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Hypertrophic Pyloric Stenosis in Infants Following Pertussis Prophylaxis with Erythromycin — Knoxville, Tennessee, 1999

In February 1999, pertussis was diagnosed in six neonates born at hospital A in Knoxville, Tennessee. Because a health-care worker at hospital A was most likely the source of exposure, the local health department recommended on February 25, 1999, that erythromycin be prescribed as postexposure prophylaxis for the approximately 200 infants born at hospital A during February 1–24, 1999. In March 1999, local pediatric surgeons noticed an increased number of cases of infantile hypertrophic pyloric stenosis (IHPS) in the area, with seven cases occurring during a 2-week period. All seven IHPS cases were in infants born in hospital A during February who were given erythromycin orally for prophylaxis following possible exposure to pertussis, although none had pertussis diagnosed. The Tennessee Department of Health and CDC investigated the cluster of IHPS cases and its possible association with use of erythromycin. This report summarizes the results of the investigation, which suggest a causal role of erythromycin in this cluster of IHPS cases (*1*).

Case Review

IHPS cases occurring during 1997–1999 were ascertained by reviewing medical records in the two area hospitals that provide IHPS treatment. IHPS was defined as a hospital diagnosis of pyloric stenosis (*International Classification of Diseases, Ninth Revision, Clinical Modification*, code 750.5) that required pyloromyotomy in an infant born in one of the six birthing facilities in the region during 1997–1999. The rate of IHPS cases per 1000 live-born infants for each month was calculated using the number of live-born infants at the six birthing facilities as the denominator. The incidence of IHPS among infants born at hospital A peaked during February 1999 with seven IHPS cases among 217 live-born infants (rate: 32.3 cases per 1000 live-born infants) (Figure 1), a rate that was nearly seven times higher than during 1997–1998 (relative risk=6.8; 95% confidence interval [CI]=3.0–15.7). No additional IHPS cases were reported among infants born during March–May 1999 at hospital A, and the risk for IHPS in the region returned to the background rates following the peak in February 1999.

To compare the clinical characteristics of the seven index IHPS cases with those of historical IHPS cases, a detailed chart review of IHPS cases from January 1998

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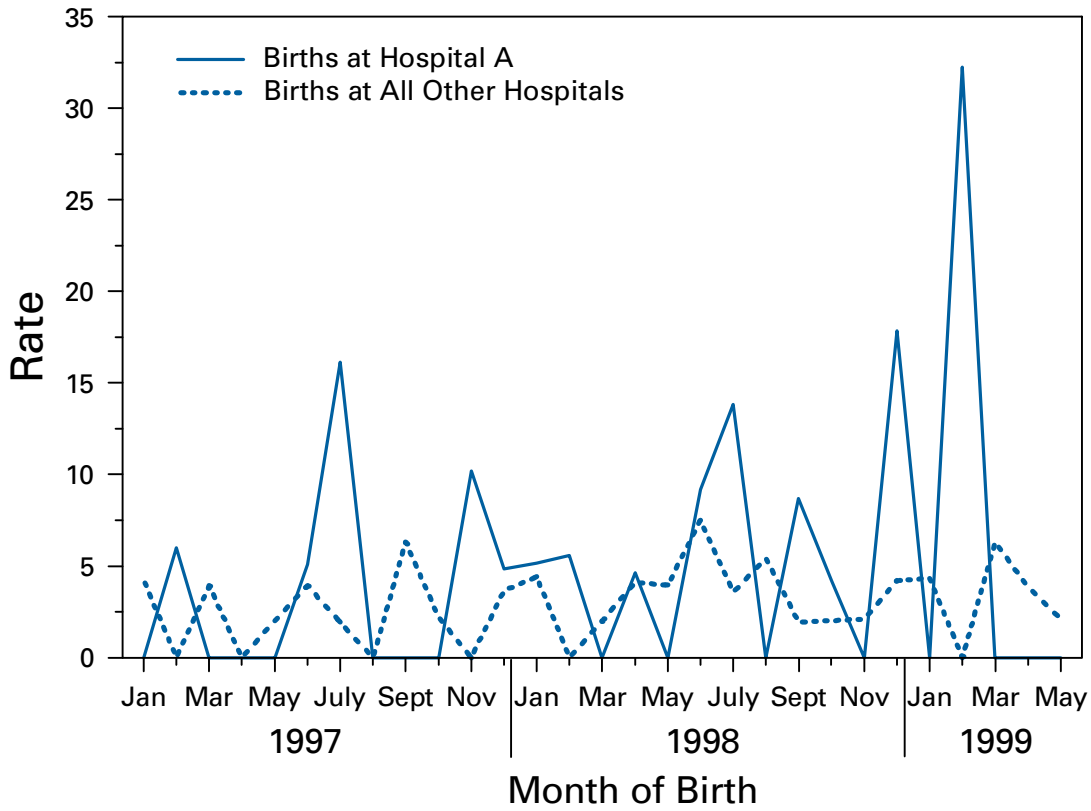
FIGURE 1. Incidence* of hypertrophic pyloric stenosis among infants born in hospital A and in all other birthing facilities — Knoxville, Tennessee, 1997–May 1999



*Per 1000 live-born infants.

through March 1999 was conducted at the two hospitals in the region that had pediatric surgery services. The diagnostic features of the seven index cases were similar to 40 historical cases. Compared with historical cases, index case-patients were younger at the time of admission for IHPS (mean age=25.6 days versus 35.4 days) and were less likely to have a family history of IHPS (0% versus 17.5%). The mean pyloric thickness and length as measured on ultrasound were similar in the two groups. All index case-patients had received oral erythromycin, compared with none of the historical case-patients.

To validate the IHPS diagnoses, a pediatric radiologist, who was blinded to the original readings, reviewed ultrasound films for the seven index case-patients and seven infants without IHPS. The ultrasound review showed perfect agreement with the original readings (Kappa=1.0; 95% CI=0.48–1.0).

Cohort Study

A retrospective cohort study of 282 infants born during January–February 1999 at hospital A was conducted to assess a possible association between erythromycin use, gastrointestinal symptoms, and IHPS. In the cohort, 157 infants (55.7%) had a history of oral erythromycin use. The prevalence of erythromycin use was 8.6% among 116 infants born during January 1999 and 88.6% among 166 infants born during

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February 1999. The erythromycin preparations administered to the infants included ethyl succinate (n=83), estolate (n=59), both ethyl succinate and estolate (n=one), and unknown (n=14). No differences were observed in gastrointestinal symptoms or risk for IHPS in relation to the type of erythromycin preparation.

The infants who were given erythromycin but who did not develop IHPS were aged 1–53 days when they began erythromycin (median age=13 days; mean=14.1 days), and the duration of erythromycin exposure ranged from 1 to 21 days (median duration=14 days; mean=12.2 days). The seven index IHPS case-patients were aged 2–17 days when they began erythromycin (median=5 days; mean=9.3 days), and the duration of their erythromycin exposure ranged from 10–18 days (median duration=14 days; mean=13.3 days). Seven IHPS cases occurred among infants who were exposed to erythromycin and none among infants not exposed to erythromycin (relative risk=infinity, lower bound of exact 95% CI=1.7).

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Editorial Note: IHPS is a hypertrophy of the pyloric muscle that usually results in nonbilious, projectile vomiting that begins at about 3.5 weeks of age (*2*). IHPS affects approximately one to three infants per 1000 live-born infants and affects about four to five times as many male as female infants (*3,4*). Evidence suggests that the pyloric muscle hypertrophy of IHPS develops postnatally (*5*). The first case reports of a possible association between IHPS and erythromycin in five neonates were published in 1976 (*6*), but the association was considered improbable and had remained unconfirmed. The only subsequent report of this association was a single case report of IHPS in a breastfed infant whose mother had taken erythromycin (*7*). The findings in this report provide further evidence that erythromycin has a causal role in the etiology of IHPS and raise concerns about the use of erythromycin in neonates.

The peak in IHPS incidence in this region corresponded temporally with the use of erythromycin following the county health department recommendation. All index IHPS case-patients began having symptoms of either vomiting or excessive irritability while taking erythromycin.

The study described in this report is not population-based but includes all live-born infants at facilities in the Knoxville metropolitan area. Local clinicians and public health workers considered it unlikely that an infant born at one of these facilities would be referred outside the region for pediatric surgery, but this possibility cannot be completely eliminated. No evidence indicated a change in case definition, in referral patterns, or in pediatric surgeons or pediatric radiologists that could account for this increase in IHPS incidence. It is unlikely that children with severely hypertrophied pylori would not exhibit symptoms, and evaluation of the pyloric muscle of normal children versus those with IHPS has not demonstrated the existence of severe hypertrophy among asymptomatic children (*8*). Therefore, it is unlikely that IHPS cases were missed.

Previous epidemiologic studies of IHPS have not identified erythromycin as a risk factor, possibly because few neonates included in such studies were exposed to

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erythromycin. In most mass prophylaxis situations, the number of neonates treated may be small, possibly explaining why an increased risk for IHPS with erythromycin had not been established.

The prevention of pertussis in infants is important; most hospitalizations for and deaths from pertussis occur in children aged <1 year (*9*). Although no data exist to confirm a safe and effective alternative to erythromycin for prophylaxis of neonates exposed to pertussis, these findings indicate a need for further examination of recommendations for erythromycin prophylaxis (*10*). The high case-fatality ratio of pertussis in neonates demonstrates the need to prevent pertussis in this age group, as was done successfully in Tennessee. However, public health officials should continue to use caution in defining risk groups to minimize unnecessary prophylaxis. Physicians who prescribe erythromycin to newborns should inform parents about the possible risks for IHPS and counsel them about signs of developing IHPS.

Cases of pyloric stenosis following use of oral erythromycin should be reported to the Food and Drug Administration (FDA) MedWatch, telephone (800) 332-1088, or through the World-Wide Web, http://www.fda.gov/medwatch.* Additional information on use of erythromycin for treatment of ophthalmia neonatorum and infant pneumonia caused by *Chlamydia trachomatis* in newborns is available at http://www.cdc.gov/nchstp/dstd/eryth.htm or by fax, (800) 332-0178.

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Carbon Monoxide Poisoning Associated with Use of LPG-Powered (Propane) Forklifts in Industrial Settings — Iowa, 1998

In 1998, the Iowa Department of Public Health (IDPH) and Iowa State University (ISU) Extension Department, with the assistance of local health departments, investigated a series of carbon monoxide (CO) poisonings associated with the use of liquified petroleum gas (LPG)-powered forklifts in light industry. In each episode, forklifts emitting high CO concentration levels were operated in inadequately ventilated warehouse and production facilities, which resulted in high CO accumulations. Employees at each site developed symptoms of CO poisoning, and some employees received inadequate or inappropriate medical care. This report summarizes the investigations and provides recommendations to prevent such incidents.

Incident 1

On August 17 and 18, 1998, during three consecutive 8-hour shifts, 34 (45%) of 75 plastic manufacturing plant employees experienced symptoms of CO poisoning (primarily headaches) while at work. Ten ill employees were evaluated at three local emergency departments (EDs). Of five employees seen at one ED, possible CO poisoning initially was diagnosed in three workers. However, because of high pulse oximeter readings, this diagnosis was dismissed erroneously, and the three employees were discharged and returned to work. The other two employees had "possible poly vinyl chloride inhalation" and "syncopal episode" diagnosed, respectively; one was admitted to the hospital, and one was discharged home. Of four employees seen at a second ED, the first two had "migraine headache" and "torticollis" diagnosed, and the second two were suspected to be CO poisoned and had carboxyhemoglobin (COHb) levels of 3.8% (1 hour after leaving work) and 10.7% (2 hours after leaving work), respectively.* One employee was seen at a third ED, and a headache of undetermined cause was diagnosed.

A local physician notified IDPH when several plant employees sought follow-up treatment the next day. Overall, 25 (38%) of 65 plant employees interviewed by IDPH had illnesses that met the case definition of CO poisoning (i.e., headache and at least one of the following: weakness, dizziness, or nausea). Illness rates increased with each shift, and no substantial associations were found between illness and age, sex, recent illness such as cold or influenza, illness in family members, hay fever, asthma, or smoking.

When measured by investigators, the plant's two forklifts each emitted concentrations of CO in excess of 40,000 ppm (recommended guidelines range from 2000 to 10,000 ppm [*1–3*]). On August 17, the plant's air-conditioning system had been shut down for servicing, and an exhaust fan had malfunctioned, reducing the effective ventilation rate. However, the forklifts emitted such excessive amounts of CO that no practical level of ventilation could have maintained CO concentrations below recommended exposure limits.† Neither employees nor managers were aware that the

*Normal COHb concentrations are <2% in nonsmokers and 5%–9% in smokers.

†CDC's National Institute for Occupational Safety and Health recommends that CO exposure not exceed 35 ppm as an 8-hour time-weighted average and that point exposure should never exceed 200 ppm.

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symptoms they experienced were related to CO poisoning, which delayed recognition and response.

Incident 2

In November 1998, after experiencing headaches, nausea, and dizziness over several days, employees of a warehouse brought conventional residential CO detectors to work; these detectors registered CO concentrations of 30–136 ppm. In the adjacent office area, concentrations as high as 76 ppm were recorded before employees inactivated the detectors to silence the continuous alarms. Employing industrial CO detectors, the investigation by IDPH determined that the facility's LPG-powered forklifts (producing from 40,000 to 70,000 ppm of CO) and inadequate plant ventilation allowed accumulations of CO up to 267 ppm in the warehouse. No employees reported seeking medical treatment.

Incident 3

From December 1998 through January 5, 1999, employees of an embroidery company experienced headaches and fatigue, and an employee's puppy became somnolent when brought to work. A local energy company was called to investigate. The company measured CO concentrations of 100–200 ppm in the embroidery offices. While attempting to find the source of CO, investigators found levels of 200–450 ppm in a wooden pallet manufacturer located in the same building one floor below the embroidery offices.

One symptomatic office employee, a pregnant woman, consulted her obstetrician and reportedly was told that no postexposure treatment existed. Approximately 24 hours after her last exposure to CO and after seeking medical advice from experts in CO poisoning, she and another symptomatic employee were treated with hyperbaric oxygen (*4*). At the time of treatment, their COHb levels were within the normal range but both were still having symptoms. Both employees demonstrated substantial subjective improvement after treatment. The since-delivered child is being monitored for CO-related complications such as neurologic conditions and growth abnormalities.

In the subsequent investigation, 23 workers were interviewed; two (29%) of seven embroidery employees and four (25%) of 16 pallet company employees had illnesses that met the case definition for CO poisoning. Investigators found an association between illness and proximity of the person's work station to areas where the forklifts were operated. The pallet manufacturer's forklifts emitted up to 75,000 ppm of CO into the inadequately ventilated warehouse. The embroidery office's furnace was vented properly with satisfactory combustion. However, the furnace was in the warehouse of the pallet company and pulled high CO-content ambient air from the warehouse into the heating system and distributed it to the embroidery office.

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Editorial Note: CO poisoning associated with indoor combustion sources has long been recognized but continues to be a problem in the United States. The events described in this report illustrate factors that result in failure to adequately prevent CO poisoning and to promptly recognize such incidents when they occur. Timely and

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correct clinical diagnosis of acute CO poisoning remains elusive because of the nonspecific and protean nature of its signs and symptoms (i.e., headache, nausea, lethargy, weakness, abdominal discomfort/pain, confusion, dizziness, visual disturbances [including blurred vision], numbness and tingling, ataxia, irritability, agitation, chest pain, dyspnea on exertion, palpitations, seizures, and loss of consciousness). In incident 1, failure to diagnose illness correctly in the first employees evaluated resulted in some CO-intoxicated employees being sent back to work and further exposure and in continued exposures to other workers at the plant. Correct diagnosis can be achieved by determining COHb levels in the patient. However, screening can be performed by breath analyzer instruments. Pulse oximeter testing does not reflect tissue hypoxia and cannot be used to screen or diagnose (*5*). Correct identification of the CO source requires specific resources (i.e., proper monitoring equipment; time for thorough investigation; and knowledge about potential CO sources, such as LPG-powered forklifts); these resources often may be unavailable on site, particularly in small business or light industrial settings but are frequently available through local utility companies.

Treatment for acute CO poisoning varies. The Undersea and Hyperbaric Medical Society provides guidelines to physicians for treating CO poisoning (*6*). These guidelines recommend that patients who manifest signs and symptoms of intoxication (e.g., altered mental status or neurologic signs, cardiovascular dysfunction, pulmonary edema, or severe acidosis) be referred for hyperbaric therapy regardless of their COHb levels (*4*).

In June 1998, the Council of State and Territorial Epidemiologists (CSTE) adopted a surveillance case definition for acute CO poisoning (*7*) that delineates criteria for categorizing reported acute CO poisonings. However, no commonly accepted clinical case definition nor consistent constellation of signs or symptoms exists that would unequivocally identify a case. All cases described in this report met the CSTE surveillance criteria for classification as confirmed cases.

Circumstances surrounding the continuing occurrence of CO poisonings and related confusion about identification of disease symptoms and appropriate treatment of cases illustrate the need for 1) improved education for ED and primary-care physicians about symptoms of CO poisoning, appropriate testing, and treatment (*4,6*); 2) improved education for employers, employees, and forklift maintenance providers about the hazards of using improperly or poorly maintained LPG-powered forklifts indoors, CO poisoning symptoms, and the appropriate response to CO symptoms; and 3) improved forklift maintenance, ventilation, and CO-monitoring procedures when LPG-powered forklifts are used in enclosed settings.

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Carbon Monoxide Poisoning — Continued

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Global Measles Control and Regional Elimination, 1998–1999

In 1989, the World Health Assembly adopted the goal of reducing measles morbidity and mortality by 90% and 95%, respectively, by 1995, compared with estimates of the disease burden in the prevaccine era (*1*). In 1990, the World Summit for Children adopted a goal of vaccinating 90% of children against measles by 2000. Three regions of the World Health Organization (WHO) have targeted elimination: in 1994, the American Region (AMR) targeted elimination by 2000; in 1997, the Eastern Mediterranean Region (EMR) targeted elimination by 2010; and in 1998, the European Region (EUR) targeted elimination by 2007. This report updates progress since 1997 (*2*) toward global measles control and regional elimination of measles, and includes vaccination coverage and disease surveillance data received by WHO as of August 14, 1999. Data for 1998 suggest that routine measles vaccination coverage has declined in some regions, the number of countries reporting cases and coverage to WHO has decreased, and measles continues to be an important cause of morbidity and mortality.

Reported Routine Measles Vaccination Coverage

Global reported coverage with one dose of measles vaccine declined from 79% in 1997 to 72% in 1998 (Table 1). In 1998, 14 countries reported measles coverage below 50%: 10 in the African Region (AFR) (Burundi, Cameroon, Central African Republic, Chad, Democratic Republic of Congo, Ethiopia, Liberia, Nigeria, Togo, and Uganda), one in AMR (Haiti), two in EMR (Afghanistan and Somalia), and one in the South-East Asia Region (SEAR) (Democratic People's Republic of Korea).

Among regions focusing on measles control, AFR and SEAR reported the lowest routine vaccination coverage rates, 49% and 67%, respectively (Table 1). These regions reported the greatest decrease in coverage during 1997–1998. The Western Pacific Region (WPR) continued to report the highest routine vaccination coverage (93%).

Among regions with an elimination target, AMR reported the highest coverage rate (86%) (Table 1). In EMR, regional measles vaccination coverage was 78%, and 14 polio-free countries that began implementing measles elimination strategies reported routine coverage rates >85% (*3*). EUR reported a routine first dose coverage rate of 71% in 1998; 21 (41%) of 51 EUR countries* did not report vaccination coverage data to WHO.

Supplementary Vaccination Campaigns

Supplemental vaccination campaigns have been conducted in several countries targeting either measles morbidity and mortality reduction or elimination. In 1998 and 1999, 31 countries in AFR† and three countries in EMR (Djibouti, Egypt, and Sudan)

*Andorra, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Luxembourg, Monaco, Norway, Poland, San Marino, Spain, Sweden, Switzerland, the former Yugoslav Republic of Macedonia, Turkey, and Yugoslavia.

†Angola, Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Democratic Republic of Congo, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Ghana, Guinea, Kenya, Liberia, Madagascar, Mali, Mauritania, Mozambique, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Togo, Uganda, United Republic of Tanzania, and Zambia.

TABLE 1. Reported routine measles vaccination* coverage among children aged 1 year, by World Health Organization (WHO) region — worldwide, 1997 and 1998†

Region	Reported coverage			Completeness of reporting from countries				
				Countries and areas				
					No. countries and areas reporting		% completeness of reporting§	
	1997	1998	% change from 1997 to 1998	Total	1997	1998	1997	1998
Measles elimination goal								
American¶	88%	86%	–2	**46**	40	38	98%	99%
Eastern Mediterranean	80%**	78%**	–2	**24**	23	20	97%	94%
European	76%**	71%**	–5	**51**	35	30	64%	57%
Measles control goal								
African	56%**	49%**	–7	**48**	41	36	92%	89%
South East Asian	84%**	67%**	–17	**10**	8	9	96%	97%
Western Pacific	93%**	93%**	0	**36**	35	31	100%	95%
Total	**79%****	**72%****	**–7**	**215**	**182**	**164**	**94%**	**91%**

* One dose of measles-containing vaccine (MCV).
† Reported to WHO as of August 14, 1999.
§ Numerator=total number of surviving infants in countries reporting MCV coverage to WHO; denominator=1998 estimates of surviving infants in region (Source: United Nations. World population prospects: 1998 revision, Population Division, Department of Economic and Social Affairs, New York: United Nations, 1999).
¶ Data provided by the Pan American Health Organization, excluding the United States. In the United States, one dose MCV coverage among children aged 19–35 months was 91% in 1997 and 92% in 1998.
** Model-based imputation used to account for missing data.

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conducted mass vaccination campaigns in high-risk areas to reduce morbidity and mortality among those children who were not vaccinated through routine vaccination services. During 1998–1999, two countries (Marshall Islands and Palau) in WPR conducted vaccination campaigns targeting children who had not been vaccinated through routine vaccination services, two countries (Lao People's Democratic Republic and Viet Nam) delivered measles vaccination to remote populations during polio subnational immunization days, and one country (Viet Nam) conducted a pilot campaign in one province.

WHO's measles elimination strategy comprises a three-part vaccination strategy (i.e., "catch-up," "keep-up," and "follow-up"[§]); two parts are supplemental vaccination (*4*). All countries in AMR, except the United States and the French and Dutch Antilles, completed catch-up campaigns by 1996. Since then, most countries in AMR have been conducting follow-up campaigns.

In nine of 15 EMR countries where measles elimination activities are ongoing, 13 million children have been vaccinated during catch-up measles vaccination campaigns conducted since 1994 (*3*). In EUR, Romania implemented a catch-up campaign during 1998–1999 targeting all children aged 7–18 years (girls aged 15–18 years received measles and rubella vaccine). Approximately 2 million children were vaccinated and 93% coverage was reported (WHO, unpublished data, 1999). During 1998–1999, staff from 23 (45%) of 51 countries[¶] in EUR attended workshops at which they evaluated their age-specific susceptibility to measles and determined strategies to reduce susceptibility to <15% for ages 0–4 years, <10% for ages 5–9 years, and <5% for ages ≥10 years (*5*).

Since 1995, 23 million children have been vaccinated during catch-up campaigns in the six southern African nations where measles-elimination initiatives have been launched (*6*). In addition, United Kingdom (1994), Bhutan (1995), the Maldives (1995), Mongolia (1996), Papua New Guinea (1997), New Zealand (1997), Australia (1998), parts of China (1997–1998), the Philippines (1998), and 13 Pacific island countries and areas (since 1997) conducted catch-up campaigns.

Reported and Estimated Measles Morbidity and Mortality

Among regions with measles elimination goals, the AMR reported the lowest incidence (1.6 per 100,000) in 1998 (Table 2). The measles outbreak that began in Brazil in 1997 affecting unvaccinated adults continued in 1998 and 1999 among unvaccinated young children in Argentina, Bolivia, Colombia, the Dominican Republic, and Paraguay. As of November 27, 1999, 2698 measles cases have been confirmed in the region compared with 10,067 cases for the same period in 1998. During 1997–1998 in EMR, the number of cases reported increased by 58%; outbreaks were reported in Iran, Syria, Morocco, and Saudi Arabia. In EUR, the number of cases reported declined 59%, but the number of countries reporting measles cases declined from 45 in 1997 to 31 in 1998. Among all regions, AFR reported the highest number of measles cases and

[§] "Catch-up" is a one-time, nationwide vaccination campaign targeting usually all children aged 9 months–14 years, regardless of history of measles disease or vaccination status; "keep-up" is routine services aimed at vaccinating 95% of each successive birth cohort; and "follow-up" is subsequent nationwide vaccination campaigns conducted every 2–5 years targeting usually all children born after the catch-up campaign.

[¶] Andorra, Bulgaria, Croatia, Czech Republic, Denmark, Germany, Greece, Hungary, Italy, Kazakhstan, Kyrgyzstan, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Switzerland, Tajikistan, Turkmenistan, and Uzbekistan.

TABLE 2. Reported measles cases and a comparison of measles surveillance, by World Health Organization (WHO) region — worldwide, 1997 and 1998*

Region	Reported cases		% change from	Incidence†		Completeness of reporting from countries				
						Countries and areas			% region's population§ living in countries reporting to WHO	
							No. of countries and areas reporting			
	1997	1998	1997 to 1998	1997	1998	Total	1997	1998	1997	1998
Measles elimination goal										
American	51,926	12,941	–75%	6.5	1.6	**47**	44	43	100%	100%
Eastern Mediterranean	33,342	52,666	58%	8.0	11.1	**24**	20	23	90%	100%
European	103,129	42,768	–59%	14.4	8.2	**51**	45	31	82%	60%
Measles control goal										
African	299,623	349,814	17%	49.2	61.7	**48**	45	34	100%	91%
South East Asian	114,331	62,722	–45%	7.8	4.2	**10**	9	10	100%	100%
Western Pacific	142,115	76,037	–46%	8.7	5.0	**36**	36	32	100%	92%
Total	**744,466**	**596,948**	**–16%**	**13.2**	**11.1**	**216**	**199**	**173**	**97%**	**91%**

*Reported to WHO as of August 14, 1999.
†Reported cases per 100,000 total population of the countries reporting in the region.
§1998 total population estimates by country (Source: United Nations. World population prospects: 1998 revision, Population Division, Department of Economic and Social Affairs, New York: United Nations, 1999).

Global Measles Control — Continued

incidence. Of all the cases reported, more than half were reported from countries in AFR.

Each year, WHO estimates actual measles morbidity and mortality; because measles is not a notifiable disease in some countries, substantial underreporting of measles occurs, and measles deaths are not reported to WHO. For 1998, WHO estimated that approximately 30 million measles cases and 888,000 measles-related deaths occurred worldwide; an estimated 85% of the measles-related deaths occurred in AFR and SEAR (*7*).

Global Measles Laboratory Network

Efforts are under way to establish a Global Measles Laboratory Network. Measles laboratories of CDC and the Central Public Laboratory Services in the United Kingdom have been selected as the Global Measles Strain Banks. Activities to strengthen laboratory capacity to support measles surveillance include assessment of country laboratory needs, training of laboratory staff, provision of diagnostic kits, and collection of specimens for diagnosis and virus isolation. During 1998–1999, eight measles laboratory workshops were conducted, and 105 laboratory staff from 42 countries in five regions were trained in basic measles diagnostic methods.

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Editorial Note: With approximately 1 million deaths attributed to measles in 1998, measles remains an important cause of vaccine-preventable illness and death. Failure to deliver at least one dose of measles vaccine to all infants remains the primary reason, despite widespread availability of an effective and safe vaccine. Morbidity and mortality decrease with increasing vaccination coverage levels; those regions with the lowest coverage levels have the highest burden, with AFR continuing to report both the lowest coverage and highest incidence.

Global and regional (except AMR) routine vaccination coverage rates in 1997 and 1998 were calculated using model-based estimates to account for missing data (*8*). Nationwide surveys indicated that in some countries actual coverage may be lower than reported coverage (*9*). For this reason, some countries in SEAR (Bangladesh, India, and Indonesia) have begun reporting coverage based on surveys rather than the administrative method. In part, this change in reporting accounts for the decline in reported coverage in SEAR in 1998. Although some regions (e.g., WPR) may have achieved the World Summit for Children goal, coverage in some WPR countries and in the remaining five regions is <90%. Reported regional routine vaccination coverage rates in the three regions with measles elimination goals are <90%, thus increasing the speed at which susceptible children accumulate and the need for more frequent follow-up campaigns to prevent re-emergence of measles (*10*). Further improvements in routine vaccination coverage and methods used to monitor it are needed to decrease the morbidity and mortality associated with measles.

During 1997–1998, the number of countries reporting vaccination coverage or measles cases decreased in some regions. EUR had the highest proportion of regional population from which data were not reported. Strengthening of measles surveillance is required in both developed and developing countries to monitor progress toward achieving morbidity and mortality reduction or regional elimination

Global Measles Control — Continued

goals. All countries should improve routine reporting of measles cases by month of occurrence and geopolitical unit. Countries should use outbreak investigations to obtain data on age and vaccination status of persons with measles and to estimate population-based case-fatality ratios. Case-based surveillance with laboratory confirmation of suspected measles cases and virus isolation from all outbreaks are needed when incidence of measles decreases to low levels following implementation of measles elimination measures. The global measles laboratory network needs to be strengthened by WHO, especially in those countries with elimination goals, by recruiting additional laboratories and compiling standard procedures for testing of samples.

Reduced measles incidence under conditions of improved surveillance suggests substantial progress in AMR toward achieving the regional measles elimination goal. Recent resurgence of measles in this region emphasizes the importance of full and timely implementation of elimination strategies. In EMR, routine vaccination coverage and surveillance need to be further strengthened throughout the region. Appropriate vaccination strategies for elimination need to be implemented to reduce susceptibility to measles in countries of EUR. Lack of reporting from some of the western European countries impairs assessment of disease burden and coverage in the region and suggests an urgent need to improve measles surveillance and to monitor vaccination coverage.

The priorities for countries pursuing accelerated measles control include improving routine vaccination coverage levels to at least 80% in all districts of every country, achieving at least 90% coverage nationwide, conducting supplementary vaccination campaigns together with administration of vitamin A in high-risk areas, and improving completeness and timeliness of reporting of measles cases at district level. Priorities for countries and regions with a measles elimination goal include improving routine vaccination coverage levels to at least 90% in all districts of every country (resulting in nationwide coverage ≥95%); achieving coverage >90% in catch-up and follow-up campaigns or achieving nationwide coverage ≥95% with a routine second dose of measles vaccine, and establishing case-based surveillance with laboratory confirmation of suspected cases and virus isolation from all chains of transmission. Adherence to these priorities will ensure that the measles morbidity and mortality burden will decrease and that the measles disease reduction targets can be reached.

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Global Measles — Continued

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Notice to Readers

Publication of the Updated Inventory of Managed-Care–Related Projects, 1998

CDC supports extramural projects in various managed-care settings and periodically inventories them to inform public and private prevention communities of relevant findings, products and ongoing efforts; and to provide benchmarks for new project development. In 1996, CDC published its first *Inventory of Managed Care-Related Projects: Fiscal Year 1995–1996*, which catalogued 83 activities. This latest release, the *Inventory of Managed Care-Related Projects: 1998* (*1*), describes 107 projects covering a wide range of activities—from studies of behavior interventions to analyses of vaccine effectiveness to comparisons of health-care delivery systems, and including examples of successful collaborations between the public health and managed-care communities.

The *Inventory* can be viewed on CDC's World-Wide Web site at http://www.cdc.gov/epo/dpram/managedcare/intro.htm. Paper copies can be obtained from the Office of HealthCare Partnerships, CDC, 4770 Buford Highway, Mailstop K73, Atlanta, GA 30341; or telephone (770) 488-8186.

Reference

1. CDC. Inventory of managed care-related projects: 1998. Atlanta, Georgia: US Department of Health and Human Services, CDC, 1999.

Notice to Readers

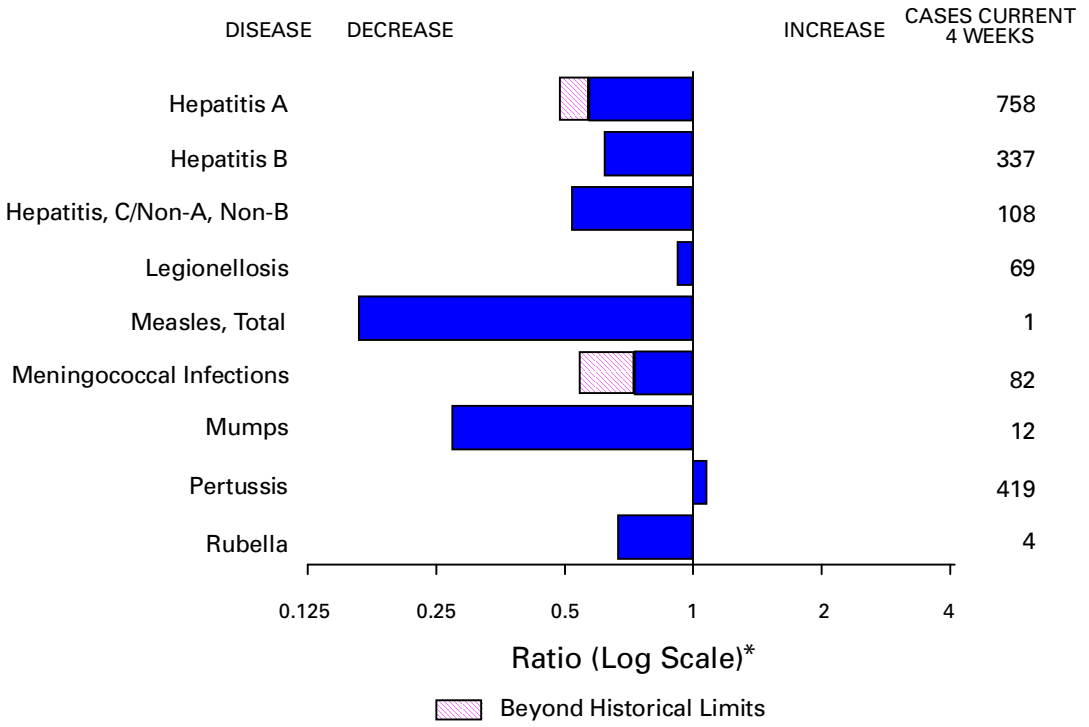
Epidemiology in Action: Intermediate Methods

CDC and Emory University's Rollins School of Public Health will co-sponsor a course, "Epidemiology in Action: Intermediate Methods" on February 7–11, 2000, in Atlanta. The course is designed for state and local public health professionals.

The course will review the fundamentals of descriptive epidemiology and biostatistics, analytic epidemiology, and Epi Info 6 but will focus on mid-level epidemiologic methods directed at strengthening participants' quantitative skills, with an emphasis on up-to-date data analysis. Topics include advanced measures of association, normal and binomial distributions, logistic regression, field investigations, and summary of statistical methods. Prerequisite is an introductory course in epidemiology (e.g., such as Epidemiology in Action or International Course in Applied Epidemiology) or any other introductory class. There is a tuition charge.

(Continued on page 1139)

FIGURE I. Selected notifiable disease reports, comparison of provisional 4-week totals ending December 11, 1999, 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 December 11, 1999 (49th Week)

	Cum. 1999		Cum. 1999
Anthrax	-	HIV infection, pediatric*§	137
Brucellosis*	48	Plague	8
Cholera	3	Poliomyelitis, paralytic	-
Congenital rubella syndrome	6	Psittacosis*	16
Cyclosporiasis*	50	Rabies, human	-
Diphtheria	1	Rocky Mountain spotted fever (RMSF)	534
Encephalitis: California*	60	Streptococcal disease, invasive Group A	2,014
eastern equine*	6	Streptococcal toxic-shock syndrome*	36
St. Louis*	5	Syphilis, congenital¶	271
western equine*	1	Tetanus	31
Ehrlichiosis human granulocytic (HGE)*	149	Toxic-shock syndrome	113
human monocytic (HME)*	40	Trichinosis	9
Hansen Disease*	93	Typhoid fever	294
Hantavirus pulmonary syndrome*†	20	Yellow fever	1
Hemolytic uremic syndrome, post-diarrheal*	117		

-: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 from reports to the Division of HIV/AIDS Prevention–Surveillance and Epidemiology, National Center for HIV, STD, and TB Prevention (NCHSTP), last update November 28, 1999.
¶ Updated from reports to the Division of STD Prevention, NCHSTP.

TABLE II. Provisional cases of selected notifiable diseases, United States, weeks ending December 11, 1999, and December 12, 1998 (49th Week)

Reporting Area	AIDS		Chlamydia		Cryptosporidiosis		*Escherichia coli* O157:H7*			
							NETSS		PHLIS	
	Cum. 1999†	Cum. 1998	Cum. 1999	Cum. 1998	Cum. 1999	Cum. 1998	Cum. 1999	Cum. 1998	Cum. 1999	Cum. 1998
UNITED STATES	40,933	42,308	558,680	558,222	2,265	3,566	3,319	2,832	2,225	2,118
NEW ENGLAND	2,090	1,664	19,769	18,990	158	147	393	324	341	274
Maine	75	28	904	963	30	31	39	36	-	-
N.H.	45	34	903	914	19	16	34	46	33	45
Vt.	16	18	438	389	36	26	32	21	20	18
Mass.	1,338	844	8,616	7,862	52	67	170	144	183	154
R.I.	96	119	2,159	2,171	6	7	27	13	26	1
Conn.	520	621	6,749	6,691	15	U	91	64	79	56
MID. ATLANTIC	10,473	11,353	55,879	58,213	411	559	308	294	92	86
Upstate N.Y.	1,196	1,322	N	N	169	328	246	213	-	-
N.Y. City	5,571	6,520	21,963	24,764	116	206	11	14	17	13
N.J.	1,932	2,007	10,095	11,130	36	25	51	67	46	52
Pa.	1,774	1,504	23,821	22,319	90	N	N	N	29	21
E.N. CENTRAL	2,801	3,061	81,247	94,937	564	720	687	448	484	367
Ohio	448	645	26,294	25,697	66	71	246	123	199	76
Ind.	320	473	10,586	10,458	38	59	107	101	64	54
Ill.	1,345	1,188	24,169	25,116	67	84	221	110	81	80
Mich.	555	577	20,198	20,469	48	38	113	114	76	69
Wis.	133	178	U	13,197	345	468	N	N	64	88
W.N. CENTRAL	940	827	33,074	33,165	202	334	586	470	406	398
Minn.	178	163	6,441	6,660	78	142	229	195	178	209
Iowa	77	62	4,649	4,245	55	65	115	91	73	59
Mo.	449	400	12,427	11,885	29	26	60	51	64	63
N. Dak.	6	5	707	977	18	30	17	12	14	15
S. Dak.	15	15	1,496	1,477	7	25	47	35	62	38
Nebr.	65	66	3,128	2,657	14	35	97	50	-	-
Kans.	150	116	4,226	5,264	1	11	21	36	15	14
S. ATLANTIC	11,305	11,023	119,300	108,094	373	341	341	245	163	168
Del.	159	152	2,604	2,461	-	3	6	-	3	2
Md.	1,344	1,482	10,616	6,888	17	19	42	42	4	14
D.C.	637	808	N	N	8	25	1	1	U	U
Va.	782	908	13,268	12,983	27	20	73	N	59	52
W. Va.	64	77	1,240	2,293	3	2	14	13	11	10
N.C.	739	753	20,705	20,644	33	N	74	56	52	47
S.C.	919	720	11,346	16,770	-	-	20	15	14	12
Ga.	1,581	1,173	30,893	22,576	132	127	36	76	-	-
Fla.	5,080	4,950	28,628	23,479	153	145	75	42	20	31
E.S. CENTRAL	1,796	1,681	42,694	38,802	35	25	132	118	58	64
Ky.	255	262	7,014	6,083	7	10	46	35	-	-
Tenn.	706	621	13,081	13,021	11	9	54	53	38	40
Ala.	449	455	12,004	9,704	12	N	26	24	16	20
Miss.	386	343	10,595	9,994	5	6	6	6	4	4
W.S. CENTRAL	4,177	5,129	79,259	84,486	84	909	128	102	124	106
Ark.	188	189	5,585	3,871	2	6	15	11	8	10
La.	813	874	11,220	14,301	22	16	9	5	14	7
Okla.	123	274	7,763	8,878	12	N	31	24	27	9
Tex.	3,053	3,792	54,691	57,436	48	887	73	62	75	80
MOUNTAIN	1,608	1,478	29,725	31,557	98	122	320	360	224	246
Mont.	13	28	1,496	1,205	13	10	25	16	-	5
Idaho	22	28	1,631	1,917	8	17	65	41	43	25
Wyo.	11	3	741	665	1	2	15	53	14	55
Colo.	290	286	5,417	7,963	14	19	107	89	88	69
N. Mex.	82	203	3,870	3,699	42	47	13	19	6	20
Ariz.	819	588	11,767	10,890	12	18	37	43	23	26
Utah	142	128	2,021	2,053	N	N	38	75	48	22
Nev.	229	214	2,782	3,165	8	9	20	24	2	24
PACIFIC	5,743	6,092	97,733	89,978	340	409	424	471	333	409
Wash.	337	386	11,370	10,356	N	N	167	109	159	130
Oreg.	208	166	5,698	5,376	93	67	74	107	68	100
Calif.	5,089	5,364	76,276	69,991	247	338	171	248	94	163
Alaska	15	17	1,770	1,791	-	1	1	7	1	-
Hawaii	94	159	2,619	2,464	-	3	11	-	11	16
Guam	10	1	299	404	-	-	N	N	U	U
P.R.	1,180	1,601	U	U	-	N	9	5	U	U
V.I.	35	31	U	U	U	U	U	U	U	U
Amer. Samoa	-	-	U	U	U	U	U	U	U	U
C.N.M.I.	-	-	U	U	U	U	U	U	U	U

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

*Individual cases may be reported through both the National Electronic Telecommunications System for Surveillance (NETSS) and the Public Health Laboratory Information System (PHLIS).

†Updated monthly from reports to the Division of HIV/AIDS Prevention–Surveillance and Epidemiology, National Center for HIV, STD, and TB Prevention, last update November 28, 1999.

TABLE II. (Cont'd.) Provisional cases of selected notifiable diseases, United States, weeks ending December 11, 1999, and December 12, 1998 (49th Week)

Reporting Area	Gonorrhea		Hepatitis C/NA,NB		Legionellosis		Lyme Disease	
	Cum. 1999	Cum. 1998	Cum. 1999	Cum. 1998	Cum. 1999	Cum. 1998	Cum. 1999	Cum. 1998
UNITED STATES	306,829	333,630	2,992	3,151	896	1,221	12,207	15,094
NEW ENGLAND	6,177	5,724	14	58	78	84	3,389	4,533
Maine	71	63	2	-	3	1	41	78
N.H.	105	88	-	-	8	7	23	43
Vt.	44	35	7	6	14	7	23	11
Mass.	2,383	2,147	2	49	28	33	945	690
R.I.	543	394	3	3	11	21	464	650
Conn.	3,031	2,997	-	-	14	15	1,893	3,061
MID. ATLANTIC	35,884	36,402	92	205	182	309	6,920	8,402
Upstate N.Y.	6,395	6,923	57	102	56	107	3,760	3,910
N.Y. City	11,762	11,305	-	-	9	35	39	230
N.J.	5,962	7,491	-	U	18	18	922	1,802
Pa.	11,765	10,683	35	103	99	149	2,199	2,460
E.N. CENTRAL	53,864	65,262	1,423	648	243	398	176	754
Ohio	15,957	16,870	4	8	79	125	73	46
Ind.	5,791	6,132	1	5	43	75	21	37
Ill.	17,967	20,791	41	40	23	52	12	14
Mich.	14,149	15,424	786	455	60	80	1	12
Wis.	U	6,045	591	140	38	66	69	645
W.N. CENTRAL	14,198	16,724	299	43	51	63	288	226
Minn.	2,484	2,578	10	11	13	7	220	173
Iowa	1,155	1,415	-	8	15	10	19	26
Mo.	7,179	8,847	277	15	14	16	26	12
N. Dak.	71	77	1	-	2	-	1	-
S. Dak.	186	209	-	-	3	3	-	-
Nebr.	1,297	1,120	5	5	4	19	10	4
Kans.	1,826	2,478	6	4	-	8	12	11
S. ATLANTIC	89,820	89,821	193	115	146	140	1,123	867
Del.	1,582	1,454	1	-	14	13	64	66
Md.	9,012	9,135	41	21	32	35	785	608
D.C.	3,316	4,009	1	-	4	8	6	4
Va.	9,015	9,106	11	12	38	20	118	68
W. Va.	387	824	17	7	N	N	17	13
N.C.	18,440	17,841	34	25	15	14	73	57
S.C.	6,744	10,728	22	11	11	11	7	7
Ga.	20,955	18,686	1	9	3	8	-	5
Fla.	20,369	18,038	65	30	29	31	53	39
E.S. CENTRAL	34,186	37,438	243	267	45	64	92	111
Ky.	3,192	3,577	21	20	20	26	10	26
Tenn.	10,498	11,366	95	160	21	23	50	44
Ala.	10,812	12,322	1	4	4	8	19	24
Miss.	9,684	10,173	126	83	-	7	13	17
W.S. CENTRAL	43,893	52,174	314	543	23	31	43	31
Ark.	2,984	3,800	18	22	-	1	4	7
La.	8,880	12,326	102	112	2	4	-	7
Okla.	3,792	4,960	15	16	3	12	4	2
Tex.	28,237	31,088	179	393	18	14	35	15
MOUNTAIN	8,881	8,665	146	362	47	71	18	18
Mont.	54	44	5	7	-	2	-	-
Idaho	80	168	7	86	3	2	5	6
Wyo.	34	33	45	90	-	1	3	1
Colo.	2,316	1,956	22	31	12	18	-	-
N. Mex.	802	894	8	96	1	2	1	4
Ariz.	4,185	3,982	45	11	7	17	2	1
Utah	216	217	6	21	18	21	5	-
Nev.	1,194	1,371	8	20	6	8	2	6
PACIFIC	19,926	21,420	268	910	81	61	158	152
Wash.	2,013	1,850	20	22	17	12	10	7
Oreg.	827	803	22	19	N	N	14	21
Calif.	16,436	17,987	226	815	63	47	134	123
Alaska	275	300	-	-	1	1	-	1
Hawaii	375	480	-	54	-	1	N	N
Guam	38	67	1	1	-	2	-	1
P.R.	328	363	-	-	-	-	N	N
V.I.	U	U	U	U	U	U	U	U
Amer. Samoa	U	U	U	U	U	U	U	U
C.N.M.I.	U	U	U	U	U	U	U	U

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

TABLE II. (Cont'd.) Provisional cases of selected notifiable diseases, United States, weeks ending December 11, 1999, and December 12, 1998 (49th Week)

Reporting Area	Malaria		Rabies, Animal		Salmonellosis*			
					NETSS		PHLIS	
	Cum. 1999	Cum. 1998	Cum. 1999	Cum. 1998	Cum. 1999	Cum. 1998	Cum. 1999	Cum. 1998
UNITED STATES	1,271	1,408	5,668	6,928	36,293	40,176	29,030	32,380
NEW ENGLAND	63	69	862	1,397	2,086	2,419	2,025	2,205
Maine	3	5	171	232	128	162	99	64
N.H.	2	5	50	77	136	178	140	215
Vt.	4	1	88	65	91	138	85	109
Mass.	24	26	216	489	1,113	1,267	1,118	1,296
R.I.	5	14	93	97	121	142	147	34
Conn.	25	18	244	437	497	532	436	487
MID. ATLANTIC	320	406	1,092	1,536	4,610	6,313	4,082	5,566
Upstate N.Y.	67	87	776	1,055	1,305	1,536	1,268	1,309
N.Y. City	167	230	U	U	1,298	1,825	1,173	1,407
N.J.	48	56	166	213	989	1,402	685	1,334
Pa.	38	33	150	268	1,018	1,550	956	1,516
E.N. CENTRAL	140	141	146	123	5,153	6,024	3,273	4,656
Ohio	18	15	36	57	1,257	1,445	1,011	1,103
Ind.	19	10	13	12	512	645	406	509
Ill.	54	57	10	N	1,495	1,853	399	1,512
Mich.	39	47	87	35	920	1,115	906	1,041
Wis.	10	12	-	19	969	966	551	491
W.N. CENTRAL	72	91	664	686	2,120	2,191	2,183	2,251
Minn.	41	56	107	114	619	550	657	636
Iowa	13	7	153	147	264	352	197	285
Mo.	14	14	14	41	689	592	876	820
N. Dak.	-	2	137	138	51	59	49	67
S. Dak.	-	1	163	151	93	120	115	127
Nebr.	-	1	3	7	185	174	78	46
Kans.	4	10	87	88	219	344	211	270
S. ATLANTIC	341	302	2,031	2,248	8,560	8,249	6,002	5,934
Del.	1	3	43	49	138	74	153	116
Md.	93	86	381	424	841	877	952	866
D.C.	18	19	-	-	69	83	U	U
Va.	70	56	554	534	1,206	1,057	943	835
W. Va.	3	2	106	76	163	147	148	158
N.C.	31	29	404	538	1,269	1,243	1,243	1,383
S.C.	17	6	133	143	675	605	479	527
Ga.	28	36	231	290	1,474	1,631	1,644	1,494
Fla.	80	65	179	194	2,725	2,532	440	555
E.S. CENTRAL	24	32	252	264	1,995	2,245	1,062	1,528
Ky.	7	7	35	31	393	347	-	124
Tenn.	8	16	93	135	513	574	509	686
Ala.	7	6	123	96	575	668	476	561
Miss.	2	3	1	2	514	656	77	157
W.S. CENTRAL	16	54	94	28	3,598	4,699	3,546	3,102
Ark.	3	1	14	28	626	589	120	367
La.	10	14	-	-	334	744	568	787
Okla.	2	3	80	N	406	468	320	225
Tex.	1	36	-	-	2,232	2,898	2,538	1,723
MOUNTAIN	43	61	197	246	2,918	2,435	2,411	1,938
Mont.	4	1	59	53	81	76	1	43
Idaho	3	8	5	N	125	118	98	94
Wyo.	1	-	44	64	67	63	49	57
Colo.	17	18	1	42	679	518	689	488
N. Mex.	2	12	9	6	362	288	245	255
Ariz.	8	9	66	48	913	798	762	663
Utah	4	1	8	27	506	341	514	122
Nev.	4	12	5	6	185	233	53	216
PACIFIC	252	252	330	400	5,253	5,601	4,446	5,200
Wash.	27	20	-	-	634	493	795	666
Oreg.	21	15	2	7	409	314	480	322
Calif.	192	207	321	370	3,833	4,457	2,875	3,881
Alaska	1	3	7	23	53	56	30	36
Hawaii	11	7	-	-	324	281	266	295
Guam	-	2	-	-	24	42	U	U
P.R.	-	-	66	49	433	769	U	U
V.I.	U	U	U	U	U	U	U	U
Amer. Samoa	U	U	U	U	U	U	U	U
C.N.M.I.	U	U	U	U	U	U	U	U

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

*Individual cases may be reported through both the National Electronic Telecommunications System for Surveillance (NETSS) and the Public Health Laboratory Information System (PHLIS).

TABLE II. (Cont'd.) Provisional cases of selected notifiable diseases, United States, weeks ending December 11, 1999, and December 12, 1998 (49th Week)

Reporting Area	Shigellosis*				Syphilis (Primary & Secondary)		Tuberculosis	
	NETSS		PHLIS					
	Cum. 1999	Cum. 1998	Cum. 1999	Cum. 1998	Cum. 1999	Cum. 1998	Cum. 1999†	Cum. 1998†
UNITED STATES	15,097	21,128	7,476	11,831	6,146	6,697	13,220	16,101
NEW ENGLAND	821	401	786	355	57	76	406	414
Maine	5	14	-	-	-	1	18	11
N.H.	17	16	17	20	1	2	10	-
Vt.	6	7	4	4	3	4	2	5
Mass.	703	258	687	253	35	43	232	239
R.I.	23	36	18	13	2	1	39	52
Conn.	67	70	60	65	16	25	105	107
MID. ATLANTIC	897	2,296	454	1,657	186	310	2,380	2,882
Upstate N.Y.	266	613	67	220	23	36	304	360
N.Y. City	281	689	82	575	79	79	1,264	1,363
N.J.	194	650	155	608	51	101	479	583
Pa.	156	344	150	254	33	94	333	576
E.N. CENTRAL	2,843	2,842	1,274	1,517	1,328	978	1,186	1,588
Ohio	411	495	136	141	87	128	228	221
Ind.	324	171	101	43	646	201	93	152
Ill.	1,048	1,518	592	1,261	365	396	508	766
Mich.	474	262	368	4	230	194	272	344
Wis.	586	396	77	68	U	59	85	105
W.N. CENTRAL	1,069	1,035	721	600	108	131	447	467
Minn.	238	298	229	325	9	9	187	146
Iowa	66	66	48	45	9	2	50	51
Mo.	638	190	352	129	72	99	152	163
N. Dak.	3	10	2	3	-	-	6	10
S. Dak.	18	32	10	23	-	1	17	17
Nebr.	69	367	35	19	8	7	16	28
Kans.	37	72	45	56	10	13	19	52
S. ATLANTIC	2,385	4,132	485	1,233	1,925	2,439	2,784	3,032
Del.	13	44	9	37	8	21	12	34
Md.	157	197	58	66	310	643	248	279
D.C.	51	37	U	U	59	85	47	102
Va.	129	192	61	87	148	144	265	280
W. Va.	8	11	5	8	2	3	37	41
N.C.	200	339	86	179	421	691	394	448
S.C.	123	178	62	94	245	309	218	270
Ga.	227	1,051	85	240	396	276	556	514
Fla.	1,477	2,083	119	522	336	267	1,007	1,064
E.S. CENTRAL	1,064	1,445	483	1,123	1,084	1,163	847	1,152
Ky.	229	145	-	45	99	103	166	157
Tenn.	600	801	426	852	602	545	334	436
Ala.	111	445	47	219	202	270	291	355
Miss.	124	54	10	7	181	245	56	204
W.S. CENTRAL	2,438	4,434	2,337	1,392	898	1,022	1,462	2,328
Ark.	74	201	23	61	79	107	161	143
La.	118	332	128	281	208	409	U	278
Okla.	456	617	153	191	175	92	122	155
Tex.	1,790	3,284	2,033	859	436	414	1,179	1,752
MOUNTAIN	1,127	1,246	722	728	223	229	427	534
Mont.	9	8	-	3	1	-	13	19
Idaho	28	19	12	14	1	2	15	11
Wyo.	3	3	1	1	-	1	3	4
Colo.	193	222	155	159	2	10	U	67
N. Mex.	139	289	89	173	11	22	59	65
Ariz.	599	594	395	324	200	175	215	205
Utah	66	46	64	34	2	4	40	48
Nev.	90	65	6	20	6	15	82	115
PACIFIC	2,453	3,297	214	3,226	337	349	3,281	3,704
Wash.	117	219	99	188	64	27	168	242
Oreg.	95	190	85	151	10	5	99	126
Calif.	2,205	2,830	-	2,830	259	313	2,793	3,119
Alaska	3	9	3	7	1	1	53	51
Hawaii	33	49	27	50	3	3	168	166
Guam	8	36	U	U	1	1	11	84
P.R.	106	62	U	U	151	167	41	140
V.I.	U	U	U	U	U	U	U	U
Amer. Samoa	U	U	U	U	U	U	U	U
C.N.M.I.	U	U	U	U	U	U	U	U

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

*Individual cases may be reported through both the National Electronic Telecommunications System for Surveillance (NETSS) and the Public Health Laboratory Information System (PHLIS).

†Cumulative reports of provisional tuberculosis cases for 1999 are unavailable ("U") for some areas using the Tuberculosis Information System (TIMS).

TABLE III. Provisional cases of selected notifiable diseases preventable by vaccination, United States, weeks ending December 11, 1999, and December 12, 1998 (49th Week)

Reporting Area	*H. influenzae*, invasive		Hepatitis (Viral), by type				Measles (Rubeola)					
			A		B		Indigenous		Imported*		Total	
	Cum. 1999†	Cum. 1998	Cum. 1999	Cum. 1998	Cum. 1999	Cum. 1998	1999	Cum. 1999	1999	Cum. 1999	Cum. 1999	Cum. 1998
UNITED STATES	1,088	1,003	15,794	21,068	6,003	9,059	-	60	1	25	85	90
NEW ENGLAND	94	68	283	281	134	212	-	6	-	5	11	3
Maine	8	3	14	20	1	5	-	-	-	-	-	-
N.H.	21	10	18	15	16	19	-	-	-	1	1	-
Vt.	5	9	19	17	3	10	-	-	-	-	-	1
Mass.	36	39	108	119	41	77	-	5	-	3	8	2
R.I.	6	6	21	17	34	68	U	-	U	-	-	-
Conn.	18	1	103	93	39	33	-	1	-	1	2	-
MID. ATLANTIC	169	166	913	1,638	555	1,167	-	-	-	2	2	14
Upstate N.Y.	76	62	256	346	172	231	-	-	-	2	2	2
N.Y. City	41	43	300	579	186	409	-	-	-	-	-	-
N.J.	49	51	112	331	41	194	U	-	U	-	-	8
Pa.	3	10	245	382	156	333	-	-	-	-	-	4
E.N. CENTRAL	159	171	2,628	3,441	625	1,362	-	1	-	2	3	16
Ohio	56	46	628	312	88	74	-	-	-	-	-	1
Ind.	23	43	107	156	43	107	-	1	-	1	2	3
Ill.	66	62	646	761	1	225	-	-	-	-	-	1
Mich.	13	13	1,180	2,029	469	463	-	-	-	1	1	10
Wis.	1	7	67	183	24	493	-	-	-	-	-	1
W.N. CENTRAL	88	87	874	1,273	344	391	-	1	-	-	1	-
Minn.	47	66	95	124	54	49	-	1	-	-	1	-
Iowa	10	3	143	394	39	53	-	-	-	-	-	-
Mo.	22	10	534	590	207	235	-	-	-	-	-	-
N. Dak.	1	-	3	3	2	4	-	-	-	-	-	-
S. Dak.	1	1	9	32	1	2	-	-	-	-	-	-
Nebr.	3	1	50	26	14	21	-	-	-	-	-	-
Kans.	4	6	40	104	27	27	U	-	U	-	-	-
S. ATLANTIC	252	176	1,950	1,925	1,168	991	-	14	-	6	20	8
Del.	-	1	2	6	1	4	-	-	-	-	-	1
Md.	66	52	339	394	165	132	-	-	-	-	-	1
D.C.	5	-	58	64	24	18	U	-	U	-	-	-
Va.	20	18	171	199	96	99	-	14	-	4	18	2
W. Va.	7	6	39	7	23	10	-	-	-	-	-	-
N.C.	35	24	156	123	212	227	-	-	-	-	-	-
S.C.	6	3	47	38	65	46	-	-	-	-	-	-
Ga.	67	44	446	638	159	138	-	-	-	-	-	2
Fla.	46	28	692	456	423	317	-	-	-	2	2	2
E.S. CENTRAL	62	61	390	382	414	479	-	2	-	-	2	2
Ky.	7	7	62	30	42	47	-	2	-	-	2	-
Tenn.	35	36	174	211	211	266	-	-	-	-	-	1
Ala.	17	15	50	73	78	72	-	-	-	-	-	1
Miss.	3	3	104	68	83	94	-	-	-	-	-	-
W.S. CENTRAL	46	53	3,612	3,857	803	1,993	-	10	-	4	14	-
Ark.	2	-	68	79	69	104	-	5	-	-	5	-
La.	7	21	73	114	77	163	U	-	U	-	-	-
Okla.	33	29	435	591	129	108	-	-	-	-	-	-
Tex.	4	3	3,036	3,073	528	1,618	-	5	-	4	9	-
MOUNTAIN	105	110	1,231	2,994	543	783	-	4	-	-	4	5
Mont.	3	-	17	93	17	5	-	-	-	-	-	-
Idaho	1	2	43	231	29	46	-	-	-	-	-	-
Wyo.	1	1	7	37	13	9	-	-	-	-	-	-
Colo.	11	21	206	324	91	102	-	-	-	-	-	-
N. Mex.	18	7	50	147	169	306	-	-	-	-	-	-
Ariz.	56	55	715	1,760	139	170	-	1	-	-	1	5
Utah	11	5	62	186	37	65	-	2	-	-	2	-
Nev.	4	19	131	216	48	80	U	1	U	-	1	-
PACIFIC	113	111	3,913	5,277	1,417	1,681	-	22	1	6	28	42
Wash.	7	9	372	927	73	108	-	-	-	-	-	1
Oreg.	40	40	238	422	100	193	-	9	-	-	9	-
Calif.	48	49	3,271	3,858	1,213	1,352	-	13	-	4	17	8
Alaska	9	4	12	17	17	13	-	-	-	-	-	33
Hawaii	9	9	20	53	14	15	-	-	1	2	2	-
Guam	-	-	2	1	2	2	U	1	U	-	1	-
P.R.	1	2	187	79	145	240	-	-	-	-	-	-
V.I.	U	U	U	U	U	U	U	U	U	U	U	U
Amer. Samoa	U	U	U	U	U	U	U	U	U	U	U	U
C.N.M.I.	U	U	U	U	U	U	U	U	U	U	U	U

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

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

†Of 212 cases among children aged <5 years, serotype was reported for 107 and of those, 31 were type b.

TABLE III. (Cont'd.) Provisional cases of selected notifiable diseases preventable by vaccination, United States, weeks ending December 11, 1999, and December 12, 1998 (49th Week)

Reporting Area	Meningococcal Disease		Mumps			Pertussis			Rubella		
	Cum. 1999	Cum. 1998	1999	Cum. 1999	Cum. 1998	1999	Cum. 1999	Cum. 1998	1999	Cum. 1999	Cum. 1998
UNITED STATES	2,197	2,484	4	322	614	127	5,560	6,494	1	232	352
NEW ENGLAND	107	112	-	8	9	7	686	1,009	-	7	38
Maine	5	6	-	-	-	-	-	5	-	-	-
N.H.	13	12	-	1	-	-	78	121	-	-	-
Vt.	5	5	-	1	-	4	75	76	-	-	-
Mass.	61	56	-	4	6	3	469	748	-	7	8
R.I.	7	8	U	2	1	U	33	13	U	-	1
Conn.	16	25	-	-	2	-	31	46	-	-	29
MID. ATLANTIC	204	266	2	35	191	18	913	620	-	25	149
Upstate N.Y.	64	76	1	14	12	11	723	317	-	21	114
N.Y. City	50	32	-	3	155	-	10	46	-	-	19
N.J.	47	57	U	-	6	U	12	28	U	1	14
Pa.	43	101	1	18	18	7	168	229	-	3	2
E.N. CENTRAL	372	379	-	43	77	48	542	830	-	2	-
Ohio	126	133	-	18	28	44	268	279	-	-	-
Ind.	67	72	-	5	7	1	74	173	-	1	-
Ill.	96	99	-	11	10	1	82	127	-	1	-
Mich.	45	44	-	7	29	2	66	69	-	-	-
Wis.	38	31	-	2	3	-	52	182	-	-	-
W.N. CENTRAL	231	216	-	13	32	17	421	574	-	124	40
Minn.	50	32	-	1	13	17	226	337	-	5	-
Iowa	43	43	-	7	11	-	70	71	-	29	-
Mo.	93	76	-	1	3	-	61	35	-	3	2
N. Dak.	4	5	-	1	2	-	18	4	-	-	-
S. Dak.	11	8	-	-	-	-	7	8	-	-	-
Nebr.	12	17	-	-	-	-	4	17	-	87	-
Kans.	18	35	U	3	3	U	35	102	U	-	38
S. ATLANTIC	403	427	1	50	47	7	414	322	1	37	19
Del.	8	2	-	-	-	-	5	5	-	-	-
Md.	54	34	-	7	-	1	108	63	-	1	1
D.C.	2	3	U	2	-	U	1	1	U	-	-
Va.	53	45	-	10	8	-	51	41	-	-	1
W. Va.	8	17	-	-	-	-	3	4	-	-	-
N.C.	46	57	-	8	11	3	93	98	-	35	13
S.C.	43	55	1	5	7	-	18	27	-	-	-
Ga.	59	97	-	4	1	-	40	27	-	-	-
Fla.	130	117	-	14	20	3	95	56	1	1	4
E.S. CENTRAL	144	195	-	13	18	-	89	148	-	1	2
Ky.	31	37	-	-	1	-	25	79	-	-	-
Tenn.	59	68	-	-	2	-	40	37	-	-	2
Ala.	32	53	-	10	8	-	21	26	-	1	-
Miss.	22	37	-	3	7	-	3	6	-	-	-
W.S. CENTRAL	174	290	-	33	59	1	158	359	-	15	88
Ark.	35	30	-	-	13	1	19	82	-	6	-
La.	34	55	U	3	7	U	3	9	U	-	-
Okla.	31	40	-	1	-	-	12	32	-	-	-
Tex.	74	165	-	29	39	-	124	236	-	9	88
MOUNTAIN	137	141	-	28	39	21	737	1,169	-	16	5
Mont.	4	4	-	-	-	-	2	13	-	-	-
Idaho	13	13	-	3	7	-	139	232	-	-	-
Wyo.	5	8	-	-	1	-	2	8	-	-	-
Colo.	35	28	-	5	6	8	207	324	-	1	-
N. Mex.	14	26	N	N	N	9	200	98	-	-	1
Ariz.	42	39	-	8	6	4	117	191	-	13	1
Utah	16	13	-	7	5	-	59	262	-	1	2
Nev.	8	10	U	5	14	U	11	41	U	1	1
PACIFIC	425	458	1	99	142	8	1,600	1,463	-	5	11
Wash.	63	64	-	2	11	6	609	329	-	-	6
Oreg.	77	85	N	N	N	-	58	89	-	-	-
Calif.	271	301	1	82	104	2	894	1,005	-	5	3
Alaska	6	3	-	3	3	-	5	15	-	-	-
Hawaii	8	5	-	12	24	-	34	25	-	-	2
Guam	2	2	U	1	5	U	1	1	U	-	-
P.R.	7	11	-	-	7	1	20	9	-	-	14
V.I.	U	U	U	U	U	U	U	U	U	U	U
Amer. Samoa	U	U	U	U	U	U	U	U	U	U	U
C.N.M.I.	U	U	U	U	U	U	U	U	U	U	U

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

TABLE IV. Deaths in 122 U.S. cities,* week ending December 11, 1999 (49th Week)

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	562	421	86	38	11	6	46
Boston, Mass.	153	105	24	15	6	3	15
Bridgeport, Conn.	43	38	4	1	-	-	3
Cambridge, Mass.	22	17	2	2	-	1	2
Fall River, Mass.	35	30	5	-	-	-	1
Hartford, Conn.	46	33	10	2	-	1	1
Lowell, Mass.	28	20	7	1	-	-	3
Lynn, Mass.	7	5	1	1	-	-	-
New Bedford, Mass.	25	22	1	1	1	-	1
New Haven, Conn.	43	30	7	4	2	-	6
Providence, R.I.	49	40	5	3	1	-	2
Somerville, Mass.	3	1	2	-	-	-	-
Springfield, Mass.	39	28	8	2	1	-	4
Waterbury, Conn.	9	6	-	2	-	1	2
Worcester, Mass.	60	46	10	4	-	-	6
MID. ATLANTIC	2,429	1,697	496	162	35	38	110
Albany, N.Y.	47	30	11	3	1	2	3
Allentown, Pa.	U	U	U	U	U	U	U
Buffalo, N.Y.	102	81	11	5	3	1	9
Camden, N.J.	42	27	6	5	2	2	2
Elizabeth, N.J.	10	9	1	-	-	-	2
Erie, Pa.	38	30	5	3	-	-	2
Jersey City, N.J.	50	26	14	7	-	3	-
New York City, N.Y.	1,236	862	260	84	10	20	22
Newark, N.J.	66	26	20	15	3	2	3
Paterson, N.J.	32	18	10	3	-	1	1
Philadelphia, Pa.	419	296	88	22	9	4	29
Pittsburgh, Pa.§	59	36	14	5	4	-	2
Reading, Pa.	28	21	7	-	-	-	1
Rochester, N.Y.	121	95	19	4	1	2	16
Schenectady, N.Y.	26	20	5	1	-	-	2
Scranton, Pa.	43	37	3	2	1	-	2
Syracuse, N.Y.	54	39	11	3	1	-	7
Trenton, N.J.	30	20	9	-	-	1	5
Utica, N.Y.	26	24	2	-	-	-	2
Yonkers, N.Y.	U	U	U	U	U	U	U
E.N. CENTRAL	2,072	1,388	421	148	60	55	162
Akron, Ohio	62	50	8	2	1	1	6
Canton, Ohio	34	28	5	1	-	-	4
Chicago, Ill.	413	249	96	33	19	16	38
Cincinnati, Ohio	58	40	11	5	1	1	5
Cleveland, Ohio	131	75	30	14	6	6	8
Columbus, Ohio	188	133	35	15	3	2	18
Dayton, Ohio	153	107	31	10	3	2	14
Detroit, Mich.	213	121	49	29	8	6	20
Evansville, Ind.	42	31	9	2	-	-	1
Fort Wayne, Ind.	57	39	11	1	3	3	-
Gary, Ind.	10	6	4	-	-	-	-
Grand Rapids, Mich.	57	38	12	2	2	3	6
Indianapolis, Ind.	185	127	41	9	4	4	8
Lansing, Mich.	47	34	8	5	-	-	5
Milwaukee, Wis.	128	99	20	5	2	2	9
Peoria, Ill.	40	28	6	3	2	1	3
Rockford, Ill.	49	32	12	3	2	-	2
South Bend, Ind.	63	48	12	1	-	2	5
Toledo, Ohio	84	62	12	7	-	3	6
Youngstown, Ohio	58	41	9	1	4	3	4
W.N. CENTRAL	935	671	178	45	18	23	70
Des Moines, Iowa	100	76	16	6	1	1	7
Duluth, Minn.	55	42	8	3	1	1	1
Kansas City, Kans.	25	17	6	1	-	1	3
Kansas City, Mo.	111	77	24	6	2	2	5
Lincoln, Nebr.	42	34	6	2	-	-	3
Minneapolis, Minn.	222	172	38	3	6	3	28
Omaha, Nebr.	90	65	14	7	1	3	5
St. Louis, Mo.	141	72	43	12	5	9	-
St. Paul, Minn.	68	54	12	1	1	-	13
Wichita, Kans.	81	62	11	4	1	3	5

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	≥65	45-64	25-44	1-24	<1	
S. ATLANTIC	1,014	676	186	90	35	27	81
Atlanta, Ga.	U	U	U	U	U	U	U
Baltimore, Md.	118	72	30	10	5	1	11
Charlotte, N.C.	93	66	16	7	3	1	8
Jacksonville, Fla.	141	99	24	13	5	-	15
Miami, Fla.	98	68	18	8	3	1	9
Norfolk, Va.	55	32	9	7	2	5	1
Richmond, Va.	56	33	11	6	4	2	5
Savannah, Ga.	56	39	12	3	1	1	6
St. Petersburg, Fla.	59	47	5	5	-	2	5
Tampa, Fla.	225	166	37	10	8	4	19
Washington, D.C.	88	41	24	9	4	10	2
Wilmington, Del.	25	13	-	12	-	-	-
E.S. CENTRAL	928	631	180	64	25	27	76
Birmingham, Ala.	177	115	37	11	4	9	21
Chattanooga, Tenn.	84	61	19	3	1	-	4
Knoxville, Tenn.	78	59	13	4	-	2	6
Lexington, Ky.	85	49	24	5	5	2	6
Memphis, Tenn.	215	136	43	23	6	7	20
Mobile, Ala.	79	62	8	5	2	2	1
Montgomery, Ala.	64	46	12	5	-	1	6
Nashville, Tenn.	146	103	24	8	7	4	12
W.S. CENTRAL	1,066	719	215	88	22	22	60
Austin, Tex.	79	56	12	8	1	2	4
Baton Rouge, La.	30	21	6	1	1	1	1
Corpus Christi, Tex.	50	38	9	3	-	-	5
Dallas, Tex.	200	131	42	22	3	2	5
El Paso, Tex.	95	65	17	6	3	4	3
Ft. Worth, Tex.	111	77	25	8	1	-	11
Houston, Tex.	U	U	U	U	U	U	U
Little Rock, Ark.	65	47	13	2	-	3	4
New Orleans, La.	108	55	29	14	6	4	4
San Antonio, Tex.	170	116	32	17	2	3	11
Shreveport, La.	33	23	6	2	2	-	1
Tulsa, Okla.	125	90	24	5	3	3	11
MOUNTAIN	1,082	742	210	80	31	19	91
Albuquerque, N.M.	120	86	19	9	5	1	12
Boise, Idaho	40	28	7	3	1	1	3
Colo. Springs, Colo.	59	44	8	3	1	3	4
Denver, Colo.	106	63	21	10	5	7	15
Las Vegas, Nev.	260	183	55	18	4	-	14
Ogden, Utah	18	15	2	1	-	-	-
Phoenix, Ariz.	187	114	45	14	9	5	11
Pueblo, Colo.	35	27	4	3	1	-	3
Salt Lake City, Utah	121	83	24	9	3	2	18
Tucson, Ariz.	136	99	25	10	2	-	11
PACIFIC	1,598	1,131	300	104	39	23	131
Berkeley, Calif.	20	14	4	1	-	1	2
Fresno, Calif.	141	96	29	8	5	3	18
Glendale, Calif.	18	12	4	-	1	1	1
Honolulu, Hawaii	81	61	14	4	1	1	5
Long Beach, Calif.	77	64	7	5	1	-	15
Los Angeles, Calif.	337	223	65	29	13	7	13
Pasadena, Calif.	24	18	6	-	-	-	3
Portland, Oreg.	194	129	51	8	4	2	15
Sacramento, Calif.	U	U	U	U	U	U	U
San Diego, Calif.	183	131	29	10	6	7	14
San Francisco, Calif.	U	U	U	U	U	U	U
San Jose, Calif.	162	112	33	13	4	-	13
Santa Cruz, Calif.	33	30	1	2	-	-	5
Seattle, Wash.	150	101	30	14	4	1	14
Spokane, Wash.	61	47	7	7	-	-	9
Tacoma, Wash.	117	93	20	3	-	-	4
TOTAL	11,686¶	8,076	2,272	819	276	240	827

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.

Additional information and applications are available from Emory University, International Health Dept. (PIA), 1518 Clifton Rd., N.E., Room 746, Atlanta, GA 30322; telephone (404) 727-3485; fax (404) 727-4590; or email pvaleri@sph.emory.edu.

Erratum: Vol. 48, No. RR-14

In the *MMWR Recommendations and Reports*, "Neuraminidase Inhibitors for Treatment of Influenza A and B Infections," the fifth sentence in the Summary on page 1 and the first sentence in the Conclusion on page 6 should read: "Amantadine was approved for prophylaxis of influenza A(H2N2) infection in the United States in 1966 and was approved for prophylaxis and treatment of influenza A infection in 1976; rimantadine was approved for treatment and prophylaxis of influenza A infection in 1993."

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