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Response to Increases in Cigarette Prices by Race/Ethnicity, Income, and Age Groups — United States, 1976–1993

Tobacco use, particularly cigarette smoking, remains the leading cause of preventable illness and death in the United States (*1*). Studies have shown that increases in the price of cigarettes will decrease the prevalence of smoking and the number of cigarettes smoked both by youth and adults (*1,2*). However, the potential impact of price increases on minority and lower-income populations is an important consideration (*3,4*). This report summarizes the analysis of data for 14 years from the National Health Interview Survey (NHIS), which indicates that lower-income, minority, and younger populations would be more likely to reduce or quit smoking in response to a price increase in cigarettes.

Data from the NHIS from 1976 to 1980, 1983, 1985, and 1987 to 1993 were pooled to conduct the analysis. The NHIS was administered to a nationally representative multistage probability sample of the noninstitutionalized civilian population aged ≥18 years. Smoking histories were obtained for these years in supplements to the NHIS; the overall response rate for these supplements was approximately 80%. Before 1992, participants were asked, "Have you smoked at least 100 cigarettes in your entire life?" and "Do you smoke cigarettes now?" In 1992 and 1993, participants were asked, "Do you now smoke cigarettes every day, some days, or not at all?" Current smokers were persons who reported having smoked ≥100 cigarettes during their lifetimes and who currently smoked cigarettes. Current smokers were asked, "On average, how many cigarettes do you smoke per day?" Information on race/ethnicity, income, age, and other demographic factors were obtained from the core of the NHIS questionnaire. Using data reported by the Tobacco Institute (*5*), the average price of a pack of cigarettes for each state, adjusted for inflation, was merged into the NHIS data by year and state of residence. The 14 cross-sections of the NHIS have 367,106 respondents; of these, 355,246 respondents had complete demographic and price data (approximately 24,000 respondents per year).

Two types of multiple regression models were estimated. A probit (limited dependent variable) model was used with the full sample (n=355,246) to estimate the change in the probability of smoking (one for current smokers and zero for all other respondents) for a change in the inflation-adjusted price (1982–1984 dollars). An ordinary least squares model, restricted to current smokers (n=112,657) with self-reported number of cigarettes smoked per day as the dependent variable, was used to estimate

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the relation between inflation-adjusted price and quantity of cigarettes consumed. Both models controlled for year, region of the country (Northeast, South, Midwest, and West)*, age, sex, race/ethnicity, education, marital status, family income, and urbanicity (based on residence in a metropolitan statistical area [MSA] central city, MSA city, or rural area). Separate subpopulation models were estimated by race/ethnicity (Hispanics, non-Hispanic blacks, and non-Hispanic whites), by age group (aged 18–24, 25–39, and ≥40 years), and by income group. Self-reported family incomes from all survey years were inflation-adjusted to 1982–1984 dollars, and the sample median was computed for all respondents reporting family income data. Respondents with incomes equal to or below the median were compared with those above the median income ($33,106 in 1997 dollars). All subpopulation models included the control variables used in the full models.

For all models, the effect of price is expressed as price elasticities. Price elasticity is a standardized measure indicating the percentage change in the dependent variable (i.e., smoking prevalence or number of cigarettes consumed per day) for a 1% change in the inflation-adjusted price of cigarettes (independent variable) (*6*). Prevalence price elasticity, using price coefficients from the probit regression models, is the percentage reduction in the prevalence of smoking that would be predicted from a 1% price increase. Consumption price elasticity, using price coefficients from the linear regression models, is the percentage reduction in the average number of cigarettes smoked by persons who continue to smoke after a 1% price increase. Total price elasticity is the sum of smoking prevalence and cigarette consumption price elasticities.

For all respondents, the models estimated a prevalence price elasticity of –0.15 and a consumption price elasticity of –0.10, yielding a total price elasticity estimate of –0.25 (Table 1). Therefore, a 50% price increase could cause a 12.5% reduction in the total U.S. cigarette consumption (i.e., 50% X –0.25=–12.5%), or approximately 60 billion fewer cigarettes smoked per year. In the age-specific model, younger smokers were more likely than older smokers to quit smoking, and after controlling for income, education, and other nonprice variables, Hispanic smokers and non-Hispanic black smokers were more likely than white smokers to reduce or quit smoking in response to a price increase. This pattern was consistent for all age groups (Figure 1). Among both non-Hispanic blacks and Hispanics, smokers aged 18–24 years were substantially more price-responsive than smokers aged ≥40 years. Lower-income populations also were more likely to reduce or quit smoking than those with higher incomes. The total price elasticity was –0.29 for lower-income persons compared with –0.17 for higher-income persons.

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* *Northeast*=Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont; *Midwest*=Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin; *South*=Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia; and *West*=Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. Models including state-specific controls yielded results similar to those obtained with controls for region of the country. Because sample sizes in subpopulation analyses were smaller, region of the country rather than state-specific controls were used in all models.

TABLE 1. Prevalence, consumption, and total price elasticities* using a probit regression model and least squares model to estimate response to increases in cigarette prices†, by selected characteristics — United States, 1976–1993

	Probit model					Least squares model					
Characteristic	No.	% Smokers	Coefficient	(95% CI§)	Prevalence elasticity¶	No.	Mean no. cigarettes	Coefficient	(95% CI)	Consumption elasticity**	Total elasticity††
Race/Ethnicity§§											
White, non-Hispanic	281,482	29.4	–0.04	±0.06	–0.05	90,829	21.49	–1.90	±1.0	–0.09	**–0.14**
Black, non-Hispanic	43,141	32.8	–0.31	±0.15	–0.36	14,158	14.12	0.50	±1.9	0.04	**–0.32**
Hispanic	21,926	24.5	–0.76	±0.26	–1.31	5,736	14.00	–7.50	±4.1	–0.58	**–1.89**
Age group (yrs)											
18–24	46,884	29.6	–0.29	±0.15	–0.37	13,875	16.03	–3.34	±1.9	–0.21	**–0.58**
25–39	119,510	34.2	–0.22	±0.09	–0.25	42,177	19.49	–3.15	±1.2	–0.17	**–0.42**
≥40	188,521	26.2	–0.04	±0.07	–0.06	56,515	21.28	–0.73	±1.2	–0.04	**–0.10**
Family income¶¶											
≤Median income	154,602	31.7	–0.16	±0.08	–0.20	51,780	19.24	–1.65	±1.1	–0.09	**–0.29**
>Median income	156,940	27.5	–0.03	±0.08	–0.05	48,422	20.82	–2.50	±1.3	–0.12	**–0.17**
Income not reported	43,704	26.1	–0.15	±0.14	–0.23	12,365	19.64	–0.60	±2.3	–0.02	**–0.25**
Sex											
Male	151,711	32.4	–0.18	±0.08	–0.18	54,417	22.17	–1.91	±1.2	–0.08	**–0.26**
Female	203,535	26.8	–0.07	±0.07	–0.09	58,150	17.89	–1.87	±1.0	–0.10	**–0.19**
Total	**355,246**	**29.3**	**–0.12**	**±0.05**	**–0.15**	**112,657**	**19.96**	**–1.94**	**±0.8**	**–0.10**	**–0.25**

*Price elasticity is a ratio of the marginal change (i.e., per unit changes) between two variables and the average change between the same variables (*7*). This ratio is a standardized measure that indicates the percentage change in the dependent variable (i.e., smoking prevalence or number of cigarettes consumed per day) for a 1% change in the Consumer Price Index (CPI) adjusted price of cigarettes (independent variable).

†Cigarette prices were denominated in constant 1982–1984 dollars for all price elasticity estimates.

§Confidence interval.

¶Percentage reduction in prevalence of smoking for each 1% increase in the CPI adjusted price of cigarettes. The numerator (the marginal change) consists of the regression coefficient for price multiplied by the average probability (based on the regression coefficient for price and variance terms) that a person is a smoker. The denominator (the average change) is the ratio of the average number of surveyed persons who smoke (smoking prevalence) to the average sample price.

**Percentage reduction in the number of cigarettes smoked per day for each 1% increase in the CPI adjusted price of cigarettes. The numerator is the coefficient on price and the denominator is the ratio of the average number of cigarettes consumed per day to the average sample price.

††Calculated by summing the smoking prevalence and cigarette consumption price elasticities.

§§Data for racial/ethnic groups other than non-Hispanic whites, non-Hispanic blacks, and Hispanics were too small for meaningful analysis.

¶¶Family income data were denominated in constant 1982–1984 dollars for all price elasticity estimates.

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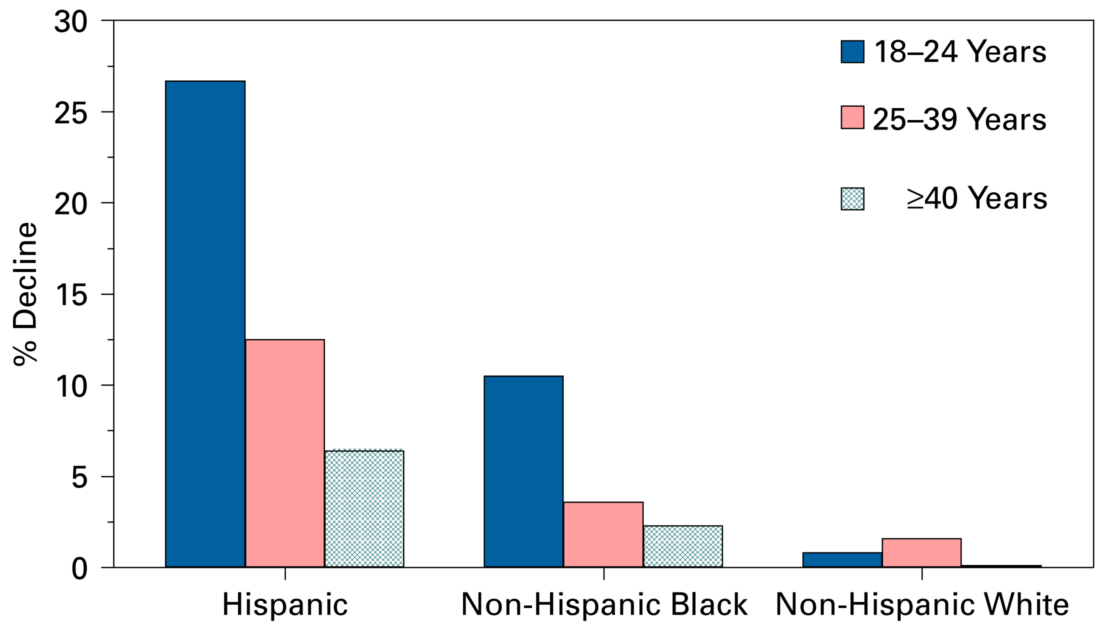
FIGURE 1. Percentage decline in smoking in response to a 10% price increase on cigarettes, by age and racial/ethnic group* — United States, 1976–1993



*Data for racial/ethnic groups other than non-Hispanic whites, non-Hispanic blacks, and Hispanics were too small for meaningful analysis.

Editorial Note: The findings in this report indicate that lower-income and minority smokers would be more likely than other smokers to be encouraged to quit in response to a price increase and thus would obtain health benefits attributable to quitting. Other studies also have found that youth, young adults, and lower-income populations are the most price responsive (*1,2,7*). In this study, smokers with family incomes equal to or below the study sample median were more likely to respond to price increases by quitting than smokers with family incomes above the median (e.g., 10% quitting compared with 3% quitting in response to a 50% price increase). After controlling for income and education, Hispanics and non-Hispanic blacks are substantially more price responsive than other smokers. Data from this model suggest that Hispanic smokers were the most price responsive. Non-Hispanic black smokers would respond to price increases primarily by quitting rather than reducing the number of cigarettes smoked per day.

This study is subject to at least five potential limitations. First, because the analysis is based on pooled cross-sectional surveys, the estimates of price elasticity could underestimate the long-term response to price changes that would be observed from longitudinal surveys. Second, this analysis does not control fully for other factors unrelated to price (e.g., differences between states in social and policy environments) that could reduce demand and be confounded with the state's excise tax level. Third, because not all respondents for whom price data was available reported family income, the analysis by income categories could be less representative than other subpopulation analyses. Fourth, the sample sizes in subpopulation analyses by race and age (Figure 1) are reduced and make the estimation of price elasticities within

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specific age groups by race less stable. Nevertheless, the pattern and magnitude of the estimated parameters are consistent with those observed in previous studies, and parameters for the control variables remained stable across models. Finally, because of the changing composition (e.g., Mexican, Cuban, or Puerto Rican) and smaller size of the Hispanic samples within the 14 NHIS samples used in this analysis, the estimates for Hispanics are subject to greater error than those for non-Hispanic blacks and non-Hispanic whites.

Comprehensive measures for promoting cessation and reducing the prevalence of smoking include increasing tobacco excise taxes, enforcing minors' access laws, restricting smoking in public places, restricting tobacco advertising and promotion, and conducting counter-advertising campaigns. Because state tax increases are more effective when combined with a comprehensive tobacco prevention and control program (*8*), price increases should be combined with such programs to increase their public health impact. Court settlements with several states and other market factors have resulted in the tobacco industry increasing the wholesale price of cigarettes by 12.2% since January 1997 (*9*). Although this and potential future industry price increases will reduce smoking prevalence and consumption—particularly among adolescents and young adults (*1*)—most adult smokers will continue to smoke and pay the higher cigarette prices. Tobacco-use prevention and cessation programs should be made available to benefit those populations paying the greatest share of the increased prices. Smoking prevention will always remain a primary public health objective, but public health efforts encouraging cessation particularly are needed for smokers aged ≥40 years, who would be the most likely group to continue smoking and paying the higher cigarette prices. In addition, tobacco-use prevention and cessation programs should be directed toward lower-income and minority populations in which the burden of tobacco-related disease is high (*10*).

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Clinical Sepsis and Death in a Newborn Nursery Associated with Contaminated Parenteral Medications — Brazil, 1996

In October 1996, a total of 35 newborn infants died in a 26-bed nursery of a 200-bed hospital in Roraima, Brazil; these deaths represented a significant increase over the baseline mortality rate in the nursery (6.0 versus 1.7 per 100 live births; $p<0.01$). Twenty of the deaths were attributed to sepsis. Fatal episodes of sepsis began 24–72 hours after birth. Although an investigation by the Roraima Health Department resulted in an improvement of infection control, increased episodes of fever and clinical sepsis persisted. As a result, in November 1996, the Secretary of Health of Roraima, Brazil Ministry of Health, requested that CDC assist in the investigation. This report summarizes this investigation, which implicated locally produced intravenous (IV) solutions as the source of the outbreak and underscores the need to assure proper quality control of parenteral medications and the importance of nosocomial infection surveillance.

In November 1996, CDC conducted a cohort study to identify risk factors for the development of fever. A case was defined as fever of 100.4 F (38 C) without a recognized cause in any neonate who was admitted to the hospital nursery on October 1, 5, 15, or 25 (these dates were chosen to represent the entire month) and who received antimicrobial therapy for sepsis. Six of the 66 patients admitted to the nursery on these days met the case definition. When case- and non-case-patients were compared, neither sex, gestational age, birthweight, nor Apgar score at 5 minutes were associated with the development of fever. In comparison, Apgar scores at 1 minute of <8 (five of 23 versus one of 43; $p=0.01$) and insertion of a peripheral IV catheter with receipt of parenteral medications (six of nine versus zero of 57; $p<0.01$; relative risk [RR]=20) were associated with the development of fever. Because this cohort study strongly implicated the insertion of peripheral IVs and receipt of parenteral medications as risk factors for the development of fever, a second cohort study was conducted to determine whether IVs were associated with the development of fever before the time of the outbreak. This second cohort included all patients admitted to the hospital nursery on June 1, 5, 15, or 25, dates preceding the time of the increase in death rate. None of the 55 patients admitted to the nursery during the June dates developed fever, including 11 patients who had been exposed to parenteral medications. The attack rate for fever following exposure to parenteral medications was significantly higher on the four dates in October compared with the four dates in June (six of nine versus zero of 11; $p<0.01$; RR=undefined).

To identify risk factors for death attributed to clinical sepsis, CDC conducted a case-control study on infants admitted to the nursery during October 1996. The case definition was expanded to include death following the onset of fever and clinical sepsis. Twenty infants admitted to the nursery during October met the case definition; 40 birthdate-matched patients were included as controls. Case-patients were more likely than controls to have a lower birthweight (mean: 2.3 kg versus 3.3 kg; $p=0.01$), lower Apgar score at 1 minute (mean: 6.5 versus 7.7; $p=0.01$) or 5 minutes (mean: 8.0 versus 8.8; $p=0.01$), lower gestational age (mean: 33.8 versus 38.8 weeks; $p=0.01$), or a peripheral IV and to have received parenteral medications (20 of 20 versus zero of 40; $p=0.01$). Various parenteral medications (i.e., glucose, aminophylline, calcium gluconate, penicillin, sodium chloride, potassium, and sodium bicarbonate) were

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administered to case-patients; only glucose, aminophylline, and bidistilled water (used to reconstitute medications) were administered to all case-patients. All case-patients developed fever only after they were exposed to the parenteral medications. Thirteen of 14 blood cultures taken from case-patients ≤2 days after the onset of fever were negative for bacterial growth; one blood culture was positive for *Klebsiella pneumoniae*.

Samples of parenteral fluids and medications used in the nursery were examined for bacterial and/or endotoxin contamination. Endotoxin was measured using the *limulus* amoebocyte assay. All cultures of these solutions were negative for bacterial growth. However, six of 13 unopened vials of bidistilled water for injection and 12 of 15 unopened vials of 25% glucose, manufactured by Hipolabor Farmaceutica Ltda. (Sabara, Minas Gerais, Brazil), had elevated endotoxin levels of 0.8–5.8 endotoxin units (EU)/mL (mean: 3.8 EU/mL) and 0.8–1.9 EU/mL (mean: 1.2 EU/mL), respectively. The United States Pharmacopeia (U.S.P.) endotoxin limit on water for injection is 0.25 EU/mL and for glucose (5%–70%) is 0.5 EU/mL. Caked amorphous-like material and bacterial cells were observed by scanning electron microscopy in samples of bidistilled water containing elevated levels of endotoxin.

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Editorial Note: The findings in the investigation described in this report implicated insertion of a peripheral IV line and receipt of parenteral medications as resulting in clinical sepsis and death during the outbreak. Laboratory results documented endotoxin contamination of unopened vials of parenteral medications administered to infants, suggesting intrinsic contamination of these products.

The release of endotoxin into the circulatory system is the initiating event of sepsis associated with gram-negative organisms. Subsequently, reactions may range from no detectable response to the onset of profound shock and death (*1,2*). Such reactions are highly dependent on the body mass of the patient (*3*). Because the minimal pyrogenic dose of endotoxin is 5 EU/kg (*4*), 2–3 mL of the contaminated bidistilled water (mean level of contamination: 3.8 EU/mL) would have been sufficient to evoke a pyrogenic reaction in an average 4 lbs, 8 oz (2000 g) infant. As a result, IV administration of these endotoxin-contaminated fluids (bidistilled water and/or 25% glucose) explained the increased number of febrile reactions detected during this outbreak. All infants receiving parenteral medications were receiving bidistilled water and glucose. Attack rates of 70% among these infants suggest that not all lots of bidistilled water and glucose were contaminated.

Exposure of the infants to parenteral fluids contaminated with endotoxin also may have been sufficient to cause the increased number of deaths during October. Previous studies on both humans and animals have demonstrated that endotoxin is capable of inducing clinical sepsis and death (*5*). Infants with low birthweight and gestational age were probably at increased risk for death because of the smaller amount of endotoxin required to cause serious pyrogenic reactions.

An investigation at the hospital described in this report previously had detected several breakdowns in aseptic technique and infection-control practices. Blood cultures collected and processed during October (mean: 8 days after the onset of fever) revealed the presence of bloodstream infection (BSI) in several infants. Exposure to

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endotoxins may have resulted in higher BSI rates by prolonging the exposure of infants to peripherally inserted IVs and breaks in aseptic technique during their manipulation. Despite a continued increase in episodes of unexplained fever, BSIs and deaths decreased in November after an improvement in infection-control practices.

Unopened vials of contaminated medication were undamaged and had no evidence of tampering, suggesting that contamination most likely occurred during the manufacturing process. Without appropriate manufacturing processes, endotoxin can contaminate solutions and reagents (*6*). Many gram-negative organisms, which can release endotoxin, require few nutrients and can grow in distilled water at 39.2 F (4 C). In addition, endotoxins can survive exposure to steam autoclaving, organic solvents, acids, ethanol, and sterilizing liquids. Only dry heat (≥482 F [≥250 C] for 30 minutes or ≥356 F [≥180 C] for 3 hours) can assure the elimination of endotoxin (*7*).

The manufacturing plant in Minas Gerais, Brazil, where the medications implicated in this outbreak were made, was closed when inadequate quality-control testing was observed by the Secretary of Health of Minas Gerais. Although all Brazilian state secretaries of health were notified of the closure, no nationally coordinated product recall was performed. Based in part on the findings of this investigation, the Secretary of Health of Minas Gerais decided not to allow reopening of the manufacturing facility until quality-control measures were improved.

The routine surveillance of nosocomial infections at the hospital level is essential for the early detection and control of such epidemics. Clusters of pyrogenic reactions should always lead to an evaluation of possible product contamination. Surveillance also is important at a nationwide level. In this outbreak, contaminated medications were distributed widely throughout Brazil, and similar episodes of sepsis among neonates were reported from other nurseries around the country.

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Use of Clinical Preventive Services by Adults Aged <65 Years Enrolled in Health-Maintenance Organizations — United States, 1996

Health-maintenance organizations (HMOs) are accountable for the preventive care of approximately one quarter of the U.S. population (*1*), and public health agencies have an increasing role in assessing the quality of care for populations enrolled in HMOs (*2–4*). The Health Plan Employer Data and Information Set (HEDIS 3.0) (*5*) reports on the performance of HMOs and is sponsored and maintained by the not-for-profit National Committee for Quality Assurance (NCQA).* This report summarizes state-specific HEDIS estimates for the delivery of four clinical preventive services: screening mammography and Papanicolaou (Pap) tests for women, screening retinal examinations for persons with diabetes, and advising smokers to quit. The advice-to-quit-smoking data from 12 states represented by HEDIS is then compared with data on insured respondents from the corresponding 12 states surveyed by the Behavioral Risk Factor Surveillance System (BRFSS).† These findings underscore the potential public health importance of HEDIS data (e.g., creating the capacity to assess statewide prevention interventions) and highlights some of the methodologic issues of comparing performance measures from HEDIS to the BRFSS.

The HEDIS data used in this report are for commercial HMO enrollees only (i.e., persons who joined the HMO through an employer group policy or an individual or family policy [excluding Medicaid and Medicare beneficiaries]). The 1996 HEDIS data used in this analysis were reported by 320 HMOs in 42 states and the District of Columbia; these HMOs are comparable to the 660 HMOs nationwide by HMO type, regional location, and tax status (*5*). Data for the measures on mammography, Pap tests, and retinal examinations for persons with diabetes were obtained from administrative data with optional medical record supplementation using standard HEDIS 3.0 methodology (*5*).§ To obtain data about the advice-to-quit-smoking measure, NCQA required HMOs to use independent contractors to administer and analyze a standardized mailed survey.¶ The median response rate was 41%. A "national" HEDIS prevalence rate for each measure was calculated by first adjusting for HMO plan size and then for state population size.

The BRFSS is an ongoing, state-based, random-digit–dialed telephone survey of noninstitutionalized persons aged ≥18 years in the 50 states and the District of Columbia. All persons responding to the BRFSS questionnaire were asked 1) whether they had health insurance, 2) what specific preventive health services they had received, and 3) the duration since they had received the service(s). BRFSS respondents reporting Medicare or Medicaid coverage or no insurance at all were excluded from the analysis. In 1996, a total of 12 states used the optional BRFSS module that contained

*The source for data contained in this article is Quality Compass™ and is used with the permission of the NCQA.

†The estimates for mammography, Pap tests, and retinal examination rates from HEDIS were not compared with BRFSS because of the differences between records-based and self-reported measurement systems.

§The HEDIS data on advice to smokers, Pap tests, and retinal examinations were derived from members who were enrolled continuously in an HMO for at least 1 year. Calculation of HEDIS mammography coverage rates required at least 2 years of continuous enrollment. HEDIS does not permit more than one 45-day break in enrollment during the reporting year.

¶Within each HMO, the survey was mailed to 1860 randomly chosen commercial enrollees aged ≥18 years. Response rate was calculated as the number of completed surveys divided by the number of persons in the sample minus (the number of ineligible persons surveyed plus the number of persons who could not be contacted).

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the advice-to-quit-smoking question. Estimates were weighted to the states' age, sex, and race distribution of adults. Statistical Analysis System (SAS) software (*6*) was used to calculate point estimates, and SUDAAN (*7*) software was used to calculate 95% confidence intervals. The response rate for the BRFSS was estimated by the CASRO method as 63.8% (*8*). Standardization of HEDIS and BRFSS data to the same population was not possible because HEDIS provided only aggregated data.

Among women aged 52–64 years, a median of 71.9% (range: 61.9%–83.2%) of HEDIS HMO records showed receipt of a mammogram during the preceding 2 years (Table 1). The prevalence of mammography was highest in New England states and lowest in the east south central states (Table 2). Among women aged 21–64 years, a median of 72.7% (range: 51.5%–85.6%) of HMO records showed receipt of a Pap test during the preceding 3 years. The prevalences of Pap test receipt for the HEDIS population were highest in the New England states and lowest in the east south central states. Among persons with diabetes aged 31–64 years in the HEDIS population, a median of 39.5% (range 19.2%–67.7%) had had a retinal examination during the previous year. Among smokers aged 18–64 years who were examined by a health-care provider during the previous year, a median of 63.0% (range: 32.3%–71.8%) reported receiving advice to quit.

HEDIS data were compared with BRFSS data for the advice-to-quit measure for 12 states and the District of Columbia. Among HEDIS smokers aged 18–64 years who had been examined by a health-care provider during the previous year, a median of 63.2% (range: 56.2%–71.8%) reported receiving advice to quit; in comparison, among the insured BRFSS smokers who had been examined by a physician for a routine check-up during the previous year, a median of 62.4% (range: 49.9%–70.8%) reported receiving advice to quit (Table 3).

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Editorial Note: The findings in this report indicate that the prevalences of preventive-care practices of HMOs in the United States varied among the states and regions. HEDIS data represent a large-scale private-sector effort to provide data that could have valuable public health applications. HEDIS measures are potentially useful for public-sector assessment of the quality of care provided by HMOs, especially because HMOs are increasingly contracted by the states and the Health Care Financing Administration to care for Medicaid and Medicare populations. This report provides the first published state-specific estimates of HEDIS performance and comparison of private-sector HEDIS data to the BRFSS, a public-sector data set.

The findings in this report are subject to at least four limitations. First, it is unclear whether HEDIS is representative of a state's HMO population because the penetration of HMOs in each state's health-care system varies widely (*1*). Because there is no government or purchaser mandate to report data to HEDIS, HMOs can voluntarily choose to submit HEDIS performance data (*5*). HEDIS data for 1996 were not audited

TABLE 1. Estimated prevalence of use of selected clinical preventive services by adults aged <65 years enrolled in health-maintenance organizations (HMOs), by service and state — United States, Health Plan Employer Data and Information Set (HEDIS), 1996

	Mammography*			Papanicolaou smear†			Retinal examinations for persons with diabetes§			Receipt of advice to quit smoking¶		
State	No. HMOs reporting**	%	(95% CI††)	No. HMOs reporting	%	(95% CI)	No. HMOs reporting	%	(95% CI)	No. HMOs reporting	%	(95% CI)
Arkansas	2	71.7	(±5.0)	2	69.6	(± 4.8)	2	23.2	(± 6.0)	NA§§		
Arizona	8	75.1	(±1.3)	8	80.8	(± 2.8)	7	40.7	(± 2.8)	5	63.7	(± 3.3)
California	6	74.7	(±3.5)	6	73.1	(± 4.5)	6	51.6	(± 9.5)	6	61.4	(± 6.3)
Colorado	8	74.2	(±3.2)	8	73.8	(± 2.9)	8	46.9	(± 6.7)	6	61.9	(± 8.2)
Connecticut**	7	69.7	(±3.9)	7	70.7	(± 4.3)	7	42.5	(± 5.0)	6	61.7	(± 9.7)
Delaware**	7	70.3	(±0.5)	6	71.2	(± 0.2)	7	37.7	(± 0.7)	3	61.9	(± 4.7)
District of Columbia**	3	76.5	(±0.4)	3	82.9	(± 0.1)	3	56.5	(± 0.6)	4	66.5	(± 3.3)
Florida	30	70.8	(±0.8)	23	67.4	(± 3.0)	26	37.9	(± 2.9)	8	64.4	(± 3.2)
Georgia	4	69.2	(±6.3)	6	65.5	(± 7.1)	6	30.5	(± 5.0)	2	61.1	(±21.9)
Hawaii	1	77.7	(±0.3)	1	76.3	(± 0.2)	1	67.7	(± 0.5)	1	65.9	(± 3.2)
Illinois**	7	66.6	(±4.9)	8	67.9	(± 6.6)	7	29.1	(± 7.8)	5	64.0	(± 5.1)
Indiana**	5	75.6	(±6.0)	6	76.4	(± 8.8)	5	39.1	(± 9.7)	4	64.2	(± 6.0)
Iowa	1	78.2	(±3.3)	1	72.7	(± 0.5)	1	47.0	(± 3.9)	1	54.8	(± 6.2)
Kansas	6	72.0	(±3.2)	6	71.3	(± 5.4)	5	48.0	(±14.4)	3	63.2	(±11.5)
Kentucky	3	64.3	(±2.5)	3	69.3	(± 5.2)	3	43.3	(± 4.5)	NA		
Louisiana	4	66.6	(±3.0)	4	51.5	(±17.0)	4	26.9	(± 6.2)	3	56.2	(± 5.1)
Maine	3	83.2	(±0.9)	3	83.7	(± 0.3)	3	56.0	(± 1.8)	3	71.8	(± 4.2)
Maryland**	15	68.3	(±0.3)	15	70.0	(± 0.1)	13	42.8	(± 2.2)	11	67.9	(± 2.4)
Massachusetts**	12	80.2	(±0.2)	10	82.0	(± 0.9)	10	56.7	(± 2.1)	10	71.1	(± 3.0)
Michigan	12	75.3	(±2.3)	12	76.8	(± 3.2)	12	39.5	(± 5.8)	10	67.9	(± 2.6)
Minnesota	2	77.9	(±9.2)	2	85.6	(± 1.8)	2	51.3	(±22.4)	2	65.6	(± 5.1)
Missouri**	9	69.4	(±4.7)	9	68.5	(± 3.2)	12	32.3	(± 4.7)	5	62.8	(± 2.7)
Nebraska	3	72.5	(±2.5)	3	76.6	(± 4.7)	3	19.2	(± 4.1)	3	62.5	(± 4.9)
Nevada	1	61.9	(±1.3)	1	69.3	(± 0.4)	NA			NA		
New Hampshire	3	77.9	(±0.8)	3	81.5	(± 0.3)	3	60.9	(± 1.5)	2	69.6	(± 4.6)
New Jersey**	9	65.8	(±4.8)	8	64.4	(± 3.9)	9	36.3	(± 6.1)	5	53.9	(± 7.8)
New Mexico	5	67.9	(±3.6)	4	65.1	(± 7.7)	4	42.7	(± 6.6)	1	32.3	(± 2.2)
New York**	26	70.8	(±1.7)	27	74.2	(± 2.2)	27	50.2	(± 2.4)	14	62.1	(± 2.5)
North Carolina	6	70.8	(±5.2)	8	74.1	(± 3.4)	8	36.9	(± 5.3)	4	63.3	(± 2.9)
Ohio	16	70.6	(±2.9)	16	69.9	(± 2.8)	16	35.4	(± 4.7)	5	67.3	(± 5.2)
Oklahoma	6	74.1	(±2.5)	6	73.5	(± 1.6)	6	34.9	(± 4.9)	3	56.4	(± 3.2)
Oregon	7	74.2	(±1.0)	7	74.9	(± 1.9)	7	44.1	(± 2.9)	3	61.4	(±18.1)
Pennsylvania**	23	73.4	(±0.2)	21	72.7	(± 0.1)	23	35.4	(± 0.1)	10	66.5	(± 2.7)
South Carolina**	5	74.7	(±1.4)	5	66.3	(± 2.9)	5	25.7	(± 3.3)	3	58.5	(± 7.6)

South Dakota	NA			1	66.2	(± 2.2)	NA			NA		
Tennessee	8	64.3	(± 3.3)	8	67.5	(± 2.5)	8	25.4	(± 6.2)	4	52.4	(± 6.2)
Texas	21	68.9	(± 2.5)	22	73.4	(± 2.4)	20	35.1	(± 2.6)	6	59.7	(± 4.6)
Utah	3	68.2	(± 4.4)	3	62.7	(± 2.5)	3	25.2	(± 4.3)	1	51.6	(± 3.6)
Vermont	1	81.0	(± 2.6)	1	84.4	(± 2.4)	1	59.4	(± 3.2)	NA		
Virginia**	5	63.5	(± 4.2)	7	66.9	(± 3.5)	5	27.7	(± 3.7)	5	64.6	(± 3.5)
Washington	10	76.4	(± 0.4)	10	77.5	(± 0.2)	10	56.6	(± 1.0)	7	60.8	(± 6.1)
West Virginia	1	69.2	(± 0.2)	1	71.4	(± 0.1)	1	32.4	(± 0.3)	1	69.1	(± 2.5)
Wisconsin**	6	75.2	(± 4.1)	6	78.1	(± 3.1)	6	59.7	(± 8.7)	4	64.5	(± 5.6)

*Women aged 52–64 years who had documented receipt of the service during the 2 years preceding the inquiry.

†Women aged 21–64 years who had documented receipt of the service during the 3 years preceding the inquiry. Denominator may exclude women who had had a hysterectomy.

§Adults aged 31–64 years who had diabetes diagnosed and who had documented receipt of a retinal examination during the previous year.

¶Adults aged 18–64 years who reported having seen a health-care provider during the year preceding the inquiry; data are from the HEDIS membership satisfaction survey.

**HMOs for which the primary service area could not be determined had their preventive service coverage rates reported for each of the multiple states served.

††Confidence interval.

§§Not available.

TABLE 2. Estimated prevalence of use of selected clinical preventive services, by region and service — United States, Health Plan Employer Data and Information Set (HEDIS), 1996

	Mammography*		Papanicolaou smear†		Retinal examinations for persons with diabetes§		Receipt of advice to quit smoking¶	
Region	**%**	**(95% CI**)**	**%**	**(95% CI)**	**%**	**(95% CI)**	**%**	**(95% CI)**
New England	77.5	(±1.3)	79.2	(±1.6)	53.4	(±2.3)	68.4	(±3.5)
Middle Atlantic	70.6	(±1.2)	71.7	(±1.3)	42.6	(±1.7)	61.8	(±2.2)
East North Central	71.8	(±2.0)	72.7	(±2.3)	37.9	(±3.5)	65.8	(±2.0)
West North Central	73.9	(±3.9)	74.7	(±3.2)	41.0	(±7.1)	62.2	(±2.8)
South Atlantic	70.0	(±0.8)	69.1	(±1.4)	34.8	(±1.7)	63.8	(±1.5)
East South Central	64.3	(±2.9)	68.3	(±2.6)	33.0	(±6.7)	52.4	(±6.5)
West South Central	69.4	(±1.8)	69.8	(±2.6)	32.8	(±2.2)	58.7	(±2.8)
Mountain	71.4	(±2.0)	72.7	(±3.3)	40.4	(±3.6)	56.5	(±5.7)
Pacific	74.9	(±2.0)	73.9	(±2.7)	52.1	(±4.4)	61.4	(±5.5)
National††	71.6	(±0.7)	72.1	(±0.9)	40.8	(±1.0)	62.3	(±0.7)

*Women aged 52–64 years with documented receipt of service during the preceding 2 years.
†Women aged 21–64 years with documented receipt of service during the preceding 3 years. Denominator may exclude women who had had a hysterectomy.
§Adults aged 31–64 years who had diabetes diagnosed and who had documented receipt of a retinal examination during the preceding year.
¶Smokers aged 18–54 years who had seen a health-care provider during the previous year and reported receipt of service.
**Confidence interval.
††National rate adjusted for participating states' population.

Clinical Preventive Services — Continued

TABLE 3. Estimated prevalence of receipt of advice to quit smoking for adults aged <65 years, by selected states — United States, Health Plan Employer Data and Information Set (HEDIS) and Behavioral Risk Factor Surveillance System (BRFSS)*, 1996

	Reported receipt of advice to quit smoking†			
	HEDIS		BRFSS	
State	%	(95% CI§)	%	(95% CI)
Arizona	63.7	(± 3.3)	51.6	(± 9.8)
Colorado	61.9	(± 7.0)	68.1	(± 8.5)
Delaware¶	61.9	(± 4.7)	66.2	(± 3.6)
District of Columbia¶	66.5	(± 3.9)	62.4	(±11.4)
Kansas	63.2	(±11.5)	49.9	(± 8.4)
Louisiana	56.2	(± 5.1)	51.5	(± 9.1)
Maine	71.8	(± 4.2)	66.9	(± 9.4)
Missouri	62.8	(± 2.5)	59.5	(± 9.1)
New York¶	62.1	(± 2.8)	69.5	(± 6.7)
North Carolina	63.3	(± 2.9)	64.5	(± 6.5)
Oklahoma	56.4	(± 3.2)	59.2	(± 8.7)
Virginia¶	64.6	(± 4.2)	70.8	(± 6.8)
West Virginia¶	69.1	(± 2.5)	62.0	(± 7.4)
Median	*63.2*		*62.4*	

*Persons responding to the BRFSS questionnaire were asked, “Do you have any kind of health-care coverage, including health insurance, prepaid plans such as health-maintenance organizations (HMOs), or government plans such as Medicare?” Those responding “yes” were asked, “What type of health-care coverage do you use to pay for most of your medical care?” Those reporting Medicare, Medicaid, or no insurance coverage were excluded from this analysis.

†Smokers aged 18–64 years who reported visiting a provider (HEDIS) or physician (BRFSS) during the preceding year and received advice to quit. The BRFSS asked the advice-to-quit smoking question in 12 states and the District of Columbia; the HEDIS data on this measure is from the same 12 states and the District of Columbia.

§Confidence interval.

¶HMOs whose primary service area could not be determined had their preventive service coverage rates reported for each of the multiple states served.

uniformly and may overrepresent HMOs in urban areas (*5*). Second, HEDIS and BRFSS populations could not be standardized to the same population. A county-by-county comparison of a large, multistate HMO population with the insured BRFSS population showed that HMO enrollees represented fewer minorities and were younger, were more likely to be married, and had higher income and education levels (*9*). Third, although the advice-to-quit-smoking measure in both populations was assessed by self-report, there were differences in both the mode of administration and wording of questions. BRFSS advice-to-quit rates may be overestimated because during routine checkups patients may be more likely to receive preventive advice than during other outpatient encounters. Finally, the low response rate for HEDIS may reflect nonresponse bias.

HEDIS is a potentially valuable means of tracking the use of clinical preventive services for a large proportion of the U.S. population. Of the four measures studied, the national health objective for 2000 has been met only for mammography for women

Clinical Preventive Services — Continued

aged 52–64 years. To track prevention interventions provided by various health-delivery systems, more comparable population-based performance measures need to be developed. Such measures would benefit both health departments and HMO managers by identifying areas for improvement for clinical preventive service delivery (*2–4*) and enable states to monitor the effectiveness of communitywide health programs.

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Erratum: Vol. 47, No. RR-5

In the *MMWR Recommendations and Reports*, "Guidelines for the Use of Antiretroviral Agents in HIV-Infected Adults and Adolescents," on page 43, information was incorrectly presented in the summary section. The sentence beginning on the 10th line from the end of the summary should read, "In general, a protease inhibitor and two *nucleoside* reverse transcriptase inhibitors should be used initially."

Errata: Vol. 47, No. 28

In the article "Outbreak of Acute Febrile Illness Among Athletes Participating in Triathlons—Wisconsin and Illinois, 1998" on page 585, in the first sentence of the first paragraph the date was incorrect. The sentence should begin, "On July 14, *1998*, ...".

In the article "Wild Poliovirus Transmission in Bordering Areas of Iran, Iraq, Syria, and Turkey, 1997–June 1998," on page 589 in Figure 1, cases with onset in 1997 were omitted from provinces labeled A, F, I, and R. Following is the corrected figure.

FIGURE 1. Location of provinces/governorates on borders of Iran, Iraq, Syria, and Turkey and distribution of virologically confirmed poliomyelitis cases, January 1997–June 1998

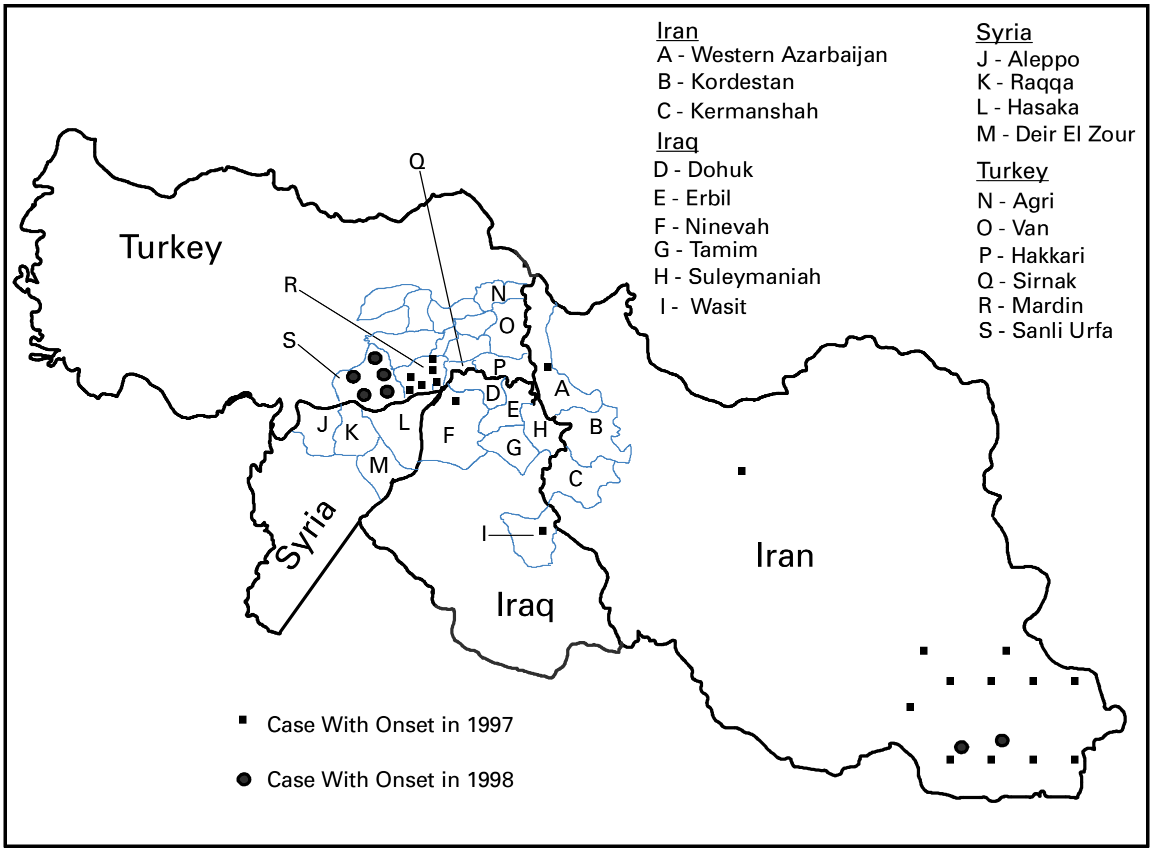
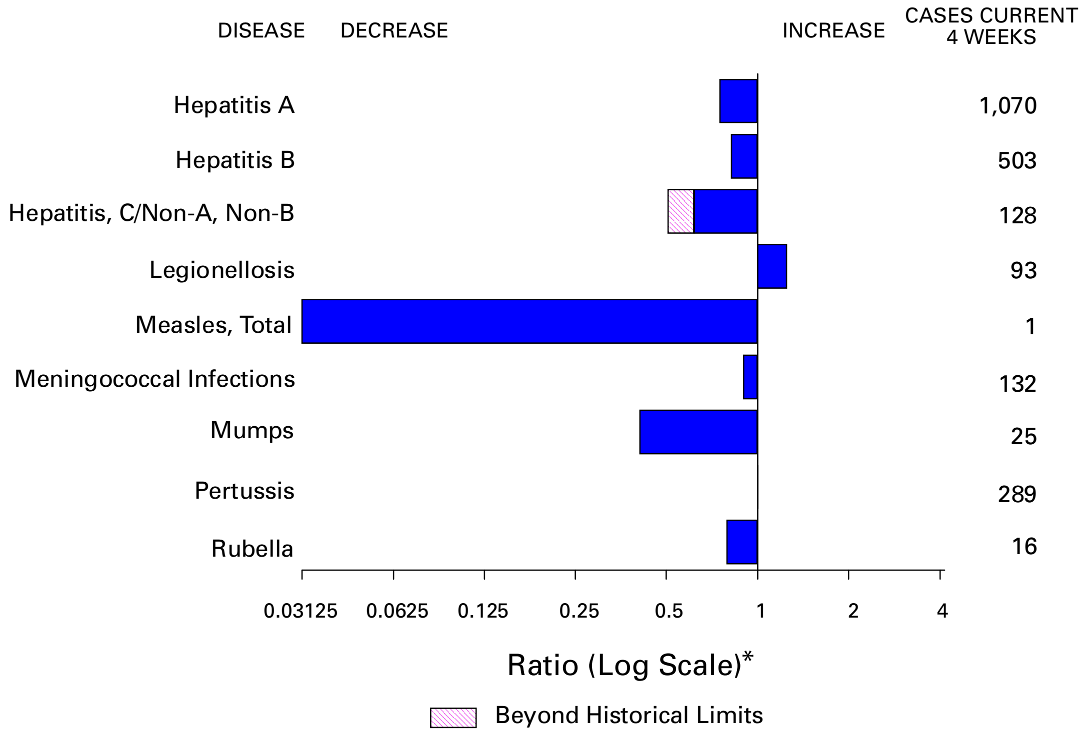


FIGURE I. Selected notifiable disease reports, comparison of provisional 4-week totals ending July 25, 1998, with historical data — United States



*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 July 25, 1998 (29th Week)

	Cum. 1998		Cum. 1998
Anthrax	-	Plague	4
Brucellosis	42	Poliomyelitis, paralytic	1
Cholera	6	Psittacosis	30
Congenital rubella syndrome	5	Rabies, human	-
Cryptosporidiosis*	1,048	Rocky Mountain spotted fever (RMSF)	126
Diphtheria	3	Streptococcal disease, invasive Group A	1,377
Encephalitis: California*	3	Streptococcal toxic-shock syndrome*	37
eastern equine*	-	Syphilis, congenital**	131
St. Louis*	-	Tetanus	17
western equine*	-	Toxic-shock syndrome	71
Hansen Disease	65	Trichinosis	6
Hantavirus pulmonary syndrome*†	6	Typhoid fever	166
Hemolytic uremic syndrome, post-diarrheal*	25	Yellow fever	-
HIV infection, pediatric*§	127		

-: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 June 28, 1998.
¶ Updated from reports to the Division of STD Prevention, NCHSTP.

TABLE II. Provisional cases of selected notifiable diseases, United States, weeks ending July 25, 1998, and July 19, 1997 (29th 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	23,929	32,521	291,740	252,518	1,156	592	169,556	157,755	2,149	1,908
NEW ENGLAND	830	1,454	11,145	9,498	153	107	3,128	3,232	31	37
Maine	18	36	570	547	16	-	39	31	-	-
N.H.	22	19	513	431	22	25	49	60	-	-
Vt.	10	24	224	214	8	6	19	27	-	2
Mass.	386	526	4,618	3,929	81	60	1,121	1,232	28	31
R.I.	67	83	1,347	1,086	5	1	195	256	3	4
Conn.	327	766	3,873	3,291	21	15	1,705	1,626	-	-
MID. ATLANTIC	6,951	9,910	34,006	30,194	112	27	19,160	19,467	223	184
Upstate N.Y.	849	1,621	N	N	79	-	3,245	3,358	171	135
N.Y. City	3,910	4,966	18,216	14,579	4	6	7,952	7,280	-	-
N.J.	1,232	2,090	5,351	5,364	29	20	3,025	3,980	-	-
Pa.	960	1,233	10,439	10,251	N	1	4,938	4,849	52	49
E.N. CENTRAL	1,768	2,281	47,677	40,616	198	111	32,548	24,505	291	346
Ohio	331	465	13,605	12,234	49	20	8,344	7,776	7	10
Ind.	326	360	3,265	4,761	55	25	2,078	3,186	3	10
Ill.	706	761	13,507	7,270	46	-	10,871	3,593	16	58
Mich.	305	544	12,004	10,372	48	27	9,110	7,484	265	248
Wis.	100	151	5,296	5,979	N	39	2,145	2,466	-	20
W.N. CENTRAL	444	615	17,185	17,428	161	95	8,609	7,872	120	39
Minn.	65	99	3,235	3,620	55	47	1,126	1,270	7	3
Iowa	49	69	2,063	2,575	51	7	660	690	12	19
Mo.	209	296	6,580	6,473	15	21	4,986	4,291	96	5
N. Dak.	4	6	290	470	2	6	29	32	-	2
S. Dak.	9	3	902	683	8	10	145	76	-	-
Nebr.	39	59	1,273	1,100	19	-	450	419	2	2
Kans.	69	83	2,842	2,507	11	4	1,213	1,094	3	8
S. ATLANTIC	5,900	8,188	60,970	51,976	93	61	49,020	50,572	109	129
Del.	75	145	1,404	-	-	1	762	639	-	-
Md.	718	1,071	4,713	3,917	14	4	5,431	6,435	5	3
D.C.	481	613	N	N	2	-	1,911	2,378	-	-
Va.	425	654	6,476	6,520	N	25	3,604	4,496	7	18
W. Va.	57	62	1,485	1,605	5	3	432	504	4	11
N.C.	390	429	12,003	9,350	15	20	10,095	9,035	14	33
S.C.	386	422	10,270	6,935	4	1	6,642	6,223	3	27
Ga.	616	972	13,486	9,647	33	-	11,212	11,019	9	-
Fla.	2,752	3,820	11,133	14,002	20	7	8,931	9,843	67	37
E.S. CENTRAL	936	1,074	19,940	18,787	59	25	18,930	18,743	93	203
Ky.	127	177	3,438	3,636	16	-	1,959	2,320	16	9
Tenn.	333	469	7,198	7,006	27	22	6,160	5,811	74	134
Ala.	274	239	5,644	4,548	16	2	7,123	6,412	3	6
Miss.	202	189	3,660	3,597	U	1	3,688	4,200	U	54
W.S. CENTRAL	2,899	3,546	42,636	30,152	72	8	24,282	20,242	534	247
Ark.	104	130	1,939	1,598	6	3	1,190	2,652	3	9
La.	512	610	7,863	4,904	3	2	6,485	4,581	17	118
Okla.	170	165	5,459	4,077	10	3	3,011	2,560	7	5
Tex.	2,113	2,641	27,375	19,573	53	-	13,596	10,449	507	115
MOUNTAIN	831	935	11,698	15,576	153	61	4,369	4,237	244	170
Mont.	15	26	696	580	8	-	26	25	5	12
Idaho	15	28	946	818	14	7	91	61	86	30
Wyo.	2	13	357	315	47	-	17	29	45	41
Colo.	147	224	3	3,454	31	20	1,270	1,194	15	18
N. Mex.	130	80	2,083	2,089	13	6	500	478	56	32
Ariz.	329	227	6,081	5,731	13	12	2,201	1,819	3	22
Utah	65	80	1,223	942	20	10	126	137	21	3
Nev.	128	257	309	1,647	7	6	138	494	13	12
PACIFIC	3,370	4,518	46,483	38,291	155	97	9,510	8,885	504	553
Wash.	236	377	6,167	5,023	28	22	1,056	1,069	11	17
Oreg.	93	162	3,136	2,702	38	34	440	421	2	2
Calif.	2,962	3,914	35,123	28,832	87	35	7,643	6,908	436	440
Alaska	12	28	1,039	797	2	-	168	219	1	-
Hawaii	67	37	1,018	937	N	6	203	268	54	94
Guam	-	2	8	193	N	-	2	27	-	-
P.R.	1,001	1,019	U	U	-	U	228	353	-	-
V.I.	17	57	N	N	N	U	U	U	U	U
Amer. Samoa	-	-	U	U	N	U	U	U	U	U
C.N.M.I.	-	1	N	N	N	U	14	17	-	2

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 June 28, 1998.

[†]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 July 25, 1998, and July 19, 1997 (29th 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	611	471	4,563	3,318	638	885	3,909	4,669	7,016	8,836	3,861
NEW ENGLAND	35	33	1,675	734	41	44	40	95	232	244	730
Maine	1	1	6	7	4	1	1	-	4	16	120
N.H.	3	4	26	7	3	2	1	-	6	9	35
Vt.	3	4	6	3	-	2	4	-	1	3	31
Mass.	12	10	307	172	14	21	24	45	123	134	238
R.I.	8	5	165	53	2	4	-	2	31	17	42
Conn.	8	9	1,165	492	18	14	10	48	67	65	264
MID. ATLANTIC	135	82	2,324	2,022	149	270	139	228	1,293	1,684	887
Upstate N.Y.	39	21	1,402	744	43	39	18	24	166	220	616
N.Y. City	19	7	10	106	68	171	29	48	810	867	U
N.J.	7	14	412	562	22	45	49	97	317	335	109
Pa.	70	40	500	610	16	15	43	59	U	262	162
E.N. CENTRAL	194	164	48	48	55	87	515	406	544	985	74
Ohio	82	71	40	15	3	11	76	120	U	169	40
Ind.	36	28	7	11	6	8	112	89	76	82	4
Ill.	14	7	-	7	18	37	188	51	296	509	5
Mich.	41	37	1	15	27	20	104	72	172	164	19
Wis.	21	21	U	U	1	11	35	74	U	61	6
W.N. CENTRAL	41	32	42	42	48	28	82	98	203	296	444
Minn.	3	1	23	20	24	10	5	14	74	77	78
Iowa	4	8	13	2	5	6	-	4	U	34	97
Mo.	14	4	1	15	10	6	64	56	86	115	19
N. Dak.	-	2	-	-	2	2	-	-	3	6	89
S. Dak.	2	2	-	-	-	-	1	-	14	7	90
Nebr.	15	12	3	2	1	1	4	1	8	12	3
Kans.	3	3	2	3	6	3	8	23	18	45	68
S. ATLANTIC	74	63	338	318	146	138	1,720	1,860	1,089	1,772	1,171
Del.	8	7	8	73	1	2	15	15	U	18	17
Md.	17	13	237	198	45	44	394	515	162	165	291
D.C.	5	3	4	7	12	10	43	71	62	57	-
Va.	8	13	31	11	26	38	92	148	144	165	357
W. Va.	N	N	6	1	-	-	2	3	24	29	49
N.C.	6	8	20	15	12	8	425	404	216	219	136
S.C.	5	3	3	1	4	9	170	222	181	194	92
Ga.	2	-	2	1	15	15	455	308	230	323	106
Fla.	23	16	27	11	31	12	124	174	70	602	123
E.S. CENTRAL	30	31	43	46	16	19	606	1,014	362	700	138
Ky.	15	7	10	8	2	5	67	85	-	103	21
Tenn.	11	17	22	20	10	4	315	430	200	258	85
Ala.	4	2	11	4	4	7	145	258	162	221	32
Miss.	U	5	U	14	U	3	79	241	U	118	U
W.S. CENTRAL	20	8	10	36	18	10	511	681	64	1,402	109
Ark.	-	1	5	11	1	2	67	106	64	118	21
La.	2	2	-	2	4	5	191	212	U	102	-
Okla.	8	1	-	5	2	3	32	67	U	122	88
Tex.	10	4	5	18	11	-	221	296	U	1,060	-
MOUNTAIN	35	29	7	6	29	45	123	91	231	321	94
Mont.	1	1	-	-	-	2	-	-	12	6	32
Idaho	-	2	1	2	3	-	-	-	8	8	-
Wyo.	1	1	-	1	-	2	1	-	2	2	43
Colo.	7	9	3	-	9	23	8	5	U	56	1
N. Mex.	2	1	2	-	11	6	12	4	33	27	3
Ariz.	7	7	-	1	5	5	97	72	114	145	9
Utah	16	5	-	-	1	3	3	3	33	13	6
Nev.	1	3	1	2	-	4	2	7	29	64	-
PACIFIC	47	29	76	66	136	244	173	196	2,998	1,432	214
Wash.	7	6	2	2	9	9	12	7	144	169	-
Oreg.	-	-	8	10	11	13	3	5	66	94	1
Calif.	39	22	65	54	114	214	158	182	2,672	1,014	193
Alaska	-	-	1	-	1	3	-	1	27	47	20
Hawaii	1	1	-	-	1	5	-	1	89	108	-
Guam	-	-	-	-	-	-	-	3	-	13	-
P.R.	-	-	-	-	-	3	118	134	46	129	30
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.	-	-	-	-	-	-	98	9	54	2	-

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

*Additional information about areas displaying "U" for cumulative 1998 Tuberculosis cases can be found in Notice to Readers, *MMWR* Vol. 47, No. 2, p. 39.

TABLE III. Provisional cases of selected notifiable diseases preventable by vaccination, United States, weeks ending July 25, 1998, and July 19, 1997 (29th 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	624	666	12,053	15,445	4,496	5,149	-	26	-	14	40	90
NEW ENGLAND	34	36	150	395	74	95	-	1	-	2	3	13
Maine	2	3	13	45	2	6	-	-	-	-	-	-
N.H.	6	5	8	21	10	6	-	-	-	-	-	1
Vt.	2	3	13	7	1	5	-	-	-	1	1	-
Mass.	22	22	46	167	18	40	-	1	-	1	2	11
R.I.	2	2	10	80	43	9	-	-	-	-	-	-
Conn.	-	1	60	75	-	29	-	-	-	-	-	1
MID. ATLANTIC	88	93	767	1,244	640	748	-	9	-	2	11	21
Upstate N.Y.	35	25	188	175	176	149	-	2	-	-	2	5
N.Y. City	16	24	204	562	172	283	-	-	-	-	-	7
N.J.	32	30	160	187	105	148	-	7	-	1	8	3
Pa.	5	14	215	320	187	168	-	-	-	1	1	6
E.N. CENTRAL	95	110	1,577	1,616	463	862	-	11	-	3	14	8
Ohio	35	60	194	207	43	48	-	-	-	1	1	-
Ind.	27	11	95	178	59	69	-	2	-	1	3	-
Ill.	29	25	261	414	89	166	-	-	-	-	-	6
Mich.	-	14	914	696	250	250	-	9	-	1	10	2
Wis.	4	-	113	121	22	329	-	-	-	-	-	-
W.N. CENTRAL	60	34	958	1,161	243	281	-	-	-	-	-	11
Minn.	46	25	78	104	21	23	-	-	-	-	-	2
Iowa	1	3	382	193	37	21	-	-	-	-	-	-
Mo.	8	3	391	618	151	206	-	-	-	-	-	1
N. Dak.	-	-	3	10	4	3	-	-	-	-	-	-
S. Dak.	-	2	17	14	1	-	-	-	-	-	-	8
Nebr.	-	1	23	49	9	8	-	-	-	-	-	-
Kans.	5	-	64	173	20	20	-	-	-	-	-	-
S. ATLANTIC	132	105	1,016	864	640	625	-	2	-	5	7	8
Del.	-	-	2	16	-	4	-	-	-	1	1	-
Md.	41	44	187	124	94	94	-	-	-	1	1	2
D.C.	-	-	30	15	6	24	-	-	-	-	-	1
Va.	13	7	137	114	56	74	-	-	-	2	2	1
W. Va.	4	3	1	6	3	9	-	-	-	-	-	-
N.C.	18	17	59	113	119	134	-	-	-	-	-	1
S.C.	4	3	18	69	21	62	-	-	-	-	-	-
Ga.	26	22	268	195	96	64	-	-	-	1	1	1
Fla.	26	9	314	212	245	160	-	2	-	-	2	2
E.S. CENTRAL	36	38	206	372	220	380	-	-	-	-	-	1
Ky.	4	5	13	46	24	25	-	-	-	-	-	-
Tenn.	24	23	144	229	163	255	-	-	-	-	-	-
Ala.	8	8	49	58	33	41	-	-	-	-	-	1
Miss.	U	2	U	39	U	59	U	U	U	U	U	-
W.S. CENTRAL	36	32	2,294	3,126	746	649	-	-	-	-	-	5
Ark.	-	2	58	134	52	47	-	-	-	-	-	-
La.	16	7	46	117	57	82	-	-	-	-	-	-
Okla.	18	21	332	924	48	22	-	-	-	-	-	-
Tex.	2	2	1,858	1,951	589	498	-	-	-	-	-	5
MOUNTAIN	69	63	1,876	2,352	490	483	-	-	-	-	-	7
Mont.	-	-	63	53	3	5	-	-	-	-	-	-
Idaho	-	1	158	82	19	15	-	-	-	-	-	-
Wyo.	1	2	24	20	2	14	-	-	-	-	-	-
Colo.	15	10	148	252	62	91	-	-	-	-	-	-
N. Mex.	5	7	88	183	211	159	-	-	-	-	-	-
Ariz.	38	26	1,199	1,154	126	111	-	-	-	-	-	5
Utah	4	3	127	365	42	56	-	-	-	-	-	-
Nev.	6	14	69	243	25	32	U	-	U	-	-	2
PACIFIC	74	155	3,209	4,315	980	1,026	-	3	-	2	5	16
Wash.	6	2	634	302	69	45	-	-	-	1	1	-
Oreg.	30	24	223	224	66	63	-	-	-	-	-	-
Calif.	30	121	2,315	3,682	834	899	-	3	-	1	4	12
Alaska	1	2	14	24	6	11	-	-	-	-	-	-
Hawaii	7	6	23	83	5	8	-	-	-	-	-	4
Guam	-	-	-	-	-	3	U	-	U	-	-	-
P.R.	2	-	28	191	257	435	-	-	-	-	-	-
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.	-	6	1	1	28	34	U	-	U	-	-	1

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

*Of 146 cases among children aged <5 years, serotype was reported for 79 and of those, 33 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 July 25, 1998, and July 19, 1997 (29th Week)

	Meningococcal Disease		Mumps			Pertussis			Rubella		
Reporting Area	Cum. 1998	Cum. 1997	1998	Cum. 1998	Cum. 1997	1998	Cum. 1998	Cum. 1997	1998	Cum. 1998	Cum. 1997
UNITED STATES	1,653	2,145	5	266	376	71	2,519	2,946	2	287	121
NEW ENGLAND	75	134	-	1	7	17	456	592	-	36	1
Maine	5	15	-	-	-	-	5	6	-	-	-
N.H.	4	12	-	-	-	-	39	69	-	-	-
Vt.	1	2	-	-	-	2	44	180	-	-	-
Mass.	37	70	-	1	2	11	338	314	-	6	1
R.I.	3	9	-	-	4	-	5	12	-	1	-
Conn.	25	26	-	-	1	4	25	11	-	29	-
MID. ATLANTIC	152	225	-	16	43	4	298	225	2	121	29
Upstate N.Y.	38	62	-	3	9	3	149	83	-	107	5
N.Y. City	18	40	-	4	3	1	9	53	2	9	24
N.J.	41	43	-	1	7	-	5	11	-	4	-
Pa.	55	80	-	8	24	-	135	78	-	1	-
E.N. CENTRAL	251	318	3	46	47	4	216	284	-	-	5
Ohio	92	116	1	20	18	3	79	85	-	-	-
Ind.	46	35	-	5	4	-	68	33	-	-	-
Ill.	60	91	1	3	8	-	16	35	-	-	1
Mich.	29	47	1	18	14	1	36	31	-	-	-
Wis.	24	29	-	-	3	-	17	100	-	-	4
W.N. CENTRAL	140	162	-	20	12	17	210	172	-	27	-
Minn.	25	29	-	10	5	15	130	108	-	-	-
Iowa	23	37	-	6	6	-	40	9	-	-	-
Mo.	53	70	-	3	-	-	16	31	-	2	-
N. Dak.	2	1	-	1	-	-	-	1	-	-	-
S. Dak.	6	4	-	-	-	1	6	3	-	-	-
Nebr.	7	6	-	-	1	1	8	4	-	-	-
Kans.	24	15	-	-	-	-	10	16	-	25	-
S. ATLANTIC	292	362	-	37	45	6	147	262	-	8	56
Del.	1	5	-	-	-	-	2	-	-	-	-
Md.	23	35	-	-	1	-	29	82	-	-	-
D.C.	-	5	-	-	-	-	1	3	-	-	-
Va.	24	35	-	5	7	-	7	32	-	-	1
W. Va.	9	14	-	-	-	-	1	5	-	-	-
N.C.	42	69	-	9	7	-	50	73	-	5	49
S.C.	41	40	-	4	10	1	17	11	-	-	6
Ga.	64	72	-	1	6	-	6	8	-	-	-
Fla.	88	87	-	18	14	5	34	48	-	3	-
E.S. CENTRAL	116	155	-	1	19	2	58	60	-	-	1
Ky.	17	38	-	-	3	-	22	16	-	-	-
Tenn.	45	54	-	1	3	1	19	23	-	-	-
Ala.	54	46	-	-	6	1	17	15	-	-	1
Miss.	U	17	U	U	7	U	U	6	U	U	-
W.S. CENTRAL	190	200	-	40	44	-	181	110	-	77	3
Ark.	23	25	-	-	1	-	26	8	-	-	-
La.	39	43	-	8	11	-	2	12	-	-	-
Okla.	29	23	-	-	-	-	18	15	-	-	-
Tex.	99	109	-	32	32	-	135	75	-	77	3
MOUNTAIN	91	124	1	24	48	17	553	742	-	5	5
Mont.	3	7	-	-	-	-	3	9	-	-	-
Idaho	4	8	-	3	2	-	194	455	-	-	1
Wyo.	4	1	-	1	1	-	7	5	-	-	-
Colo.	19	33	1	6	3	9	120	194	-	-	-
N. Mex.	16	20	N	N	N	2	69	39	-	1	-
Ariz.	32	31	-	5	31	4	118	20	-	1	4
Utah	10	11	-	3	6	2	30	10	-	2	-
Nev.	3	13	U	6	5	U	12	10	U	1	-
PACIFIC	346	465	1	81	111	4	400	499	-	13	21
Wash.	47	55	-	6	13	-	153	210	-	9	5
Oreg.	55	92	N	N	N	2	29	22	-	-	-
Calif.	239	315	1	60	81	2	211	250	-	2	8
Alaska	1	1	-	2	5	-	2	4	-	-	-
Hawaii	4	2	-	13	12	-	5	13	-	2	8
Guam	-	1	U	-	1	U	-	-	U	-	-
P.R.	6	8	-	1	5	-	2	-	-	-	-
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	2	4	U	1	-	U	-	-

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

TABLE IV. Deaths in 122 U.S. cities,* week ending July 25, 1998 (29th Week)

Reporting Area	All Causes, By Age (Years)						P&I[†] Total
	All Ages	>65	45-64	25-44	1-24	<1	
NEW ENGLAND	543	379	98	42	13	11	32
Boston, Mass.	141	95	27	13	3	3	10
Bridgeport, Conn.	35	25	8	1	-	1	3
Cambridge, Mass.	15	10	4	1	-	-	1
Fall River, Mass.	18	15	2	1	-	-	2
Hartford, Conn.	55	34	10	9	1	1	-
Lowell, Mass.	25	18	3	3	1	-	-
Lynn, Mass.	6	4	2	-	-	-	1
New Bedford, Mass.	14	10	2	1	1	-	1
New Haven, Conn.	31	16	8	4	2	1	1
Providence, R.I.	66	49	11	3	2	1	-
Somerville, Mass.	6	4	2	-	-	-	-
Springfield, Mass.	33	18	11	1	2	1	-
Waterbury, Conn.	41	30	7	2	1	1	3
Worcester, Mass.	57	51	1	3	-	2	10
MID. ATLANTIC	2,211	1,483	449	189	51	39	88
Albany, N.Y.	58	33	17	4	2	2	4
Allentown, Pa.	18	11	5	-	2	-	-
Buffalo, N.Y.	71	52	15	4	-	-	7
Camden, N.J.	34	22	7	1	1	3	-
Elizabeth, N.J.	20	15	3	2	-	-	-
Erie, Pa.	41	31	5	4	-	1	3
Jersey City, N.J.	28	13	8	5	-	2	-
New York City, N.Y.	1,144	760	232	118	21	13	31
Newark, N.J.	U	U	U	U	U	U	U
Paterson, N.J.	17	8	5	3	-	1	-
Philadelphia, Pa.	400	265	76	32	15	12	22
Pittsburgh, Pa.[§]	58	38	16	3	-	1	3
Reading, Pa.	38	33	3	2	-	-	1
Rochester, N.Y.	112	82	19	8	2	1	3
Schenectady, N.Y.	26	17	7	-	1	1	2
Scranton, Pa.	22	12	5	1	4	-	-
Syracuse, N.Y.	77	61	14	-	1	1	9
Trenton, N.J.	28	15	9	2	1	1	2
Utica, N.Y.	19	15	3	-	1	-	1
Yonkers, N.Y.	U	U	U	U	U	U	U
E.N. CENTRAL	1,549	1,101	250	92	66	40	79
Akron, Ohio	34	27	4	1	1	1	1
Canton, Ohio	37	29	6	2	-	-	4
Chicago, Ill.	U	U	U	U	U	U	U
Cincinnati, Ohio	96	62	14	6	7	7	5
Cleveland, Ohio	133	91	24	8	5	5	5
Columbus, Ohio	190	130	38	15	4	3	12
Dayton, Ohio	106	77	15	6	3	5	6
Detroit, Mich.	180	108	39	18	11	4	3
Evansville, Ind.	39	32	3	1	3	-	1
Fort Wayne, Ind.	60	45	11	2	2	-	5
Gary, Ind.	13	4	4	1	3	1	-
Grand Rapids, Mich.	52	43	4	1	1	3	4
Indianapolis, Ind.	174	126	24	12	8	4	5
Lansing, Mich.	35	27	7	-	1	-	8
Milwaukee, Wis.	104	79	19	3	2	1	5
Peoria, Ill.	51	40	6	-	4	1	2
Rockford, Ill.	39	30	3	3	2	1	3
South Bend, Ind.	48	39	4	3	2	-	4
Toledo, Ohio	103	70	19	8	5	1	4
Youngstown, Ohio	55	42	6	2	2	3	2
W.N. CENTRAL	764	523	144	48	25	19	36
Des Moines, Iowa	64	43	11	7	1	2	5
Duluth, Minn.	39	24	10	5	-	-	2
Kansas City, Kans.	40	19	15	3	3	-	1
Kansas City, Mo.	68	43	10	6	3	1	1
Lincoln, Nebr.	33	28	4	-	1	-	2
Minneapolis, Minn.	191	135	37	13	3	3	8
Omaha, Nebr.	72	51	13	2	3	3	7
St. Louis, Mo.	112	70	21	5	8	8	5
St. Paul, Minn.	55	47	7	1	-	-	2
Wichita, Kans.	90	63	16	6	3	2	3

Reporting Area	All Causes, By Age (Years)						P&I[†] Total
	All Ages	>65	45-64	25-44	1-24	<1	
S. ATLANTIC	951	626	196	84	24	21	49
Atlanta, Ga.	U	U	U	U	U	U	U
Baltimore, Md.	126	68	37	13	5	3	10
Charlotte, N.C.	85	61	13	6	1	4	10
Jacksonville, Fla.	140	102	24	11	1	2	5
Miami, Fla.	100	70	19	9	1	1	-
Norfolk, Va.	41	34	3	2	1	1	1
Richmond, Va.	66	40	13	8	4	1	2
Savannah, Ga.	40	27	10	1	1	1	4
St. Petersburg, Fla.	47	34	8	3	2	-	2
Tampa, Fla.	164	114	29	16	4	1	12
Washington, D.C.	129	69	35	14	4	7	3
Wilmington, Del.	13	7	5	1	-	-	-
E.S. CENTRAL	607	415	112	42	23	14	28
Birmingham, Ala.	U	U	U	U	U	U	U
Chattanooga, Tenn.	89	61	17	3	8	-	5
Knoxville, Tenn.	92	69	17	4	-	2	10
Lexington, Ky.	71	46	13	6	4	2	2
Memphis, Tenn.	122	81	27	6	3	5	9
Mobile, Ala.	67	44	13	4	4	2	-
Montgomery, Ala.	43	34	2	6	-	1	1
Nashville, Tenn.	123	80	23	13	4	2	1
W.S. CENTRAL	1,438	926	281	134	45	52	91
Austin, Tex.	80	54	14	10	2	-	4
Baton Rouge, La.	21	15	3	2	-	1	-
Corpus Christi, Tex.	52	39	7	3	3	-	4
Dallas, Tex.	209	123	47	20	5	14	5
El Paso, Tex.	60	43	9	4	2	2	3
Ft. Worth, Tex.	106	75	14	6	8	3	9
Houston, Tex.	351	200	81	47	10	13	25
Little Rock, Ark.	71	43	19	2	3	4	4
New Orleans, La.	91	58	21	8	2	2	-
San Antonio, Tex.	187	132	31	16	5	3	15
Shreveport, La.	97	67	19	7	4	-	10
Tulsa, Okla.	113	77	16	9	1	10	12
MOUNTAIN	939	624	170	94	33	18	55
Albuquerque, N.M.	73	43	15	10	5	-	1
Boise, Idaho	43	35	5	1	-	2	6
Colo. Springs, Colo.	43	24	8	7	2	2	1
Denver, Colo.	113	67	26	14	2	4	6
Las Vegas, Nev.	225	156	39	16	11	3	10
Ogden, Utah	22	14	3	2	3	-	2
Phoenix, Ariz.	173	119	23	19	6	6	14
Pueblo, Colo.	38	30	6	2	-	-	2
Salt Lake City, Utah	111	75	19	14	2	1	8
Tucson, Ariz.	98	61	26	9	2	-	5
PACIFIC	1,875	1,338	331	132	29	45	143
Berkeley, Calif.	18	14	2	-	-	2	1
Fresno, Calif.	127	91	21	13	2	-	7
Glendale, Calif.	52	39	11	2	-	-	3
Honolulu, Hawaii	83	58	19	2	2	2	6
Long Beach, Calif.	68	51	12	2	-	3	11
Los Angeles, Calif.	594	444	100	37	5	8	35
Pasadena, Calif.	20	12	3	1	-	4	2
Portland, Oreg.	U	U	U	U	U	U	U
Sacramento, Calif.	195	137	28	22	3	5	24
San Diego, Calif.	113	68	28	9	6	2	9
San Francisco, Calif.	118	78	21	11	1	7	9
San Jose, Calif.	184	131	37	10	2	4	21
Santa Cruz, Calif.	34	27	4	3	-	-	8
Seattle, Wash.	144	95	25	14	7	3	3
Spokane, Wash.	54	42	8	2	-	2	2
Tacoma, Wash.	71	51	12	4	1	3	2
TOTAL	10,877[¶]	7,415	2,031	857	309	259	601

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 the year to date (provisional data). In addition, the table compares provisional data with provisional data for the previous year and highlights the number of reported cases among 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.

Number of reported cases of nationally notifiable diseases preventable by routine childhood vaccination — United States, April–June 1998 and January–June 1997 and 1998*

Disease	No. cases, April–June 1998	Total cases January–June		No. cases among children aged <5 years† January–June	
		1997	1998	1997	1998
Congenital rubella syndrome	2	**3**	**3**	3	3
Diphtheria	1	**4**	**1**	1	0
Haemophilus influenzae§	275	**588**	**544**	113	132
Hepatitis B¶	2122	**4430**	**3809**	39	37
Measles	28	**77**	**37**	28	17
Mumps	129	**339**	**236**	64	41
Pertussis	1130	**2537**	**2075**	1021	818
Poliomyelitis, paralytic**	0	**2**	**1**	1	1
Rubella	147	**64**	**251**	7	13
Tetanus	10	**22**	**12**	0	1

* Data for 1997 and 1998 are provisional.

† For 1997 and 1998, age data were available for ≥96% of cases.

§ Invasive disease; *H. influenzae* serotype is not routinely reported to the National Notifiable Diseases Surveillance System. Of 132 cases among children aged <5 years, serotype was reported for 74 cases, and of those, 32 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 1998 and three cases with onset in 1997 have been confirmed. All were associated with administration of oral poliovirus vaccine. One suspected case with onset in 1997 remains under investigation.

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