported in this safety study are not known at this time.

Additional safety data for PEDIARIX are available from a US study designed to evaluate lot-to-lot consistency and a bridge for a new manufacturing step. These were the rates for local reactions and selected adverse events within 4 days of vaccination with PEDIARIX administered concomitantly with a Hib vaccine at 2, 4, and 6 months of age.

Percentage of US Infants With Solicited Local Reactions or Selected Systemic Adverse Events Within 4 Days of Vaccination* (ITT Cohort)	PEDIARIX & Hib		
	Dose 1	Dose 2	Dose 3
N	482	469	466
Local†			
Pain, any	30.5	25.4	23.0
Pain, grade 2 or 3	6.2	5.5	3.6
Pain, grade 3	1.2	0.6	0.6
Redness, any	25.3	32.6	35.6
Redness, >5 mm	9.3	10.4	8.6
Redness, >20 mm	0.6	1.5	1.3
Swelling, any	15.1	16.6	22.3
Swelling, >5 mm	6.8	6.2	4.7
Swelling, >20 mm	1.0	1.3	1.3
Systemic			
Restlessness, any	28.8	30.3	28.5
Restlessness, grade 2 or 3	7.1	9.0	9.4
Restlessness, grade 3	1.0	1.1	0.6
Fever [‡] , $\geq 100.4^{\circ}\text{F}$	26.6	31.3	25.9
Fever [‡] , $>101.3^{\circ}\text{F}$	2.9	6.2	4.7
Fever [‡] , $>103.1^{\circ}\text{F}$	0.0	0.2	0.6
Fussiness, any	61.8	63.8	57.0
Fussiness, grade 2 or 3	14.9	21.5	17.1
Fussiness, grade 3	2.7	3.4	1.7
Loss of appetite, any	21.6	19.8	18.8
Loss of appetite, grade 2 or 3	3.1	3.2	2.4
Loss of appetite, grade 3	0.2	0.4	0.0
Sleeping more than usual, any	46.7	31.8	28.1
Sleeping more than usual, grade 2 or 3	10.2	6.0	4.7
Sleeping more than usual, grade 3	1.7	0.4	0.6

N = number of infants in the intent-to-treat (ITT) cohort (infants who received the indicated vaccine and for whom at least one symptom sheet was completed). Grade 2 defined as sufficiently discomforting to interfere with daily activities. Grade 3 defined as preventing normal daily activities. * Within 4 days of vaccination defined as day of vaccination and the next 3 days. † Local reactions at the injection site for PEDIARIX. ‡ Rectal temperatures. § Unusual cry lasting >1 hour.

Percentage of US Infants With Fever Within 4 Days of Dose 1* (ITT Cohort)	PEDIARIX, Hib, & Pneumococcal Conjugate (N = 667)	INFANRIX, ENGERIX-B, IPV, Hib, & Pneumococcal Conjugate (N = 333)	Separate Vaccine Group Minus Combination Vaccine Group	Difference (95% CI)
Fever [‡]				
$\geq 100.4^{\circ}\text{F}$	27.9	19.8	-8.07	(-13.54, -2.60)
$>101.3^{\circ}\text{F}$	7.0	4.5	-2.54	(-5.50, 0.41)
$>102.2^{\circ}\text{F}$	2.2	0.3	-1.95	(-3.22, -0.68)
$>103.1^{\circ}\text{F}$	0.4	0.0	-0.45	(-0.98, 0.06)
M.A. [§]	1.2	0.0	-1.20	(-2.03, -0.37)

N = number of infants for whom at least one symptom sheet was completed, excluding 3 infants for whom temperature was not measured and 3 infants whose temperature was measured by the tympanic method. * Within 4 days of vaccination defined as day of vaccination and the next 3 days. † Rectal temperatures. ‡ The group that received PEDIARIX compared to separate vaccine group p value <0.05 (2-sided Fisher Exact test) or the 95% confidence interval on the difference between groups does not include 0. M.A. = Medically attended (a visit to or from medical personnel).

In this study, medical attention (a visit to or from medical personnel) for fever within 4 days following vaccination was sought for 8 infants who received PEDIARIX (1.2%) and no infants who received separately administered vaccines. Four infants were seen by medical personnel in an office setting; no diagnostic tests were performed in 2 of the infants and a complete blood count (CBC) was done in the other 2 infants. Of 3 infants who were seen in an emergency room, all had a CBC and a blood and urine culture performed; chest X-rays were done in 2 of the infants and a nasopharyngeal specimen was tested for Respiratory Syncytial Virus in one of the infants. One infant was hospitalized for a work-up that included a CBC, blood and urine cultures, a lumbar puncture, and a chest X-ray. All episodes of medically attended fever resolved within 4 days post-vaccination.

Limited data are available from a study conducted in Moldova in which infants received a dose of hepatitis B vaccine within 48 hours of birth followed by 3 doses of PEDIARIX at 6, 10, and 14 weeks of age. No information was collected on the HBsAg status of mothers of enrolled infants. These were the rates for local reactions and selected adverse events within 4 days of vaccination with PEDIARIX administered concomitantly with Hib vaccine following a birth dose of hepatitis B vaccine:

Percentage of Moldovan Infants With Solicited Local Reactions or Selected Systemic Adverse Events Within 4 Days of Vaccination* (ITT Cohort)	PEDIARIX & Hib		
	Dose 1	Dose 2	Dose 3
N	160	158	157
Local†			
Pain, any	25.6	18.4	14.0
Pain, grade 3	3.1	0.6	1.9
Redness, any	41.9	41.8	47.1
Redness, >20 mm	1.9	2.5	4.5
Swelling, any	20.6	18.4	28.0
Swelling, >20 mm	4.4	2.5	7.0
Systemic			
Restlessness, any	13.1	10.8	8.9</