CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

January 30, 1998 / Vol. 47 / No. 3

MMWR™
MORBIDITY AND MORTALITY WEEKLY REPORT

Adverse Ocular Reactions Following Transfusions — United States, 1997–1998

On December 23, 1997, the Portland region of the American Red Cross (ARC) notified the Oregon Health Division about a cluster of adverse ocular reactions among six patients who had received out-patient red blood cell (RBC) transfusions at a hospital in Washington; all patients experienced severe bilateral conjunctival erythema within 24 hours of transfusion. Since the initial report, 106 similar reactions in 74 patients in 14 states (Alabama, California, Connecticut, Maine, Michigan, Minnesota, Montana, Oklahoma, Oregon, Pennsylvania, Texas, Utah, Washington, and Wisconsin) have been identified. This report summarizes the preliminary findings from three of these states about the ongoing investigation of these reactions.

From November 15, 1997, through January 7, 1998, a total of 49 adverse ocular reactions were reported in 38 patients in Michigan, Oregon, and Washington. An adverse ocular reaction was defined as bilateral eye redness occurring after November 1, 1997, and within 24 hours of receiving a RBC product. Median age of patients was 59 years (range: 28–84 years), and 22 (58%) were male; all had an underlying oncologic or hematologic diagnosis. Median time from transfusion initiation to symptom onset was 20 hours (range: 1–24 hours). Reactions were characterized by severe conjunctival erythema and/or conjunctival hemorrhage (100%), eye pain (62%), headache (25%), periorbital edema (23%), arthralgias (19%), nausea (15%), dyspnea (6%), and rash (6%). Median time from symptom onset to resolution was 5 days (range: 2–21 days); two patients remained symptomatic at the time of the interview. All patients had received transfusions of leukocyte-reduced RBCs within 24 hours of symptom onset; four also had received platelets. For 45 of 46 patients for whom information was available, the patient had received at least one unit of blood filtered with the LeukoNet Prestorage Leukoreduction Filtration System (HemaSure Inc., Marlborough, Massachusetts)*, one of several prestorage leukocyte-reducing methods used by ARC. In three reactions, patients also received blood filtered with another leukocyte-reducing prestorage method.

Because all initial reports of reactions were linked to specific lots of LeukoNet-filtered blood products, on December 31, 1997, ARC issued a nationwide voluntary

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Adverse Ocular Reactions — Continued

quarantine of seven lots. On January 7, 1998, ARC expanded this nationwide quarantine to all LeukoNet-filtered blood products produced since October 1, 1997. No additional adverse reactions have been reported among persons who received transfusions since January 8, 1998. CDC, in collaboration with state health departments, the Food and Drug Administration (FDA), and ARC, is conducting an investigation to determine the source and extent of these reactions.

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Editorial Note: Short-term adverse transfusion events may be febrile, nonhemolytic transfusion reactions or hemolytic (i.e., RBC destruction by either immune or nonimmune mechanisms). Allergic transfusion reactions also can occur and range in clinical severity from minor urticarial reactions to anaphylaxis; such events usually occur during or soon after transfusion (*1*).

The most frequent use of leukocyte-reduced blood is to minimize the likelihood of febrile, nonhemolytic transfusion reactions, particularly in persons with underlying hematologic malignancies (*1*). Leukocyte reduction also has been used to reduce alloimmunization and transfusion-transmitted infections (*2*).

Leukocytes can be reduced from blood 1) immediately after collection by using a filter that is integral to the collection system (in-line filtration); 2) after collection through use of a filter that must be attached to the collection bag; and 3) immediately at or before transfusion. The first two methods are referred to as "pre-storage" filtration, and maximize leukocyte adherence and minimize cytokine release.

The underlying mechanism for the cluster of adverse reactions described in this report has not been determined. However, potential causes include a toxic reaction to a chemical or material used in the production of the blood-collection system, or an allergic response to an unidentified allergen in the collection-filtration system (*3,4*). To assist the ongoing investigation and to determine the source, mechanisms, and potential magnitude of these reactions, clinicians and blood bank personnel should report cases of post-transfusion adverse ocular reactions through state health departments to CDC's Hospital Infections Program, National Center for Infectious Diseases, telephone (404) 639-6413 and to FDA's MedWatch Program, telephone (800) 332-1088.

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State-Specific Prevalence Estimates of Uninsured and Underinsured Persons — Behavioral Risk Factor Surveillance System, 1995

In the United States, cost of health-care services is a barrier to accessibility of health care, and persons often do not seek medical care because of concerns about cost, regardless of whether they have health insurance (*1,2*). In addition, three fourths of persons in the United States who have difficulties paying their medical bills have some type of health insurance (*1*). Although the affordability of health care among persons without health insurance has been described, characterization of affordability among persons who are underinsured is limited (*3*). To determine state-specific estimates of the prevalence of persons aged 18–64 years who are either uninsured or underinsured using an experiential definition of underinsurance, CDC analyzed data from the Behavioral Risk Factor Surveillance System (BRFSS). This report summarizes the results of that analysis, which document variations in state-specific rates for adequate insurance coverage.

The BRFSS is a state-based, random-digit–dialed telephone survey of the U.S. noninstitutionalized population aged ≥18 years. Data were obtained from all 50 states participating in the 1995 BRFSS. A total of 90,691 persons responded (range across states: 944–3398). Analyses were restricted to persons aged 18–64 years. Sample estimates were statistically weighted on the basis of sex, age, and race to reflect the noninstitutionalized civilian population of each state. The presence of health insurance was based on responses to the question "Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare?" Failure to seek medical care because of cost was based on responses to the question "Was there a time during the last 12 months when you needed to see a doctor, but could not because of the cost?" Adequate insurance was defined as being insured and reporting no problems because of cost, and underinsurance was defined as being insured but failing to see a doctor because of cost. Additional state-specific analyses examined the prevalence of adequate insurance, underinsurance, and lack of insurance among persons by employment status (i.e., employed for wages, self-employed, or unemployed).

During 1995, 67.8%–87.9% of persons aged 18–64 years were adequately insured (Table 1); however, approximately one fifth were either underinsured (range: 4.3%–9.0%) or uninsured (range: 6.8%–24.6%). The prevalence of adequate coverage was highest in Hawaii (87.9%), the only state to have nearly universal health-care coverage (*4*). The prevalence of adequate insurance was higher in states in the northern plains and the upper Midwest and lower in states in the South, Southwest, and West (Figure 1). Underinsurance and lack of insurance were most common among the unemployed (ranges: 1.2%–21.0% and 24.0%–60.0%, respectively). Persons who were self- employed were more frequently uninsured (range: 4.7%–36.8%) than those employed for wages (range: 3.6%–21.0%) but reported similar estimates of underinsurance (range: 1.7%–11.7%). Among persons employed for wages, estimates of either underinsured or uninsured persons ranged from 7.9% (Hawaii) to 28.0% (Louisiana) (Table 2).

Reported by the following BRFSS coordinators: J Cook, MPA, Alabama; P Owen, Alaska; B Bender, Arizona; J Senner, PhD, Arkansas; B Davis, PhD, California; M Leff, MSPH, Colorado; M Adams, MPH, Connecticut; F Breukelman, Delaware; D McTague, MS, Florida; E Pledger, MPA,

Estimates of Uninsured and Underinsured — Continued

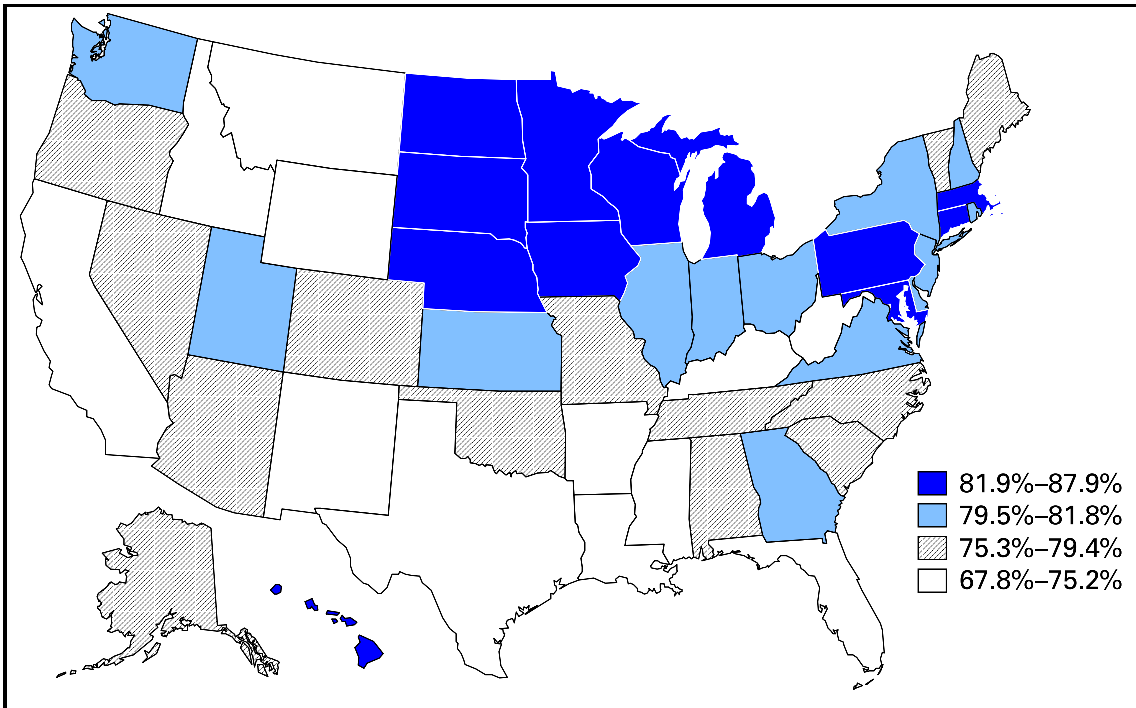
TABLE 1. Percentage of persons aged 18–64 years who were adequately insured, underinsured, or uninsured, by state — United States, Behavioral Risk Factor Surveillance System, 1995

	Adequately insured		Underinsured		Uninsured	
State	**%**	**(95% CI*)**	**%**	**(95% CI)**	**%**	**(95% CI)**
Alabama	76.6	(±2.5%)	6.9	(±1.4%)	16.5	(±2.2%)
Alaska	75.7	(±3.2%)	8.0	(±1.9%)	16.3	(±2.9%)
Arizona	76.0	(±2.8%)	5.5	(±1.4%)	18.5	(±2.7%)
Arkansas	73.9	(±2.5%)	7.5	(±1.4%)	18.6	(±2.3%)
California	70.2	(±2.5%)	7.2	(±1.4%)	22.6	(±2.3%)
Colorado	79.0	(±2.3%)	4.5	(±1.1%)	16.5	(±2.2%)
Connecticut	82.3	(±2.3%)	6.2	(±1.5%)	11.4	(±2.0%)
Delaware	81.0	(±2.2%)	5.6	(±1.2%)	13.4	(±1.9%)
Florida	72.6	(±2.0%)	8.2	(±1.2%)	19.2	(±1.8%)
Georgia	79.9	(±2.1%)	8.8	(±1.4%)	11.3	(±1.7%)
Hawaii	87.9	(±1.9%)	5.3	(±1.4%)	6.8	(±1.5%)
Idaho	74.9	(±1.9%)	8.1	(±1.2%)	17.0	(±1.7%)
Illinois	80.1	(±2.0%)	6.5	(±1.2%)	13.4	(±1.7%)
Indiana	81.4	(±2.0%)	6.5	(±1.2%)	12.1	(±1.6%)
Iowa	83.9	(±1.5%)	4.5	(±0.8%)	11.6	(±1.4%)
Kansas	80.4	(±2.1%)	6.2	(±1.3%)	13.4	(±1.9%)
Kentucky	74.0	(±2.3%)	9.0	(±1.4%)	17.0	(±2.0%)
Louisiana	67.8	(±2.8%)	7.6	(±1.6%)	24.6	(±2.6%)
Maine	76.0	(±3.0%)	4.5	(±1.3%)	19.6	(±2.8%)
Maryland	84.1	(±1.3%)	5.2	(±0.7%)	10.7	(±1.1%)
Massachusetts	81.9	(±2.3%)	5.8	(±1.4%)	12.3	(±2.0%)
Michigan	83.2	(±1.8%)	6.8	(±1.2%)	10.0	(±1.4%)
Minnesota	84.7	(±1.4%)	5.8	(±0.9%)	9.5	(±1.1%)
Mississippi	74.3	(±2.9%)	9.0	(±1.7%)	16.8	(±2.5%)
Missouri	75.3	(±2.9%)	6.6	(±1.4%)	18.1	(±2.7%)
Montana	72.7	(±3.1%)	7.8	(±1.8%)	19.5	(±2.7%)
Nebraska	84.1	(±2.2%)	6.3	(±1.4%)	9.7	(±1.8%)
Nevada	78.3	(±2.5%)	6.4	(±1.4%)	15.3	(±2.2%)
New Hampshire	79.5	(±2.8%)	6.0	(±1.5%)	14.5	(±2.5%)
New Jersey	81.3	(±2.9%)	8.9	(±2.0%)	9.9	(±2.3%)
New Mexico	71.3	(±3.2%)	7.1	(±1.6%)	21.7	(±3.0%)
New York	79.6	(±2.2%)	6.1	(±1.1%)	14.3	(±2.0%)
North Carolina	76.7	(±1.9%)	8.6	(±1.2%)	14.6	(±1.6%)
North Dakota	82.9	(±2.1%)	4.4	(±1.1%)	12.8	(±2.0%)
Ohio	80.3	(±2.9%)	6.6	(±1.6%)	13.1	(±2.5%)
Oklahoma	76.4	(±2.7%)	5.6	(±1.4%)	18.0	(±2.5%)
Oregon	76.2	(±2.0%)	8.1	(±1.2%)	15.7	(±1.7%)
Pennsylvania	82.5	(±1.9%)	6.0	(±1.4%)	11.5	(±1.5%)
Rhode Island	81.5	(±2.3%)	5.6	(±1.3%)	13.0	(±2.0%)
South Carolina	77.6	(±2.3%)	8.3	(±1.5%)	14.2	(±1.9%)
South Dakota	83.0	(±2.2%)	6.1	(±1.4%)	10.9	(±1.8%)
Tennessee	78.5	(±2.2%)	8.3	(±1.4%)	13.2	(±1.9%)
Texas	73.2	(±2.8%)	6.9	(±1.5%)	19.9	(±2.5%)
Utah	80.6	(±2.2%)	6.8	(±1.4%)	12.6	(±1.8%)
Vermont	78.8	(±2.1%)	7.3	(±1.4%)	13.9	(±1.8%)
Virginia	80.1	(±2.4%)	6.8	(±1.4%)	13.1	(±2.0%)
Washington	79.9	(±1.7%)	6.6	(±1.0%)	13.5	(±1.4%)
West Virginia	71.3	(±2.4%)	8.8	(±1.3%)	19.9	(±2.1%)
Wisconsin	86.4	(±2.1%)	4.3	(±1.2%)	9.3	(±1.8%)
Wyoming	73.7	(±2.2%)	7.3	(±1.2%)	19.0	(±2.0%)
Median	*79.2*		*6.6*		*14.0*	
Range	*67.8–87.9*		*4.3–9.0*		*6.8–24.6*	

*Confidence interval.

Estimates of Uninsured and Underinsured — Continued

FIGURE 1. Percentage of persons aged 18–64 years with adequate insurance — United States, Behavioral Risk Factor Surveillance System, 1995



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Editorial Note: The finding in this report that 6.8%–24.6% of persons aged 18–64 years in the United States during 1995 were uninsured is consistent with previous national estimates (*3,5*). Previous reports have indicated a decline in the proportion of persons in the United States with health insurance, including a decline among employed persons (*3,5*). The BRFSS analysis also indicates that most persons who were uninsured or underinsured were employed, and approximately one fifth of employed adults were either uninsured or underinsured, possibly reflecting the inadequacy of employer-based health-care coverage (*3*).

The findings in this report are subject to at least two limitations. First, only residences with telephones were surveyed. Because households without telephones generally have lower incomes than those with telephones, the percentages of uninsured

Estimates of Uninsured and Underinsured — Continued

TABLE 2. Percentage of persons aged 18–64 years employed for wages who were adequately insured, underinsured, or uninsured, by state — United States, Behavioral Risk Factor Surveillance System, 1995

	Adequately insured		Underinsured		Uninsured	
State	**%**	**(95% CI*)**	**%**	**(95% CI)**	**%**	**(95% CI)**
Alabama	81.5	(±2.8%)	6.8	(±1.7%)	11.7	(±2.4%)
Alaska	79.4	(±3.9%)	8.1	(±2.5%)	12.6	(±3.3%)
Arizona	80.1	(±3.4%)	5.4	(±2.0%)	14.5	(±3.1%)
Arkansas	78.5	(±3.0%)	7.7	(±1.9%)	13.7	(±2.5%)
California	74.7	(±3.0%)	6.5	(±1.5%)	18.8	(±2.8%)
Colorado	82.0	(±2.8%)	4.4	(±1.3%)	13.7	(±2.5%)
Connecticut	87.2	(±2.5%)	5.3	(±1.7%)	7.5	(±2.0%)
Delaware	83.7	(±2.5%)	5.3	(±1.5%)	10.9	(±2.2%)
Florida	76.2	(±2.6%)	7.5	(±1.4%)	16.3	(±2.3%)
Georgia	83.4	(±2.2%)	8.4	(±1.6%)	8.2	(±1.7%)
Hawaii	92.1	(±2.0%)	4.3	(±1.6%)	3.5	(±1.3%)
Idaho	79.1	(±2.4%)	7.2	(±1.5%)	13.6	(±2.0%)
Illinois	83.8	(±2.2%)	5.4	(±1.2%)	10.8	(±1.9%)
Indiana	85.1	(±2.1%)	5.8	(±1.3%)	9.1	(±1.8%)
Iowa	86.0	(±1.8%)	4.4	(±1.0%)	9.6	(±1.5%)
Kansas	82.7	(±2.4%)	6.1	(±1.5%)	11.2	(±2.1%)
Kentucky	81.9	(±2.6%)	7.5	(±1.7%)	10.7	(±2.1%)
Louisiana	72.0	(±3.6%)	7.1	(±2.0%)	21.0	(±3.2%)
Maine	83.1	(±3.3%)	3.2	(±1.4%)	13.7	(±3.1%)
Maryland	87.1	(±1.4%)	5.1	(±0.9%)	7.8	(±1.2%)
Massachusett	85.0	(±2.6%)	4.8	(±1.6%)	10.3	(±2.2%)
Michigan	86.5	(±2.0%)	5.4	(±1.3%)	8.1	(±1.7%)
Minnesota	86.8	(±1.6%)	5.4	(±1.0%)	7.8	(±1.3%)
Mississippi	81.3	(±3.0%)	7.7	(±2.0%)	11.0	(±2.5%)
Missouri	77.4	(±3.4%)	6.4	(±1.8%)	16.1	(±3.1%)
Montana	76.9	(±3.9%)	7.1	(±2.2%)	16.0	(±3.5%)
Nebraska	85.8	(±2.6%)	5.6	(±1.6%)	8.7	(±2.1%)
Nevada	85.0	(±2.6%)	6.0	(±1.7%)	9.0	(±2.1%)
New Hampshire	83.4	(±3.0%)	6.0	(±1.8%)	10.6	(±2.5%)
New Jersey	87.0	(±3.2%)	6.7	(±2.2%)	6.4	(±2.5%)
New Mexico	76.1	(±3.8%)	7.0	(±2.0%)	17.0	(±3.6%)
New York	85.4	(±2.2%)	5.5	(±1.4%)	9.1	(±1.8%)
North Carolina	80.2	(±2.2%)	7.7	(±1.4%)	12.0	(±1.8%)
North Dakota	85.1	(±2.5%)	3.5	(±1.2%)	11.4	(±2.3%)
Ohio	81.9	(±3.4%)	5.8	(±2.0%)	12.3	(±3.1%)
Oklahoma	79.7	(±3.2%)	4.7	(±1.6%)	15.6	(±3.0%)
Oregon	80.0	(±2.4%)	7.8	(±1.6%)	12.3	(±1.9%)
Pennsylvania	86.5	(±1.9%)	4.7	(±1.1%)	8.8	(±1.6%)
Rhode Island	84.3	(±2.8%)	5.9	(±1.7%)	9.7	(±2.4%)
South Carolina	80.1	(±2.8%)	8.5	(±1.8%)	11.5	(±2.3%)
South Dakota	84.3	(±2.6%)	6.1	(±1.6%)	9.6	(±2.1%)
Tennessee	83.2	(±2.6%)	6.4	(±1.6%)	10.5	(±2.2%)
Texas	78.5	(±3.2%)	7.5	(±2.0%)	14.0	(±2.7%)
Utah	83.4	(±2.5%)	6.2	(±1.6%)	10.4	(±2.1%)
Vermont	81.2	(±2.5%)	5.6	(±1.4%)	13.2	(±2.2%)
Virginia	81.8	(±2.8%)	6.6	(±1.7%)	11.5	(±2.3%)
Washington	84.4	(±1.9%)	5.9	(±1.2%)	9.7	(±1.6%)
West Virginia	75.2	(±2.9%)	8.8	(±1.8%)	16.1	(±2.5%)
Wisconsin	88.4	(±2.4%)	3.8	(±1.3%)	7.8	(±2.1%)
Wyoming	77.9	(±2.7%)	7.0	(±1.5%)	15.1	(±1.2%)
Median	*81.2*		*6.1*		*11.2*	
Range	*72.0–92.1*		*3.2–8.5*		*3.6–21.0*	

*Confidence interval.

Estimates of Uninsured and Underinsured — Continued

and underinsured persons may have been underestimated (*6*). Second, estimates of underinsurance were based on a relatively simple definition of underinsurance that differs from the econometric and perceptual terms used previously (*7*); this definition requires further evaluation to determine its accuracy.

Many studies examining trends in health-care coverage or the impact of health-care coverage on health-care status, receipt of services, or health outcomes have characterized persons as either "insured" or "uninsured." Developing a standardized working definition for monitoring underinsurance is a priority. Because the question used to define "underinsured" in the state-based BRFSS has been used frequently in national surveys, this definition enables states to compare their rates of underinsurance with national estimates and to better characterize the population segments that lack adequate health insurance.

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Outbreaks of Gram-Negative Bacterial Bloodstream Infections Traced to Probable Contamination of Hemodialysis Machines — Canada, 1995; United States, 1997; and Israel, 1997

During 1996, approximately 236,000 persons received hemodialysis in the United States; of these, an estimated 183,000 (78%) received chronic hemodialysis (*1*). Patients who receive chronic hemodialysis are at increased risk for bloodstream infections (BSIs) because of the need for repeated vascular access. Reported BSI rates for hemodialysis patients have ranged from 8.4 to 16.8 episodes per 100 patient-years (*2*), and BSI has been identified as the cause of death in 6%–18% of hemodialysis patients (*2*). Outbreaks of BSIs in hemodialysis units usually have been caused by inadequate disinfection of 1) water treatment or distribution systems (*3,4*) and 2) reprocessed dialyzers (*5–8*). This report summarizes the investigations of three clusters of gram-negative bacterial BSIs at hemodialysis centers in Canada, the United States, and Israel. The findings indicate that all three outbreaks probably resulted from contamination of the waste drain ports in the same model of hemodialysis machine.

Canada

From June 17 through November 15, 1995, nine adult patients at an ambulatory hemodialysis center in Montreal, Canada, had *Enterobacter cloacae* BSIs. All patients

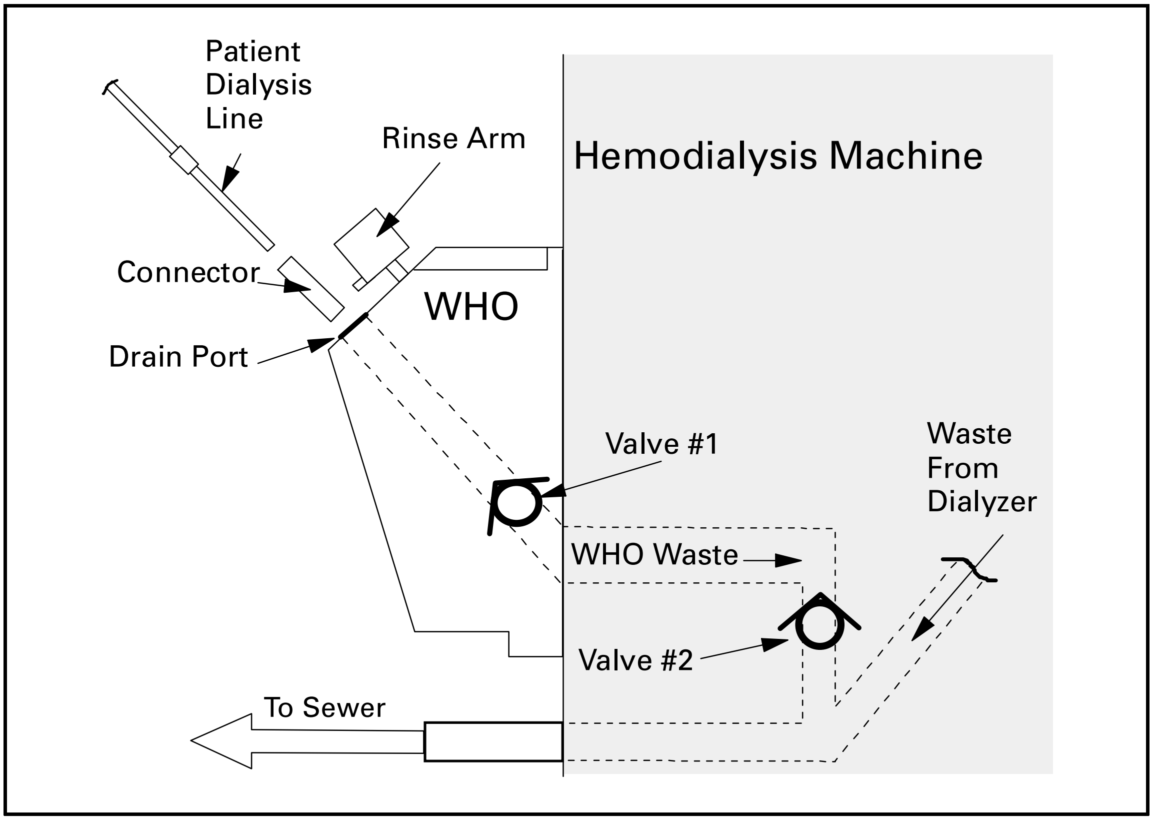
Bacterial Bloodstream Infections — Continued

at the hemodialysis center were dialyzed on COBE® Centrysystem 3* (CS3, GAMBRO® Healthcare™, Lakewood, Colorado) hemodialysis machines. Each CS3 had a Centry® Waste Handling Option (WHO™), which is a waste port designed to dispose of the saline used to flush a dialyzer before the machine is used for a patient (Figure 1). The WHO waste drain line employs two one-way valves to prevent drain line waste from refluxing into the WHO. The investigation indicated that at least one of the two one-way valves in the WHO waste drain lines of seven of 11 machines were incompetent,† potentially allowing drain backflow and contamination of dialysis lines in contact with the WHO port.

*Use of trade names and commercial sources is for identification only and does not imply endorsement by CDC or the U.S. Department of Health and Human Services.

†The manufacturer recommends daily testing of the competency of WHO valves by filling a 30 cc syringe with water, injecting the contents into the WHO drain port, and attempting to draw back fluid from the WHO. Competent valves should prevent backflow.

FIGURE 1. Waste Handling Option (WHO™)* of a Centrysystem 3† hemodialysis machine



*A WHO is a waste port that is attached to the front of the hemodialysis machine; it is designed to dispose of the saline used to flush the dialyzer before the machine is used for a patient. The waste drain line of the WHO joins the dialyzer waste drain line inside the dialysis machine to become one main drain line that empties into the sewer. Two valves along the WHO waste drain line are designed to prevent reflux of waste to the WHO drain port.

†Use of trade names and commercial sources is for identification only and does not imply endorsement by CDC or the U.S. Department of Health and Human Services.

Bacterial Bloodstream Infections — Continued

An epidemiologic investigation demonstrated that case-patients (i.e., the nine patients at the hemodialysis center who had *Enterobacter cloacae* BSIs) were more likely than control-patients to have received dialysis on a machine that had at least one incompetent valve on the WHO waste drain line (all seven case-dialysis sessions versus 145 [53%] of 272 control-dialysis sessions; odds ratio: undefined; p=0.02). Case- and control-patients were otherwise similar in demographic characteristics, underlying renal disease, type of vascular access, and dialyzer type. *Enterobacter cloacae* isolated from all nine infected patients and from the WHOs of 10 of 11 dialysis machines were identical when examined by pulsed field-gel electrophoresis (PFGE).

United States

From December 5, 1996, through January 25, 1997, a total of 10 adult patients at an ambulatory hemodialysis center in Maryland had gram-negative bacterial BSIs. Six BSIs were caused by *Enterobacter cloacae*, four by *Pseudomonas aeruginosa,* and two by *Escherichia coli*; two were polymicrobial BSIs. All patients at the hemodialysis center were dialyzed on CS3 hemodialysis machines that had WHOs. Results of a cohort study of all patients receiving dialysis at the center during the 2-month epidemic period indicated that the risk for gram-negative BSI was associated with exposure to any of three particular dialysis machines (seven BSIs in 20 patients who were exposed to one or more of the three machines versus three BSIs in 64 patients who were exposed to the other machines; relative risk=7.5; 95% confidence interval=2.1–26.2). Incompetent valves on WHO waste drain lines were present in eight of 26 dialysis machines and in two of the three implicated machines. *Enterobacter cloacae* was recovered from the WHOs of 14 of 26 machines, and *P. aeruginosa* was recovered from seven of 26. PFGE patterns of available *Enterobacter cloacae* isolates from the dialysis machines and from three patients were identical; none of the *P. aeruginosa* isolates obtained from patients were available for PFGE testing.

Israel

From February 9 through September 19, 1997, eight adult patients at an ambulatory hemodialysis center in Jerusalem, Israel, had gram-negative bacterial BSIs. BSIs in four patients were caused by *Escherichia coli*, three by *P. aeruginosa*, two by *Enterobacter cloacae*, and one by *Stenotrophomonas maltophilia*; two patients had polymicrobial BSIs. All patients at the hemodialysis center were dialyzed on CS3 hemodialysis machines that had WHOs. All eight patients who had BSIs had been dialyzed on three of 13 dialysis machines. Backflow was observed in the WHOs of the three implicated dialysis machines, and cultures obtained from the WHOs of six of 13 machines were positive for gram-negative organisms. Five of the eight patients, including all four with *Escherichia coli* BSIs, had been dialyzed on one machine that subsequently was culture-positive for *Escherichia coli* and *P. aeruginosa*. Both patients with *Enterobacter cloacae* BSIs had been dialyzed on a second machine that was culture-positive for *Enterobacter cloacae* and *P. aeruginosa*. *Escherichia coli* isolates obtained from three patients and the WHO of the implicated machine were identical by PFGE.

Follow-Up Investigation

Daily quality-control testing of WHOs as specified by the manufacturer had not been performed at any of the three hemodialysis centers. The manufacturer specifies

Bacterial Bloodstream Infections — Continued

that preventive maintenance of the valves in the WHO waste drain line includes replacement of the two valves after every 2000 hours of use. However, personnel at the three hemodialysis centers were aware of the need to change only one valve in the WHO waste drain line, and personnel at two centers did not know a second WHO valve existed; schematic diagrams provided by the manufacturer to these two hemodialysis centers identified only one of the two valves. At one center, experimentally bending and twisting the main drain line of a machine that had incompetent valves in the WHO waste drain line demonstrated the ease with which backflow can occur in the WHO.

In one hemodialysis center, the outbreak was controlled after high-level WHO disinfection (i.e., disinfecting dialysis machines with formaldehyde on two occasions and increasing the dwell time for routine weekly machine disinfection). In the other two centers, the outbreaks were terminated by discontinuing use of the WHO. All three hemodialysis centers discontinued using the WHOs.

In June 1997, GAMBRO Healthcare sent a Medical Device Safety Alert letter to all hemodialysis centers of record that use the CS3. This letter informed users of the need to ensure proper functioning of the WHO and outlined procedures for proper disinfection and maintenance of the equipment.

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Editorial Note: Bacterial BSI is a potentially severe complication associated with hemodialysis vascular access. In the United States, complications associated with vascular access represent one of the most common sources of morbidity among patients undergoing end-stage renal dialysis, with associated costs exceeding an estimated $1 billion per year (*9*). This report links three outbreaks of gram-negative bacterial BSIs to a unique design feature of the CS3 hemodialysis machine. The results of these outbreak investigations demonstrated that the WHO, if not properly maintained and disinfected, may be a source of bacterial contamination leading to BSIs in hemodialysis patients. Because waste backflow can occur with incompetent valves and WHO contamination can occur easily, the design of the WHO creates a mechanism for possible cross-contamination of the patient dialysis line.

In addition to the problems associated with the WHO feature, insufficient training of hemodialysis personnel about the design and proper handling and maintenance of WHOs might contribute to transmission of BSIs to hemodialysis patients. In June 1996, GAMBRO Healthcare and CDC surveyed 595 U.S. dialysis centers that use CS3 machines to characterize the methods used to clean and disinfect the dialysis machines and to characterize quality-control procedures (GAMBRO Healthcare and CDC, unpublished data). The survey indicated that personnel at most (87%) of the responding dialysis centers reported weekly disinfection of their dialysis machines as specified by COBE guidelines, although most (62%) were not disinfecting dialysate and bicarbonate sampling ports as often as recommended. Of the 290 centers that reported using the WHO, only 42 (14%) performed the recommended daily quality-control assessment of the WHO valves to determine whether drain reflux was occurring. Of the 137 centers responding to the question “If fluid can be aspirated from the

Bacterial Bloodstream Infections — Continued

WHO, what is done?," 112 (82%) indicated the need for replacing WHO valves or taking the machine off-line for servicing.

This report underscores the importance of surveillance and infection control in the ambulatory health-care setting. The detection of these outbreaks and identification of the likely cause was aided by the brief time-frame during which multiple infections were identified. The limited availability of data about infection rates in ambulatory dialysis centers impedes the identification of small or prolonged low-level outbreaks. Because of the lack of such data, inappropriate infection-control or maintenance practices that were identified in the GAMBRO Healthcare/CDC survey could not be linked to adverse patient outcomes at the dialysis centers surveyed. Outbreaks of gram-negative bacterial BSIs in hemodialysis patients that appear to be associated with use of the WHO should be reported to state health departments and to CDC's Hospital Infections Program, National Center for Infectious Diseases; telephone (404) 639-6413.

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Notice to Readers

National Child Passenger Safety Week — February 8–14, 1998

February 8–14 is National Child Passenger Safety Week. During 1996, a total of 1701 children aged <15 years died as passengers in motor-vehicle crashes in the United States (National Highway Traffic Safety Administration [NHTSA], unpublished data, 1996). This week focuses on efforts to improve the safety of children riding in motor vehicles. Several specific actions should be taken to help reduce injuries and death among child passengers.

- **All children riding in motor vehicles should be properly restrained at all times.** In 1996, a total of 938 (55%) child passengers who died in motor-vehicle crashes were

Notice to Readers — Continued

unrestrained at the time of the crash (NHTSA, unpublished data, 1996). In addition, many children are not restrained properly. In 1996, although approximately 85% of infants and 60% of children aged 1–4 years were restrained, almost 80% of child-safety seats were used improperly (*1*). Rigorous adherance to the instructions for child-safety seats and the recommendations provided in vehicle owners' manuals will help to avoid mistakes when using child-safety seats. In addition, the following specific child-safety–seat instructions will improve safety for child passengers:

— Ensure harness straps are not twisted and provide a snug fit by routing them through the correct seat slots behind the child's shoulders;

— Position the harness retainer (chest) clip at the armpit level of the child to hold the harness straps on the shoulders; and

— Properly use locking clip (within 6 inches from the latchplate) on all vehicle safety belts that have a sliding latchplate (the latchplate locks into the buckle).

- **Efforts to protect children from drivers who drink should be strengthened.** In 1996, a total of 395 (23%) child passenger deaths involved a drinking driver; of these children, 259 (66%) were in the vehicle driven by the driver who had been drinking (NHTSA, unpublished data, 1996). The legislatures of 21 states have enacted child endangerment laws that create a separate violation for persons who drive while intoxicated with a child in the vehicle (*2*).
- **Children should be protected from air-bag–related injury.** As of January 1, 1998, a total of 12 children in rear-facing child-safety seats and 38 other children have died while riding in the front seat as a result of injuries associated with deployment of air bags in motor-vehicle crashes of minor or moderate severity (Special Crash Investigation Program, NHTSA, unpublished data, 1998). In vehicles with passenger side air bags, all children aged ≤12 years should be placed in the back seat in age- and size-appropriate restraints. Riding in the back seat is safer for children regardless of whether vehicles are equipped with air bags.

The safety of child passengers is improved through the combination of increased public education, strong child passenger safety laws, and rigorous enforcement of these laws. Additional information is available from the Office of Communications and Outreach, NHTSA, 400 Seventh St., S.W., NTS-21, Washington, DC 20590; fax (202) 493-2062; or NHTSA World-Wide Web site at http://www.nhtsa.dot.gov; and from CDC at http://www.cdc.gov.

References

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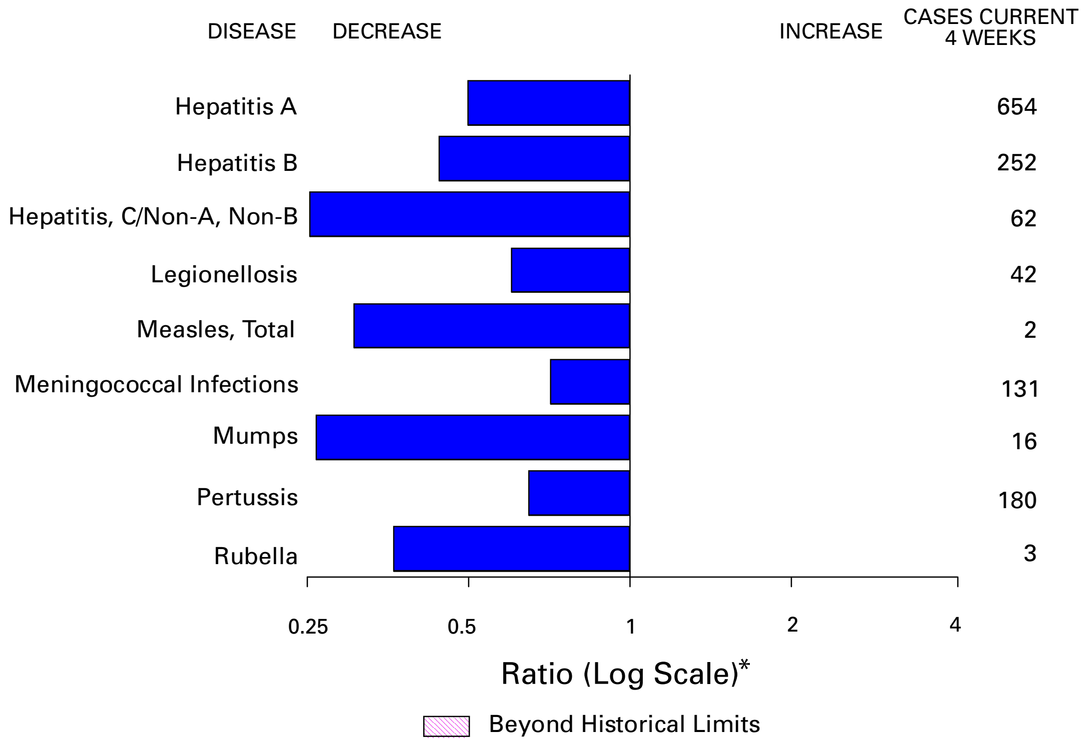
FIGURE I. Selected notifiable disease reports, comparison of provisional 4-week totals ending January 24, 1998, with historical data — United States



*Ratio of current 4-week total to mean of 15 4-week totals (from previous, comparable, and subsequent 4-week periods for the past 5 years). The point where the hatched area begins is based on the mean and two standard deviations of these 4-week totals.

TABLE I. Summary — provisional cases of selected notifiable diseases, United States, cumulative, week ending January 24, 1998 (3rd Week)

	Cum. 1998		Cum. 1998
Anthrax	-	Plague	-
Brucellosis	1	Poliomyelitis, paralytic	-
Cholera	-	Psittacosis	1
Congenital rubella syndrome	-	Rabies, human	-
Cryptosporidiosis*	38	Rocky Mountain spotted fever (RMSF)	3
Diphtheria	-	Streptococcal disease, invasive Group A	70
Encephalitis: California*	-	Streptococcal toxic-shock syndrome*	2
eastern equine*	-	Syphilis, congenital**	-
St. Louis*	-	Tetanus	1
western equine*	-	Toxic-shock syndrome	3
Hansen Disease	1	Trichinosis	1
Hantavirus pulmonary syndrome*†	-	Typhoid fever	9
Hemolytic uremic syndrome, post-diarrheal*	-	Yellow fever	-
HIV infection, pediatric*§	-		

-:no reported cases
*Not notifiable in all states.
† Updated weekly from reports to the Division of Viral and Rickettsial Diseases, National Center for Infectious Diseases (NCID).
§ Updated monthly to the Division of HIV/AIDS Prevention–Surveillance and Epidemiology, National Center for HIV, STD, and TB Prevention (NCHSTP), last update December 23, 1997.
¶ Updated from reports to the Division of STD Prevention, NCHSTP.

TABLE II. Provisional cases of selected notifiable diseases, United States, weeks ending January 24, 1998, and January 18, 1997 (3rd Week)

Reporting Area	AIDS		Chlamydia		*Escherichia coli* O157:H7 NETSS†	*Escherichia coli* O157:H7 PHLIS§	Gonorrhea		Hepatitis C/NA,NB	
	Cum. 1998*	Cum. 1997	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1997
UNITED STATES	-	2,788	19,001	20,113	30	2	14,322	13,734	57	128
NEW ENGLAND	-	80	609	870	1	-	143	327	-	1
Maine	-	-	-	20	-	-	-	1	-	-
N.H.	-	1	37	35	-	-	5	12	-	-
Vt.	-	7	17	10	-	-	-	1	-	-
Mass.	-	61	389	430	1	-	112	139	-	1
R.I.	-	10	155	84	-	-	23	26	-	-
Conn.	-	1	11	291	-	-	3	148	-	-
MID. ATLANTIC	-	1,410	2,995	2,359	1	-	1,866	1,444	2	2
Upstate N.Y.	-	113	N	N	1	-	-	128	2	-
N.Y. City	-	1,030	1,920	1,503	-	-	1,036	741	-	-
N.J.	-	70	1	474	-	-	212	348	-	-
Pa.	-	197	1,074	382	N	-	618	227	-	2
E.N. CENTRAL	-	48	3,953	3,292	5	-	3,313	2,644	22	41
Ohio	-	6	743	1,225	3	-	485	978	2	3
Ind.	-	-	301	385	2	-	320	312	1	1
Ill.	-	1	1,268	605	-	-	1,206	317	-	6
Mich.	-	29	1,571	425	-	-	1,256	723	19	31
Wis.	-	12	70	652	N	1	46	314	-	-
W.N. CENTRAL	-	81	1,111	1,344	2	-	494	679	3	5
Minn.	-	2	80	351	2	-	52	132	-	-
Iowa	-	19	39	-	-	-	13	-	3	-
Mo.	-	54	491	611	-	-	210	384	-	4
N. Dak.	-	-	-	31	-	-	-	2	-	-
S. Dak.	-	-	85	46	-	-	17	9	-	-
Nebr.	-	6	11	99	-	-	1	34	-	-
Kans.	-	-	405	206	-	-	201	118	-	1
S. ATLANTIC	-	584	4,498	4,381	10	-	3,947	4,177	6	7
Del.	-	-	75	-	-	-	80	-	-	-
Md.	-	158	382	258	5	-	245	652	1	3
D.C.	-	2	N	N	-	-	237	331	-	-
Va.	-	48	303	607	N	-	322	439	1	-
W. Va.	-	-	168	196	N	-	47	63	-	-
N.C.	-	1	923	1,352	2	-	840	986	2	3
S.C.	-	30	1,013	498	-	-	835	554	-	1
Ga.	-	1	970	590	1	-	780	539	-	-
Fla.	-	344	664	880	2	-	561	613	2	-
E.S. CENTRAL	-	86	1,634	1,633	2	-	1,866	1,923	3	9
Ky.	-	-	282	290	1	-	217	229	-	-
Tenn.	-	36	645	504	-	-	679	477	3	2
Ala.	-	37	541	420	1	-	772	682	-	1
Miss.	-	13	166	419	-	1	198	535	-	6
W.S. CENTRAL	-	366	1,391	761	-	-	1,469	958	-	1
Ark.	-	18	186	116	-	-	360	262	-	-
La.	-	32	754	332	-	-	832	402	-	1
Okla.	-	11	451	313	-	-	277	294	-	-
Tex.	-	305	-	-	-	-	-	-	-	-
MOUNTAIN	-	83	819	1,122	4	2	418	387	13	20
Mont.	-	7	6	22	-	-	-	4	3	2
Idaho	-	-	33	70	1	-	-	9	2	5
Wyo.	-	1	29	25	-	-	2	3	4	7
Colo.	-	24	-	45	1	-	188	100	1	3
N. Mex.	-	-	266	273	1	1	56	57	-	2
Ariz.	-	1	362	421	N	1	156	146	-	1
Utah	-	8	113	86	1	-	13	7	2	-
Nev.	-	42	10	180	-	-	3	61	1	-
PACIFIC	-	50	1,991	4,351	5	-	806	1,195	8	42
Wash.	-	45	507	478	-	-	88	127	-	-
Oreg.	-	-	279	202	1	-	48	32	-	1
Calif.	-	2	1,054	3,560	4	-	648	996	8	39
Alaska	-	-	77	70	-	-	10	33	-	-
Hawaii	-	3	74	41	N	-	12	7	-	2
Guam	-	-	-	17	N	-	-	2	-	-
P.R.	-	1	U	U	-	U	11	30	2	-
V.I.	-	1	N	N	N	U	-	-	-	-
Amer. Samoa	-	-	-	-	N	U	-	-	-	-
C.N.M.I.	-	-	N	N	N	U	-	3	-	-

N: Not notifiable U: Unavailable -: no reported cases C.N.M.I.: Commonwealth of Northern Mariana Islands

*Updated monthly to the Division of HIV/AIDS Prevention–Surveillance and Epidemiology, National Center for HIV, STD, and TB Prevention, last update December 23, 1997.

†National Electronic Telecommunications System for Surveillance.

§Public Health Laboratory Information System.

TABLE II. (Cont'd.) Provisional cases of selected notifiable diseases, United States, weeks ending January 24, 1998, and January 18, 1997 (3rd Week)

Reporting Area	Legionellosis		Lyme Disease		Malaria		Syphilis (Primary & Secondary)		Tuberculosis		Rabies, Animal
	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1997	Cum. 1998*	Cum. 1997	Cum. 1998
UNITED STATES	37	32	93	157	23	59	328	427	282	454	309
NEW ENGLAND	-	2	2	42	-	1	2	5	-	7	73
Maine	-	-	-	-	-	-	-	-	U	-	10
N.H.	-	-	-	-	-	-	-	-	-	-	8
Vt.	-	1	-	1	-	-	-	-	-	-	1
Mass.	-	1	2	4	-	1	2	3	-	1	23
R.I.	-	-	-	1	-	-	-	-	-	-	9
Conn.	-	-	-	36	-	-	-	2	U	6	22
MID. ATLANTIC	1	5	55	93	3	6	20	23	-	19	85
Upstate N.Y.	-	-	8	-	-	-	-	-	U	2	52
N.Y. City	-	-	-	6	1	1	3	6	U	6	U
N.J.	-	1	-	32	-	3	13	14	U	-	13
Pa.	1	4	47	55	2	2	4	3	U	11	20
E.N. CENTRAL	19	13	6	2	4	8	39	38	17	51	1
Ohio	12	8	6	1	1	-	13	14	U	30	1
Ind.	1	-	-	-	1	1	8	9	U	3	-
Ill.	-	1	-	1	-	5	18	6	17	18	-
Mich.	6	4	-	-	2	2	-	-	U	-	-
Wis.	-	-	U	U	-	-	-	9	U	-	-
W.N. CENTRAL	-	3	-	-	-	-	4	11	2	3	13
Minn.	-	-	-	-	-	-	-	2	U	3	1
Iowa	-	-	-	-	-	-	-	-	U	-	8
Mo.	-	1	-	-	-	-	2	7	2	-	1
N. Dak.	-	-	-	-	-	-	-	-	U	-	-
S. Dak.	-	-	-	-	-	-	-	-	-	-	-
Nebr.	-	1	-	-	-	-	-	-	-	-	-
Kans.	-	1	-	-	-	-	2	2	U	-	3
S. ATLANTIC	8	3	24	9	6	4	119	171	23	15	110
Del.	1	-	-	1	-	1	-	-	-	-	-
Md.	3	2	22	7	5	1	23	46	-	4	35
D.C.	1	1	1	-	-	-	1	6	5	5	-
Va.	1	-	-	-	-	-	14	12	-	-	15
W. Va.	N	N	-	-	-	-	-	-	5	1	4
N.C.	-	-	-	1	-	1	32	35	13	-	28
S.C.	-	-	-	-	-	1	18	23	U	-	4
Ga.	-	-	-	-	-	-	15	34	U	-	12
Fla.	2	-	1	-	1	-	16	15	U	5	12
E.S. CENTRAL	-	2	4	8	-	1	70	100	-	26	4
Ky.	-	-	-	1	-	-	8	7	-	7	1
Tenn.	-	-	4	1	-	-	33	34	U	7	-
Ala.	-	1	-	-	-	1	23	42	U	12	3
Miss.	-	1	-	6	-	-	6	17	U	-	-
W.S. CENTRAL	-	-	-	-	-	-	46	54	-	49	11
Ark.	-	-	-	-	-	-	15	12	-	-	1
La.	-	-	-	-	-	-	27	31	-	-	-
Okla.	-	-	-	-	-	-	4	11	U	3	10
Tex.	-	-	-	-	-	-	-	-	U	46	-
MOUNTAIN	5	3	-	-	2	3	11	9	3	5	4
Mont.	-	-	-	-	-	1	-	-	-	-	2
Idaho	-	-	-	-	-	-	-	-	-	-	-
Wyo.	-	-	-	-	-	-	-	-	-	1	2
Colo.	2	1	-	-	1	-	1	-	U	3	-
N. Mex.	1	-	-	-	1	-	-	-	U	-	-
Ariz.	-	1	-	-	-	-	8	8	3	1	-
Utah	2	-	-	-	-	-	2	-	-	-	-
Nev.	-	1	-	-	-	2	-	1	U	-	-
PACIFIC	4	1	2	3	8	36	17	16	237	279	8
Wash.	-	-	-	-	-	-	-	-	U	8	-
Oreg.	-	-	-	1	2	2	1	1	U	5	-
Calif.	4	1	2	2	6	34	16	15	236	246	8
Alaska	-	-	-	-	-	-	-	-	-	4	-
Hawaii	-	-	-	-	-	-	-	-	1	16	-
Guam	-	-	-	-	-	-	-	-	-	2	-
P.R.	-	-	-	-	-	-	7	8	-	-	2
V.I.	-	-	-	-	-	-	-	-	-	-	-
Amer. Samoa	-	-	-	-	-	-	-	-	-	-	-
C.N.M.I.	-	-	-	-	-	-	-	-	-	-	-

N: Not notifiable U: Unavailable -: no reported cases

*Additional information about areas displaying "U" can be found in Notices to Readers, *MMWR* Vol. 47, No. 2, p. 39.

TABLE III. Provisional cases of selected notifiable diseases preventable by vaccination, United States, weeks ending January 24, 1998, and January 18, 1997 (3rd Week)

Reporting Area	*H. influenzae*, invasive		Hepatitis (Viral), by type				Measles (Rubeola)					
			A		B		Indigenous		Imported†		Total	
	Cum. 1998*	Cum. 1997	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1997	1998	Cum. 1998	1998	Cum. 1998	Cum. 1998	Cum. 1997
UNITED STATES	42	58	629	1,018	241	349	-	-	-	-	-	6
NEW ENGLAND	2	7	14	26	1	6	-	-	-	-	-	-
Maine	-	2	5	1	-	1	-	-	-	-	-	-
N.H.	1	-	1	-	1	-	-	-	-	-	-	-
Vt.	-	-	1	2	-	-	-	-	-	-	-	-
Mass.	1	5	1	10	-	4	-	-	-	-	-	-
R.I.	-	-	-	1	-	-	-	-	-	-	-	-
Conn.	-	-	6	12	-	1	-	-	-	-	-	-
MID. ATLANTIC	5	12	23	85	24	56	-	-	-	-	-	1
Upstate N.Y.	2	-	10	-	7	-	-	-	-	-	-	1
N.Y. City	-	4	7	40	5	20	-	-	-	-	-	-
N.J.	3	5	-	15	-	17	-	-	-	-	-	-
Pa.	-	3	6	30	12	19	-	-	-	-	-	-
E.N. CENTRAL	4	7	126	141	45	65	-	-	-	-	-	1
Ohio	3	3	30	26	6	4	-	-	-	-	-	-
Ind.	1	-	15	19	2	8	-	-	-	-	-	-
Ill.	-	4	-	48	-	24	-	-	-	-	-	-
Mich.	-	-	81	33	36	26	-	-	-	-	-	1
Wis.	-	-	-	15	1	3	-	-	-	-	-	-
W.N. CENTRAL	1	2	51	55	3	23	-	-	-	-	-	-
Minn.	-	-	-	-	-	-	-	-	-	-	-	-
Iowa	1	-	27	10	1	1	-	-	-	-	-	-
Mo.	-	2	24	22	1	19	-	-	-	-	-	-
N. Dak.	-	-	-	-	-	-	U	-	U	-	-	-
S. Dak.	-	-	-	1	1	-	-	-	-	-	-	-
Nebr.	-	-	-	4	-	1	-	-	-	-	-	-
Kans.	-	-	-	18	-	2	-	-	-	-	-	-
S. ATLANTIC	12	9	43	38	30	21	-	-	-	-	-	-
Del.	-	-	-	4	-	1	-	-	-	-	-	-
Md.	7	3	9	24	8	9	-	-	-	-	-	-
D.C.	-	-	2	1	1	1	-	-	-	-	-	-
Va.	-	-	6	-	2	-	-	-	-	-	-	-
W. Va.	1	1	-	1	-	1	-	-	-	-	-	-
N.C.	-	4	6	6	15	7	-	-	-	-	-	-
S.C.	-	-	3	1	-	2	-	-	-	-	-	-
Ga.	3	-	7	1	2	-	-	-	-	-	-	-
Fla.	1	1	10	-	2	-	-	-	-	-	-	-
E.S. CENTRAL	1	5	15	37	13	32	-	-	-	-	-	1
Ky.	-	-	-	3	-	-	-	-	-	-	-	-
Tenn.	1	1	9	15	7	25	-	-	-	-	-	-
Ala.	-	4	6	6	6	1	-	-	-	-	-	1
Miss.	-	-	-	13	-	6	U	-	U	-	-	-
W.S. CENTRAL	-	2	17	34	5	2	-	-	-	-	-	-
Ark.	-	-	1	6	5	2	-	-	-	-	-	-
La.	-	-	-	-	-	-	-	-	-	-	-	-
Okla.	-	2	9	26	-	-	-	-	-	-	-	-
Tex.	-	-	7	2	-	-	-	-	-	-	-	-
MOUNTAIN	8	2	181	185	42	48	-	-	-	-	-	-
Mont.	-	-	3	5	1	-	-	-	-	-	-	-
Idaho	-	-	4	15	3	-	-	-	-	-	-	-
Wyo.	-	-	-	2	-	1	-	-	-	-	-	-
Colo.	1	1	16	29	5	10	-	-	-	-	-	-
N. Mex.	-	-	11	13	16	23	-	-	-	-	-	-
Ariz.	3	1	117	65	9	9	-	-	-	-	-	-
Utah	-	-	11	42	3	2	-	-	-	-	-	-
Nev.	4	-	19	14	5	3	-	-	-	-	-	-
PACIFIC	9	12	159	417	78	96	-	-	-	-	-	3
Wash.	-	-	-	-	-	-	-	-	-	-	-	-
Oreg.	6	3	12	34	3	12	-	-	-	-	-	-
Calif.	3	7	147	370	74	82	-	-	-	-	-	1
Alaska	-	-	-	3	1	-	-	-	-	-	-	-
Hawaii	-	2	-	10	-	2	-	-	-	-	-	2
Guam	-	-	-	-	-	1	U	-	U	-	-	-
P.R.	-	-	-	5	-	6	-	-	-	-	-	-
V.I.	-	-	-	-	-	-	U	-	U	-	-	-
Amer. Samoa	-	-	-	-	-	-	U	-	U	-	-	-
C.N.M.I.	-	1	-	-	-	-	U	-	U	-	-	-

N: Not notifiable U: Unavailable -: no reported cases

*Of 10 cases among children aged <5 years, serotype was reported for 3 and of those, 0 were type b.

†For imported measles, cases include only those resulting from importation from other countries.

TABLE III. (Cont'd.) Provisional cases of selected notifiable diseases preventable by vaccination, United States, weeks ending January 24, 1998, and January 18, 1997 (3rd Week)

Reporting Area	Meningococcal Disease		Mumps			Pertussis			Rubella		
	Cum. 1998	Cum. 1997	1998	Cum. 1998	Cum. 1997	1998	Cum. 1998	Cum. 1997	1998	Cum. 1998	Cum. 1997
UNITED STATES	138	207	5	13	10	35	155	221	2	3	2
NEW ENGLAND	11	9	-	-	-	-	25	76	-	-	-
Maine	1	-	-	-	-	-	-	4	-	-	-
N.H.	1	-	-	-	-	-	-	3	-	-	-
Vt.	-	-	-	-	-	-	5	29	-	-	-
Mass.	5	6	-	-	-	-	20	40	-	-	-
R.I.	-	-	-	-	-	-	-	-	-	-	-
Conn.	4	3	-	-	-	-	-	-	-	-	-
MID. ATLANTIC	11	18	-	1	1	-	-	1	1	1	-
Upstate N.Y.	1	-	-	1	-	-	-	-	1	1	-
N.Y. City	1	4	-	-	-	-	-	-	-	-	-
N.J.	9	5	-	-	1	-	-	1	-	-	-
Pa.	-	9	-	-	-	-	-	-	-	-	-
E.N. CENTRAL	17	34	1	1	-	2	13	24	-	-	2
Ohio	13	11	1	1	-	2	12	15	-	-	-
Ind.	3	4	-	-	-	-	-	-	-	-	-
Ill.	-	13	-	-	-	-	-	1	-	-	-
Mich.	1	2	-	-	-	-	1	5	-	-	-
Wis.	-	4	-	-	-	-	-	3	-	-	2
W.N. CENTRAL	4	15	-	-	-	-	-	4	-	-	-
Minn.	-	-	-	-	-	-	-	-	-	-	-
Iowa	1	5	-	-	-	-	-	3	-	-	-
Mo.	1	9	-	-	-	-	-	-	-	-	-
N. Dak.	-	-	U	-	-	U	-	-	U	-	-
S. Dak.	1	-	-	-	-	-	-	1	-	-	-
Nebr.	-	-	-	-	-	-	-	-	-	-	-
Kans.	1	1	-	-	-	-	-	-	-	-	-
S. ATLANTIC	39	32	1	7	-	3	26	7	-	1	-
Del.	-	2	-	-	-	-	-	-	-	-	-
Md.	8	2	-	1	-	3	5	7	-	-	-
D.C.	-	2	-	-	-	-	-	-	-	-	-
Va.	3	2	-	-	-	-	-	-	-	-	-
W. Va.	2	1	-	-	-	-	-	-	-	-	-
N.C.	3	6	-	3	-	-	21	-	-	1	-
S.C.	5	11	-	2	-	-	-	-	-	-	-
Ga.	11	4	-	-	-	-	-	-	-	-	-
Fla.	7	2	1	1	-	-	-	-	-	-	-
E.S. CENTRAL	5	24	-	-	4	2	3	1	-	-	-
Ky.	-	4	-	-	-	-	-	-	-	-	-
Tenn.	5	7	-	-	1	-	-	-	-	-	-
Ala.	-	8	-	-	1	2	3	1	-	-	-
Miss.	-	5	U	-	2	U	-	-	U	-	-
W.S. CENTRAL	7	3	-	-	-	-	4	1	1	1	-
Ark.	2	2	-	-	-	-	4	-	-	-	-
La.	-	-	-	-	-	-	-	-	-	-	-
Okla.	5	1	-	-	-	-	-	-	-	-	-
Tex.	-	-	-	-	-	-	-	1	1	1	-
MOUNTAIN	11	13	-	1	1	27	74	88	-	-	-
Mont.	1	1	-	-	-	-	-	-	-	-	-
Idaho	-	-	-	-	-	13	38	69	-	-	-
Wyo.	1	-	-	-	-	-	-	1	-	-	-
Colo.	5	-	-	-	-	-	7	9	-	-	-
N. Mex.	2	2	N	N	N	13	25	4	-	-	-
Ariz.	1	5	-	1	-	-	-	4	-	-	-
Utah	1	3	-	-	-	1	4	-	-	-	-
Nev.	-	2	-	-	1	-	-	1	-	-	-
PACIFIC	33	59	3	3	4	1	10	19	-	-	-
Wash.	-	-	-	-	-	-	-	-	-	-	-
Oreg.	16	21	N	N	N	1	3	1	-	-	-
Calif.	17	38	1	1	2	-	7	17	-	-	-
Alaska	-	-	2	2	-	-	-	1	-	-	-
Hawaii	-	-	-	-	2	-	-	-	-	-	-
Guam	-	-	U	-	-	U	-	-	U	-	-
P.R.	-	-	-	-	1	-	-	-	-	-	-
V.I.	-	-	U	-	-	U	-	-	U	-	-
Amer. Samoa	-	-	U	-	-	U	-	-	U	-	-
C.N.M.I.	-	-	U	-	-	U	-	-	U	-	-

N: Not notifiable U: Unavailable -: no reported cases

TABLE IV. Deaths in 122 U.S. cities,* week ending January 24, 1998 (3rd Week)

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	>65	45-64	25-44	1-24	<1	
NEW ENGLAND	556	437	73	23	12	11	56
Boston, Mass.	135	99	24	5	4	3	15
Bridgeport, Conn.	51	42	8	-	1	-	2
Cambridge, Mass.	20	18	2	-	-	-	2
Fall River, Mass.	24	17	7	-	-	-	-
Hartford, Conn.	64	49	8	4	3	-	2
Lowell, Mass.	23	18	3	2	-	-	3
Lynn, Mass.	22	18	2	2	-	-	-
New Bedford, Mass.	22	20	2	-	-	-	1
New Haven, Conn.	46	40	4	-	-	2	5
Providence, R.I.	U	U	U	U	U	U	U
Somerville, Mass.	8	5	2	-	1	-	-
Springfield, Mass.	38	24	6	3	3	2	4
Waterbury, Conn.	38	34	1	3	-	-	8
Worcester, Mass.	65	53	4	4	-	4	14
MID. ATLANTIC	2,610	1,849	471	201	52	37	159
Albany, N.Y.	44	29	6	6	1	2	3
Allentown, Pa.	24	21	2	1	-	-	1
Buffalo, N.Y.	65	48	13	3	-	1	1
Camden, N.J.	46	35	2	4	4	1	7
Elizabeth, N.J.	26	21	5	-	-	-	-
Erie, Pa.	35	27	6	2	-	-	-
Jersey City, N.J.	52	32	13	4	-	3	4
New York City, N.Y.	1,368	952	258	109	28	21	65
Newark, N.J.	60	36	12	9	2	1	5
Paterson, N.J.	30	15	11	4	-	-	-
Philadelphia, Pa.	399	264	85	31	13	6	26
Pittsburgh, Pa.§	60	46	7	6	-	1	3
Reading, Pa.	49	44	1	3	1	-	1
Rochester, N.Y.	153	118	28	5	2	-	18
Schenectady, N.Y.	33	28	3	2	-	-	4
Scranton, Pa.	41	33	5	2	1	-	5
Syracuse, N.Y.	70	59	7	3	-	1	12
Trenton, N.J.	28	18	6	4	-	-	4
Utica, N.Y.	27	23	1	3	-	-	-
Yonkers, N.Y.	U	U	U	U	U	U	U
E.N. CENTRAL	2,249	1,547	421	181	52	47	134
Akron, Ohio	42	29	8	5	-	-	-
Canton, Ohio	47	36	10	-	1	-	7
Chicago, Ill.	448	257	91	68	19	12	20
Cincinnati, Ohio	118	84	19	6	3	6	15
Cleveland, Ohio	165	115	38	11	1	-	4
Columbus, Ohio	214	144	51	11	5	3	18
Dayton, Ohio	131	94	21	11	4	1	9
Detroit, Mich.	221	122	55	30	7	7	10
Evansville, Ind.	67	55	8	4	-	-	6
Fort Wayne, Ind.	64	51	10	1	1	1	5
Gary, Ind.	7	4	3	-	-	-	-
Grand Rapids, Mich.	57	41	7	5	1	3	5
Indianapolis, Ind.	191	148	30	9	2	2	-
Lansing, Mich.	49	39	8	1	1	-	6
Milwaukee, Wis.	138	110	16	6	3	3	9
Peoria, Ill.	52	33	12	4	-	3	4
Rockford, Ill.	53	41	7	2	1	2	4
South Bend, Ind.	52	40	9	2	1	-	4
Toledo, Ohio	68	50	11	4	2	1	7
Youngstown, Ohio	65	54	7	1	-	3	1
W.N. CENTRAL	769	554	119	49	18	14	54
Des Moines, Iowa	69	49	12	6	2	-	5
Duluth, Minn.	31	24	3	3	1	-	3
Kansas City, Kans.	43	30	10	2	-	1	2
Kansas City, Mo.	161	108	23	9	2	4	4
Lincoln, Nebr.	31	22	8	1	-	-	6
Minneapolis, Minn.	110	81	17	5	3	4	9
Omaha, Nebr.	91	76	8	2	5	-	8
St. Louis, Mo.	77	56	10	8	1	2	-
St. Paul, Minn.	82	56	14	8	3	1	14
Wichita, Kans.	74	52	14	5	1	2	3

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	>65	45-64	25-44	1-24	<1	
S. ATLANTIC	1,138	745	236	115	23	17	106
Atlanta, Ga.	U	U	U	U	U	U	U
Baltimore, Md.	151	88	36	22	3	1	21
Charlotte, N.C.	125	93	21	8	2	1	13
Jacksonville, Fla.	149	107	28	9	2	3	8
Miami, Fla.	98	63	17	14	3	1	-
Norfolk, Va.	50	35	11	-	4	-	3
Richmond, Va.	65	38	16	9	-	2	7
Savannah, Ga.	75	51	18	4	1	1	14
St. Petersburg, Fla.	98	77	13	3	4	1	17
Tampa, Fla.	196	122	49	18	2	4	18
Washington, D.C.	122	68	27	22	2	3	5
Wilmington, Del.	9	3	-	6	-	-	-
E.S. CENTRAL	786	568	148	35	14	16	63
Birmingham, Ala.	249	171	48	11	9	5	24
Chattanooga, Tenn.	71	53	14	2	1	1	10
Knoxville, Tenn.	101	79	15	5	1	1	15
Lexington, Ky.	46	32	11	1	1	1	5
Memphis, Tenn.	U	U	U	U	U	U	U
Mobile, Ala.	50	34	12	3	-	1	-
Montgomery, Ala.	92	68	16	5	1	2	2
Nashville, Tenn.	177	131	32	8	1	5	7
W.S. CENTRAL	1,906	1,280	384	153	47	42	171
Austin, Tex.	66	48	11	5	1	1	4
Baton Rouge, La.	35	24	6	2	1	2	-
Corpus Christi, Tex.	84	63	9	9	3	-	1
Dallas, Tex.	233	150	47	25	6	5	7
El Paso, Tex.	129	87	26	11	2	3	13
Ft. Worth, Tex.	130	78	32	9	3	8	8
Houston, Tex.	491	321	110	43	11	6	56
Little Rock, Ark.	96	62	21	6	4	3	4
New Orleans, La.	148	96	31	12	5	4	-
San Antonio, Tex.	257	180	55	13	3	6	36
Shreveport, La.	85	62	14	5	2	2	15
Tulsa, Okla.	152	109	22	13	6	2	27
MOUNTAIN	1,129	816	190	75	26	21	139
Albuquerque, N.M.	121	95	13	9	3	1	12
Boise, Idaho	55	42	9	3	-	1	3
Colo. Springs, Colo.	60	37	14	5	2	2	5
Denver, Colo.	126	87	21	11	5	1	24
Las Vegas, Nev.	236	173	44	13	5	1	21
Ogden, Utah	22	18	2	1	1	-	4
Phoenix, Ariz.	143	96	22	16	2	7	12
Pueblo, Colo.	40	34	4	-	2	-	11
Salt Lake City, Utah	147	95	30	11	4	7	21
Tucson, Ariz.	179	139	31	6	2	1	26
PACIFIC	1,666	1,241	252	109	29	35	296
Berkeley, Calif.	23	15	4	4	-	-	3
Fresno, Calif.	93	63	10	14	2	4	12
Glendale, Calif.	U	U	U	U	U	U	U
Honolulu, Hawaii	88	63	18	5	1	1	8
Long Beach, Calif.	104	86	14	2	1	1	29
Los Angeles, Calif.	U	U	U	U	U	U	U
Pasadena, Calif.	53	45	6	1	-	1	13
Portland, Oreg.	U	U	U	U	U	U	U
Sacramento, Calif.	283	210	40	22	4	7	63
San Diego, Calif.	204	156	32	9	3	4	54
San Francisco, Calif.	142	99	26	12	3	2	30
San Jose, Calif.	302	238	39	14	5	6	50
Santa Cruz, Calif.	34	27	5	1	-	1	10
Seattle, Wash.	184	126	36	15	4	3	10
Spokane, Wash.	57	36	11	6	2	2	4
Tacoma, Wash.	99	77	11	4	4	3	10
TOTAL	12,809¶	9,037	2,294	941	273	240	1,178

U: Unavailable -: no reported cases

*Mortality data in this table are voluntarily reported from 122 cities in the United States, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fetal deaths are not included.

†Pneumonia and influenza.

§Because of changes in reporting methods in this Pennsylvania city, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.

¶Total includes unknown ages.

Quarterly Immunization Table

To track progress toward achieving the goals of the Childhood Immunization Initiative (CII), CDC publishes quarterly a tabular summary of the number of cases of nationally notifiable diseases preventable by routine childhood vaccination reported during the previous quarter and year-to-date (provisional data). In addition, the table compares provisional data with final data for the previous year and highlights the number of reported cases in children aged <5 years, who are the primary focus of CII. Data in the table are reported through the National Electronic Telecommunications System for Surveillance (NETSS).

Number of reported cases of nationally notifiable diseases preventable by routine childhood vaccination — United States, October–December 1997 and January–December 1996 and 1997*

Disease	No. cases, October–December 1997	Total cases January–December 1996	Total cases January–December 1997	No. cases among children aged <5 years† January–December 1996	No. cases among children aged <5 years† January–December 1997
Congenital rubella syndrome	1	**4**	**6**	4	6
Diphtheria	0	**2**	**5**	0	1
Haemophilus influenzae§	246	**1,170**	**1,075**	273	245
Hepatitis B¶	2,134	**10,637**	**8,902**	93	96
Measles	20	**549**	**136**	160	54
Mumps	184	**751**	**639**	158	127
Pertussis	1,809	**7,796**	**5,729**	3,464	2,480
Poliomyelitis, paralytic**	0	**5**	**1**	3	1
Rubella	28	**238**	**161**	18	10
Tetanus	14	**36**	**46**	0	0

*Data for 1996 are final; data for 1997 are provisional.
†For 1996 and 1997, data by age were available for ≥97% cases.
§Invasive disease; *H. influenzae* serotype is not routinely reported to the National Notifiable Diseases Surveillance System. Of 245 cases in children aged <5 years, serotype was reported for 126; of these, 47 were type b, the only serotype of *H. influenzae* preventable by vaccination.
¶Because most hepatitis B virus infections among infants and children aged <5 years are asymptomatic (although likely to become chronic), acute disease surveillance does not reflect the incidence of this problem in this age group or the effectiveness of hepatitis B vaccination in infants.
**One case with onset in 1997 has been confirmed; three suspected cases are being investigated. One suspected case occurred in a child aged <5 years.

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