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CDC Surveillance Summaries

Contents

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Foreword

The purpose of the *CDC Surveillance Summaries* is to make available the most current information on conditions of public health interest for which CDC has major responsibility. The *CDC Surveillance Summaries* are published quarterly and provide detailed analysis of the most current available data obtained for CDC surveillance programs. These reports complement other data published by CDC in the *Morbidity and Mortality Weekly Report (MMWR),* the *MMWR Annual Summary,* and various disease-surveillance reports. This volume contains epidemiologic information derived from surveillance forms, special investigations, and other sources of information collected at the state and national levels.

History of CDC Surveillance Activities

CDC has been actively involved in disease-surveillance activities since the formation of the Communicable Disease Center in 1946. The original scope of the National Surveillance Program included the study of malaria, murine typhus, smallpox, psittacosis, diphtheria, leprosy, and sylvatic plague. In 1954, a surveillance section was established within the Epidemiology Branch of CDC, primarily concerned with planning and conducting continuing surveillance and making periodic reports. National emergencies such as the Asian influenza pandemic and the discovery of Legionnaires' disease have prompted the involvement of CDC in new surveillance activities. Over the years the surveillance activities of CDC have expanded to include not only new areas in infectious disease but also programs in human reproduction, environmental health, chronic disease, risk reduction, and occupational safety and health. Ongoing evaluation of these programs has led to new methods of data collection and analysis and has prompted examination of how data are disseminated to the public health community.

In 1980 and 1981, a survey of CDC staff and state epidemiologists suggested that improved coordination of surveillance reports with the *MMWR* and the *MMWR Annual Summary* would facilitate timely publication; provide greater uniformity in the acquisition, evaluation, and reporting of surveillance data; and encourage use of these data. Several approaches to the development of a systematic process of disseminating disease-specific surveillance reports were considered. On the basis of considerations of timeliness, cost advantages, and editorial uniformity, a report published on a quarterly basis was recommended.

The *CDC Surveillance Summaries* contain information more reflective of the detailed surveillance reports of the past. CDC hopes that the *Surveillance Summaries* will disseminate surveillance data on a regular schedule, improve the clarity of community public health information, and also realize a cost savings. Although the *CDC Surveillance Summaries* are published quarterly, they will not be limited to quarterly data; annual data will probably be more typical. The *MMWR Annual Summary* will complement rather than serve as the cumulative summary of the quarterly publications.

Data Sources

Data on the reported occurrence of notifiable diseases are derived from reports supplied by the state and territorial departments of health and CDC program activities, routinely published in the *MMWR*, and compiled in final form in the *MMWR Annual Summary*.

CDC also maintains national surveillance programs for selected diseases with the cooperation of state and local health departments as well as other federal agencies, and publishes detailed epidemiologic analyses periodically. Data appearing in the *CDC Surveillance Summaries* or in a surveillance report may not agree exactly with reports published in the *MMWR* because of differences in timing of reports or because of refinements in case definition. It should be noted that data collected for the *MMWR* and the more detailed data published by individual CDC programs are collected independently.

These data should be interpreted with caution. Some diseases that cause severe clinical illness and are associated with serious consequences are probably reported quite accurately. However, diseases that are clinically mild and infrequently associated with serious consequences are less likely to be reported. Additionally, subclinical cases are seldom detected except in the course of epidemic investigations or special studies. The degree of completeness of reporting is also influenced by the diagnostic facilities available, the control measures in effect, and the interests and priorities of state and local officials responsible for disease control and surveillance. Finally, factors such as the introduction of new diagnostic tests and the discovery of new disease entities may cause changes in disease reporting independent of the true incidence of disease. Despite these limitations the data in these reports have proven to be useful in the analysis of trends.

Surveillance Programs
Centers for Disease Control

Surveillance program	Responsible branch	Most recent report/summary*
Abortion	Pregnancy Epidemiology Branch Division of Reproductive Health Center for Health Promotion and Education	May 1983 (SS 32/2) (data from 1979-1980)
Behavioral risk factors	Division of Nutrition Center for Health Promotion and Education	SS 33/1 (data from 1981-1983)
Berylliosis cohorts: registry of disease and exposure	Surveillance Branch Division of Surveillance, Hazard Evaluations, and Field Studies National Inst. for Occup. Safety & Hlth.	March 1983 (data from 1951-1980)
Biologics	Data Management Branch Division of Immunization Center for Prevention Services	Dec 1982 (1982 data)
Botulism	Enteric Diseases Branch Division of Bacterial Diseases Center for Infectious Diseases	May 1979 (data from 1899-1977)
Brucellosis	Bacterial Zoonoses Activity Division of Bacterial Diseases Center for Infectious Diseases	June 1979 (1978 data)
Coal workers' pneumoconiosis	Epidemiological Investigations Branch Division of Respiratory Disease Studies National Inst. for Occup. Safety & Hlth.	Feb 1983 (SS 32/1) (data from 1978-1980)
Congenital malformations	Birth Defects Branch Chronic Diseases Division Center for Environmental Health	Feb 1983 (SS 32/1) (data from 1970-1980)
Dengue	Dengue Branch Division of Vector-Borne Viral Diseases Center for Infectious Diseases	SS 33/1 (1982 data)
Diabetes	Division of Diabetes Control Center for Prevention Services	June 1979 (1978 data)
Diphtheria	Surveillance, Investigations and Research Branch Division of Immunization Center for Prevention Services	July 1978 (data from 1971-1975)
Ectopic pregnancy	Pregnancy Epidemiology Branch Division of Reproductive Health Center for Health Promotion and Education	Feb 1983 (SS 32/1) (data from 1970-1978)

*Publications denoted by "SS" appeared in issues of *CDC Surveillance Summaries*. Other reports listed can be obtained by contacting the responsible branch listed.

Surveillance Programs
Centers for Disease Control

Surveillance program	Responsible branch	Most recent report/summary*
Encephalitis	Arbovirus Reference Branch Division of Vector-Borne Viral Diseases Center for Infectious Diseases	May 1981 (1978 data)
Enterovirus	Respiratory and Enterovirus Branch Division of Viral Diseases Center for Infectious Diseases	Nov 1981 (data from 1970-1979)
Fifteen leading causes of death in the U.S., 1978	Health Analysis and Planning for Preventive Services Center for Prevention Services	Sept 1982 (1978 data)
Food-borne disease	Enteric Diseases Branch Division of Bacterial Diseases Center for Infectious Diseases	June 1983 (1981 data)
Hepatitis	Hepatitis Laboratory Branch Division of Hepatitis and Viral Enteritis Center for Infectious Diseases	May 1983 (SS 32/2) (1981 data)
Homicide	Violence Epidemiology Branch Office of the Director Center for Health Promotion and Education	May 1983 (SS 32/2) (data from 1970-1978)
Hysterectomy	Epidemiologic Studies Branch Division of Reproductive Health Center for Health Promotion and Education	Aug 1983 (SS 32/3) (data from 1979-1980)
Influenza	Influenza Branch Division of Viral Diseases Center for Infectious Diseases	Jan 1983 (data from 1977-1979)
Lead poisoning in workers	Surveillance Branch Division of Surveillance, Hazard Evaluations, and Field Studies National Inst. for Occup. Safety & Hlth.	April 1983 (data from 1976-1980)
Leprosy	Respiratory and Special Pathogens Branch Division of Bacterial Diseases Center for Infectious Diseases	April 1976 (data from 1971-1973)
Leptospirosis	Bacterial Zoonoses Activity Division of Bacterial Diseases Center for Infectious Diseases	Aug 1979 (1978 data)
Malaria	Malaria Branch Division of Parasitic Diseases Center for Infectious Diseases	Aug 1983 (SS 32/3) (data from 1978-1982)

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Surveillance Programs
Centers for Disease Control

Surveillance program	Responsible branch	Most recent report/summary*
Maternal mortality	Division of Reproductive Health Center for Health Promotion and Education	SS 33/1 (data from 1974-1978)
Measles	Surveillance, Investigations and Research Branch Division of Immunization Center for Prevention Services	Sept 1982 (data from 1977-1981)
Mumps	Surveillance, Investigations and Research Branch Division of Immunization Center for Prevention Services	July 1978 (data from 1974-1976)
National electronic injury surveillance system	Safety Surveillance Branch Division of Safety Research National Inst. for Occup. Safety & Hlth.	May 1983 (SS 32/2) (1982 data)
Nosocomial infections	National Nosocomial Infections Study Hospital Infections Program Center for Infectious Diseases	SS 32/4 (data from 1980-1982)
Nutrition	Division of Nutrition Center for Health Promotion and Education	Nov 1982 (1980 data)
Occupational characteristics of disabled workers	Surveillance Branch Division of Surveillance, Hazard Evaluations, and Field Studies National Inst. for Occup. Safety & Hlth.	July 1980 (data from 1969-1972)
Occupational injuries among loggers	Safety Surveillance Branch Division of Safety Research National Inst. for Occup. Safety & Hlth.	Aug 1983 (SS 32/3) (data from 1969-1974)
Pediatric nutrition	Division of Nutrition Center for Health Promotion and Education	SS 32/4 (1982 data)
Pelvic inflammatory disease	Division of Sexually Transmitted Disease Center for Prevention Services	SS 32/4 (data from 1965-1982)
Plague	Plague Branch Division of Vector-Borne Viral Diseases Center for Infectious Diseases	SS 33/1 (1983 data)
Poliomyelitis	Surveillance, Investigations and Research Branch Division of Immunization Center for Prevention Services	Dec 1982 (data from 1980-1981)

*Publications denoted by "SS" appeared in issues of *CDC Surveillance Summaries*. Other reports listed can be obtained by contacting the responsible branch listed.

Surveillance Programs
Centers for Disease Control

Surveillance program	Responsible branch	Most recent report/summary*
Psittacosis	Bacterial Zoonoses Activity Division of Bacterial Diseases Center for Infectious Diseases	Feb 1983 (SS 32/1) (1979 data)
Rabies	Viral and Rickettsial Zoonoses Branch Division of Viral Diseases Center for Infectious Diseases	Feb 1983 (SS 32/1) (1981 data)
Reye syndrome	Epidemiology Office Division of Viral Diseases Center for Infectious Diseases	SS 32/4 (data from 1981-1982)
Rickettsial disease (RMSF, murine typhus, Q fever, endemic typhus)	Viral and Rickettsial Zoonoses Branch Division of Viral Diseases Center for Infectious Diseases	May 1981 (1979 data)
Rubella	Surveillance, Investigations and Research Branch Division of Immunization Center for Prevention Services	May 1980 (data from 1976-1978)
Salmonella	Enteric Diseases Branch Division of Bacterial Diseases Center for Infectious Diseases	Dec 1982 (1980 data)
Sentinel health event (occupational) (SHE)	Surveillance Branch Division of Surveillance, Hazard Evaluations, and Field Studies National Inst. for Occup. Safety & Hlth.	Sept 1983
Summer mortality	Special Studies Branch Chronic Diseases Division Center for Environmental Health	Feb 1983 (SS 32/1) (data from 1979-1981)
Surgical sterilization	Epidemiologic Studies Branch Division of Reproductive Health Center for Health Promotion and Education	Aug 1983 (SS 32/3) (data from 1979-1980)
Trichinosis	Helminthic Diseases Branch Division of Parasitic Diseases Center for Infectious Diseases	May 1983 (SS 32/2) (1981 data)
Tuberculosis	Division of Tuberculosis Control Center for Prevention Services	Sept 1982 (1981 data) TB Statistics: States & Cities Nov 1983 (1980 data) TB in the United States

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Surveillance Programs
Centers for Disease Control

Surveillance program	Responsible branch	Most recent report/summary*
U.S. immunization survey	Surveillance, Investigations and Research Branch Division of Immunization Center for Prevention Services	April 1983 (data from 1979-1982)
Venereal disease	Division of Sexually Transmitted Disease Center for Prevention Services	(1980 data) Sexually Transmitted Diseases Statistical Letter-No. 130 (data from 1978-1979) STD Fact Sheet-Edition 35
Water-related disease outbreaks	Enteric Diseases Branch Division of Bacterial Diseases Center for Infectious Diseases	Aug 1983 (1982 data)

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Behavioral Risk Factor Surveillance, 1981-1983

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Introduction

It is becoming increasingly apparent that lifestyle patterns and health behaviors are linked with major causes of morbidity and mortality in the United States today. The Behavioral Risk Factor Surveys (BRFS) were initiated in 1981 to help states obtain prevalence estimates of health behaviors that have been associated with risk of chronic disease. These behaviors, such as smoking and alcohol use, have been targeted for prevention efforts in the 1990 Objectives for the Nation. Surveillance of behavioral risk factors as an ongoing activity is being instituted in 20 states beginning in January 1984. This report presents data obtained in the initial surveys undertaken 1981-1983.

Materials and Methods

The BRFS were carried out by telephone interviewers using similar questionnaires in 27 states and the District of Columbia. In order to develop national prevalence estimates, a sample of the remainder of the U.S. population (excluding N.Y.* and Hawaii) was interviewed. These results were then weighted statistically and combined with the results of the individual state surveys.

The questionnaire, administered to adults ≥18 years of age, required approximately 10 minutes and covered seat-belt use, hypertension control, overweight exercise, smoking, and alcohol use. For comparability, questions were selected from previously conducted national surveys whenever possible. The criteria used to define "at risk" status were also drawn from previous surveys when available. Some of the criteria, such as those defining overweight, may be revised as more data become available.

The sampling procedure employed a multistage sampling design based on the Waksberg method (*1*). The various individual surveys were combined using a five-stage weighting procedure to allow the combined survey population to reflect the age/race/sex distributions of the 1982 U.S. adult population.

Results

The overall completion rate was 62.9%, yielding a total of approximately 21,000 interviews. Excluding "ring-no-answers" brought the completion rate to 76.5%. The refusal rate was 15.9%. The remaining 7.6% represents interviews not completed primarily because of inability to contact the selected respondent. Women, Hispanics, Native Americans, and persons ages 24-35 were slightly overrepresented in the sample prior to weighting.

*New York data unavailable at the time of report.

For each health behavior, an "at risk" category was defined. The following results represent the initial analysis of the aggregated data looking at the prevalence of risk for each factor. A more detailed analysis of each of the survey variables will be reported at a later time.

Respondents were first asked to estimate frequency of seat-belt use. A total of 57.6% (95% C.I.=56.2%-59.1%) of respondents of both sexes reported that they never or almost never used seatbelts.

Hypertension control was estimated using questions to determine whether respondents had ever been told they had high blood pressure, what treatments were followed, and current blood pressure status. In total, 3.9% of adults had been told that they had high blood pressure and that they were still hypertensive at the time of the interview (95% C.I.=3.2%-4.5%). Blacks were somewhat more likely than those of other races to be hypertensive. Hypertension was more prevalent among older persons and among persons living in the Southeast.

Current smokers made up 31.5% of the U.S. adult population (95% C.I.=30.1%-32.8%) with more males reporting that they smoked than females. The state prevalence rates of current smokers ranged from a low of 23.7% to a high of 37.4%.

Prevalence of overweight (defined as 120% of ideal body weight in 1959 Metropolitan Life Weight Tables) was estimated based on self-reported heights and weights. The national estimate for overweight was 22.5% (95% C.I.=21.3%-23.7%) with little overall difference by sex. The rate increased through the 45-54 age bracket to 35.8% and declined thereafter. Both before and after age was adjusted for, higher prevalence of overweight was reported in the Eastern states.

Sedentary lifestyle was defined as sedentary work activity combined with less than one hour per month of vigorous physical exercise and less than eight hours per month of light activity. According to these criteria, 11.7% of adults lead sedentary lives (95% C.I.=10.8%-12.7%). Rates were higher among older adults. There were no consistent differences by sex.

Patterns of alcohol use were estimated using questions about frequency of consumption, amount consumed per occasion, and frequency of driving after drinking. In total, 8.4% (95% C.I.=7.6%-9.1%) of adults reported heavy alcohol use, defined as an average consumption of two or more drinks per day. Sex differences were marked with 13.3% of males and 3.9% of females reporting this level of use. Alcohol consumption was generally lowest in the Southeastern states.

Acute or binge drinking, defined as consumption of five or more drinks on a given occasion in the past month, was reported by 22.7% of adults (95% C.I.=21.4%-23.9%). Young males ages 18-24 reported the highest prevalence of binge drinking (51.9%).

Driving after drinking was also correlated with the sex of the respondent. Overall, 6.3% of adults responded that, in the past month, they had driven when they might have had too much to drink (95% C.I.=5.5%-7.1%). Of the men surveyed, 9.4% responded affirmatively to this item compared with 3.4% of the women.

Individual state-level findings are summarized in Table 1.

Discussion

Much of the morbidity and mortality in the United States today is related to lifestyle and behavior. As seen above and in recent publications, the prevalence of risk behaviors can vary greatly between states and by demographic characteristics (*2-4*). Overweight is more prevalent in the Eastern states. More men than women report high overall levels of alcohol consumption and young men are particularly at risk for binge drinking. The significant amount of state-to-state variation shown by the initial surveys supports the need for continued surveillance.

TABLE 1. State-specific risk factor rates

	Non-use of seatbelts	Uncontrolled hypertension	Sedentary lifestyle	Obesity	Cigarette smoking	Chronic heavy drinking	Acute drinking	Drinking and driving
Alabama	60.0%	6.1%	12.1%	24.4%	30.5%	4.4%	14.9%	4.7%
Alaska	51.5	2.3	10.9	18.9	36.0	11.7	22.9	4.7
Arizona	53.0	3.4	9.2	17.7	32.0	10.2	21.1	4.7
Arkansas	72.0	5.7	12.8	26.1	26.8	5.5	9.3	2.1
California	48.8	3.6	12.8	16.1	28.4	10.6	23.6	6.7
Colorado	56.5	5.6	11.4	16.6	34.4	8.2	25.9	*
Delaware	55.2	5.6	13.6	19.2	30.6	9.9	25.8	7.4
D. C.	42.5	6.1	17.5	22.5	33.1	9.3	16.9	1.8
Florida	60.1	3.9	12.7	26.2	32.3	13.8	22.4	3.5
Georgia	58.4	4.0	12.9	18.7	28.6	6.6	16.9	5.4
Indiana	63.0	3.4	12.4	24.0	32.8	6.9	22.7	4.8
Iowa	68.8	2.0	5.3	21.9	29.6	8.7	26.9	8.6
Kansas	66.2	3.5	9.1	20.8	22.1	9.1	16.8	7.0
Kentucky	62.0	4.8	13.1	24.3	36.6	3.9	14.8	2.4
Michigan	54.7	4.9	11.6	24.2	31.1	6.8	30.9	7.8
Montana	62.5	3.0	9.2	17.5	25.7	8.4	29.3	*
Nebraska	63.9	3.3	11.6	21.9	23.2	5.4	23.7	8.3
New Hampshire	68.3	3.9	9.7	23.0	29.1	14.8	24.2	7.1
New Jersey	60.6	3.6	17.6	23.0	31.8	8.8	20.7	5.7
New Mexico	52.3	2.3	13.9	18.1	29.1	7.3	21.4	3.7
North Carolina	64.3	5.5	13.0	25.2	37.7	4.6	16.6	5.3
Ohio	60.3	3.7	*	25.3	30.2	3.8	20.2	*
Pennsylvania	62.8	3.8	10.9	24.3	34.0	10.2	26.1	5.5
Tennessee	59.2	4.1	12.8	21.9	32.4	4.3	12.7	2.7
Texas	61.8	2.3	11.3	20.0	29.9	10.9	23.5	6.5
Virginia	49.7	2.8	13.0	21.0	33.6	7.5	19.4	5.3
West Virginia	67.9	4.1	11.4	23.2	32.2	3.7	13.3	2.4
Wyoming	53.8	2.8	10.0	17.1	31.5	9.3	29.2	8.7
Supplementary sample	56.2	4.0	10.7	24.2	32.5	8.3	24.6	7.9
Aggregate	57.6	3.9	11.7	22.5	31.5	8.4	22.7	6.3

*Survey questions not comparable in these states.

Range for standard errors

Non-use of seatbelts: 2.6-5.3
Uncontrolled hypertension: 0.7-2.7
Sedentary lifestyle: 1.6-4.0
Obesity: 2.1-4.8
Cigarette smoking: 2.5-5.2
Chronic heavy drinking: 1.6-4.1
Acute drinking: 2.4-4.8
Drinking and driving: 1.1-3.3

Certain caveats should be kept in mind when interpreting the BRFS data. One important consideration is that the prevalence rates obtained are based on self-report. As with all self-reported information, there may be significant under- or overreporting of behaviors, depending on whether the behavior is thought to be desirable. The extent of misreporting may be related to demographic characteristics such as age, sex, race or level of education, thus producing a bias intrinsic to the overall under- or overreporting. Another consideration is that telephone surveys may underrepresent certain groups at particularly high risk such as transients and the very poor. In addition, the precise definitions of the "at risk" categories for many health behaviors are controversial. Though many of these behaviors are widespread, the level at which certain behaviors such as alcohol use or exercise cease to be benign or protective and become instead health risks is unclear.

BRFS focus on health risk behavior rather than disease status as the outcome variable. Because much of the morbidity and mortality in the United States today is chronic and develops over an extended period, current behavior is likely to be associated with future disease status. The one-time surveys reported here are currently being extended into an ongoing Behavioral Risk Factor Surveillance System that will provide continued state-level information. This information will allow states to identify their particular high-risk groups, define baseline prevalence estimates for the risk factors, and track temporal trends in rates. These efforts should enhance the development and monitoring of prevention programs in the future.

It may also be possible to detect long-term trends in behavioral risk factors on the national level. Continued surveillance may permit comparison of trends in behavior with morbidity and mortality in the U.S. As the in-depth analyses proceed, it will probably become apparent that many of the individual health behaviors are part of more complex patterns of behavior and that risk in one category is associated with a high likelihood of other types of risk behaviors. Continued analysis of the BRFS data should enhance our understanding of the complex interactions among health behaviors and thereby further attempts at more effective prevention.

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Maternal Mortality Surveillance, 1974-1978

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Introduction

Surveillance of maternal deaths has several goals, including: identifying risk factors associated with maternal deaths, tracing patterns of these risk factors over time, and providing a benchmark to which the safety of fertility control measures can be compared. This report outlines the program currently being conducted by CDC's Division of Reproductive Health in an effort to achieve these goals.

Materials and Methods

CDC obtained copies of 1974-1978 death certificates from each state health department for all deaths classified by the National Center for Health Statistics (NCHS) as maternal (1,949), and for any additional pregnancy-related deaths (741) identified by state health departments.

National maternal mortality data published by NCHS for 1974-1978 were based on the Eighth Revision of the International Classification of Diseases, Adapted (ICDA-8) (*1*). To classify the maternal deaths in this report, we used the ninth revision of the International Classification of Diseases (ICD-9) (*2*), which has a broader definition of maternal death than ICDA-8. The ICD-9 definition includes as maternal:

> the death of any woman while pregnant or within 42 days of termination of pregnancy,* from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes. (*3*)

Pregnancy-associated deaths from underlying conditions aggravated by the pregnancy (e.g., diabetes, heart disease or tuberculosis), which would not be coded as maternal using ICDA-8, are coded as maternal when ICD-9 is used. We excluded 206 deaths from causes incidental to pregnancy (e.g., motor vehicle accidents).

The traditional measure of maternal mortality is maternal deaths/100,000 live births; this measure is known as the "maternal mortality rate." The live-birth data used to calculate rates were provided by NCHS.

Results

For the years 1974-1978, we classified 2,555 deaths as maternal. For this 5-year period, the maternal mortality rate was 15.8/100,000 live births (Table 1). While the annual number of live births was relatively stable over this period, the maternal mortality rate declined by 27%, from 18.5 in 1974 to 13.5 in 1978.

With the exception of the youngest age group (*A* 15), maternal mortality rates increased with maternal age (Table 2). The maternal mortality rate for women ages 35-39, for instance, was some five times higher than that for women ages 15-19.

*Includes live births, stillbirths, abortions, and ectopic pregnancies.

Race was an important risk factor for maternal death. The 1974-1978 maternal death rate for blacks and others (36.4) was more than three times higher than the rate for whites (11.0) (Table 3).

Discussion

Maternal death rates in the United States have declined over thirtyfold since 1940 (*4*). A number of factors may have played a role in this decline, including greater access to and utili-

TABLE 1. Number and rate of maternal deaths,* by year, United States, 1974-1978

Year	Number of deaths	Number of live births	Maternal mortality rate†
1974	584	3,159,958	18.5
1975	526	3,144,198	16.7
1976	498	3,167,788	15.7
1977	497	3,326,632	14.9
1978	450	3,333,279	13.5
Total	2,555	16,131,855	15.8

*Classified by CDC according to the ICD-9 definition of maternal death.
†Maternal deaths/100,000 live births.

TABLE 2. Number and rate of maternal deaths,* by age, United States, 1974-1978

Age group	Number of deaths	Number of live births	Maternal mortality rate†	Relative risk§
< 15	11	59,326	18.5	1.7
15-19	312	2,838,992	11.0	1.0
20-24	645	5,579,344	11.6	1.1
25-29	663	4,863,648	13.6	1.2
30-34	469	2,061,560	22.8	2.1
35-39	319	596,282	53.5	4.9
40-44	114	125,324	91.0	8.3
⩾ 45	18	7,379	243.9	22.2
Unknown	4	—		
Total	2,555	16,131,855	15.8	

*Classified by CDC according to the ICD-9 definition of maternal death.
†Maternal deaths/100,000 live births.
§Based on an index rate of 11.0 deaths/100,000 live births for 15- to 19-year-olds.

zation of prenatal care and hospitals for childbirth; technical advances in medical care such as improvements in blood banking, antibiotic treatment of infections, and anesthesia; lower parity; fewer unwanted births; and the decrease in the number of illegal abortions (*5*). In addition, the reduction in births to women over age 35 (*6*), achieved in part through increased surgical sterilization (*7*), may have contributed to lower maternal mortality rates.

The number of maternal deaths included in this report is 21% higher than the number published by NCHS in national vital statistics reports for the same period. A large part of this difference results from our use of the broader ICD-9 definition of maternal death (*8*). However, even using the broader definition, we may be substantially undercounting the number of maternal deaths in the United States. Intensive surveillance of maternal deaths in Georgia (*9*) and New Jersey (*10*) suggests that there has been substantial failure to identify and classify maternal deaths properly, principally through failure to indicate on the death certificate the temporal or causal relationship of the pregnancy.

The maternal mortality rate for women of black and other races is substantially higher than for white women, as is the death-to-case rate for legal abortion (*11*) and ectopic pregnancy (*12*). Less access to, and utilization of, obstetric care by minority race women (*13*) may account in part for these higher rates.

Marital status, parity, and preexisting health problems may also influence risk of maternal mortality, but because national data on these factors are not available, we have not calculated maternal mortality rates by these variables.

Although maternal mortality has declined, 75% of maternal deaths are still considered preventable (*14*), suggesting that further decreases are feasible. Increased access to and utilization of family planning and prenatal services, particularly by minority women, might reduce overall maternal mortality rates (*15*) as well as the differential between the maternal mortality rates for whites and for blacks and others. Improved management of pregnancy complications could further reduce rates of maternal death (*15*). These observations suggest that obstetric care should be targeted to minority women, and that existing medical technology, if appropriately applied, can prevent most maternal deaths in the United States.

This analysis of maternal mortality has important implications for national health objectives (*16*). One of these objectives is to reduce the maternal mortality rate to 5/100,000 live births by 1990. The benchmark for this goal was a reported maternal mortality rate of 9.6 for 1978. Our analysis shows a maternal mortality rate of 13.5 for that year, 41% higher than the benchmark. In view of this, increased efforts may be required to achieve the stated objective.

TABLE 3. Number and rate of maternal deaths,* by race, United States, 1974-1978

Race	Number of deaths	Number of live births	Maternal mortality rate†	Relative risk§
White	1,431	13,067,588	11.0	1.0
Black and other	1,116	3,064,267	36.4	3.3
Unknown	8	-	-	
Total	2,555	16,131,855	15.8	

*Classified by CDC according to the ICD-9 definition of maternal death.

†Maternal deaths/100,000 live births.

§Based on an index rate of 11.0 deaths/100,000 live births for whites.

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Dengue in the United States, 1982

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Introduction

Dengue, caused by a virus with four distinct serotypes, is usually an acute illness of short duration; classic symptoms include fever, vomiting, myalgia, headache, severe retro-orbital pain, and lower back pain. Infrequent complications include dengue hemorrhagic fever and dengue shock syndrome. There is no specific antiviral therapy for dengue, but for both classic dengue and dengue hemorrhagic fever, symptomatic and supportive measures are effective.

Dengue types 2 and 3 have been present in the Caribbean basin since at least the 1940s (*1*); dengue type 1 was first recognized there during an outbreak of illness in Jamaica in 1977, which was followed by a pandemic that eventually involved most of the countries of the region (*2*). Dengue type 4 was recognized for the first time in the Western Hemisphere in 1981, when two U.S. travelers became ill after returning home from the island of St. Barthelemy, where, according to health authorities, an outbreak of dengue-like illness had been occurring for several months (*3*). An epidemic of dengue hemorrhagic fever caused by dengue type 2 occurred in Cuba in the summer of 1981, with over 10,000 persons hospitalized and 159 deaths (*4*). Currently, dengue serotypes 1, 2, and 4 are active and widespread in the Caribbean basin. Improved surveillance is being implemented in an attempt to prevent epidemic dengue and dengue hemorrhagic fever in the United States.

Methods

Dengue surveillance in the United States is passive and, as such, depends upon suspected cases being reported to CDC by various state health departments. Reporting is done on the CDC surveillance form, which is sent to CDC with single or paired blood samples. Similarly, surveillance in the Caribbean region depends upon physicians and health authorities recognizing and reporting suspected cases and sending blood samples for testing. As a result, the number of suspected cases reported is considered to be an underestimate of the actual number of cases. Furthermore, in many instances only single blood samples are submitted, which makes serologic confirmation difficult. Surveillance in Puerto Rico is active and is designed to monitor the serotype(s) transmitted on the island and to detect, without too much delay, the introduction of new viruses. Cases specified in this report as confirmed have been documented as dengue either serologically or virologically.

Results

In 1982, widespread dengue 1 and 4 activity occurred in the Americas, with major epidemics in Colombia (DEN 4), El Salvador (DEN 4), Mexico (DEN 1), Puerto Rico (DEN 4), Brazil (DEN 1 and 4), and Surinam (DEN 1 and 4).

An outbreak of dengue 4 occurred at the beginning of 1982 in Puerto Rico, following closely the decline of an epidemic of dengue 1 in the last half of 1981. Dengue 4 was introduced into Puerto Rico in August or September 1981, but initially only sporadic cases were observed. Transmission of this serotype increased in late 1981 and continued into 1982. Although the dengue 4 outbreak was not explosive, relatively high transmission continued

through the middle of October, after which the number of reported cases declined to a low level by December (Figure 1). Overall, 4,530 cases of suspected dengue were reported in 1982.

A high percentage of cases tested were confirmed as dengue each month of the year (Figure 2). Only in November and December did the confirmation rate fall below 65%. In most other months the rate ranged from 66% to 93%, with an overall confirmation rate for the year of 83% (1,253/1,518). This high laboratory confirmation rate is generally associated with epidemic transmission in Puerto Rico.

Dengue 4 was the predominant virus isolated in 1982, although sporadic cases of dengue 1 continued to occur in the western part of the island until September (Figure 3). Dengue 4 was introduced into Puerto Rico at the height of a dengue 1 epidemic, but remained localized for several months in metropolitan San Juan, an area where dengue 1 activity was low. Cases of dengue 4 remained sporadic through October 1981, but in November transmission of dengue 4 began to increase. This pattern of occurrence coincided with a decrease in dengue 1 transmission, and by December 1981 dengue 4 had become the predominant virus isolated. Only occasional isolates of dengue 4 were obtained from patients in the southern and western parts of the island during this time.

Figures 2 and 3 show a marked decrease in confirmed dengue in Puerto Rico in April and May 1982. This period of decreased transmission coincided with the only dry period in Puerto Rico in 1982. The rains returned in June, and there was a concurrent increase in dengue 4 transmission. At this time, however, most cases occurred in the southern part of the island. By late June and early July, high-level transmission was occurring in the western part of the island, and by August, cases were occurring all over the island.

FIGURE 1. Reported cases of dengue by date of onset, Puerto Rico, 1982

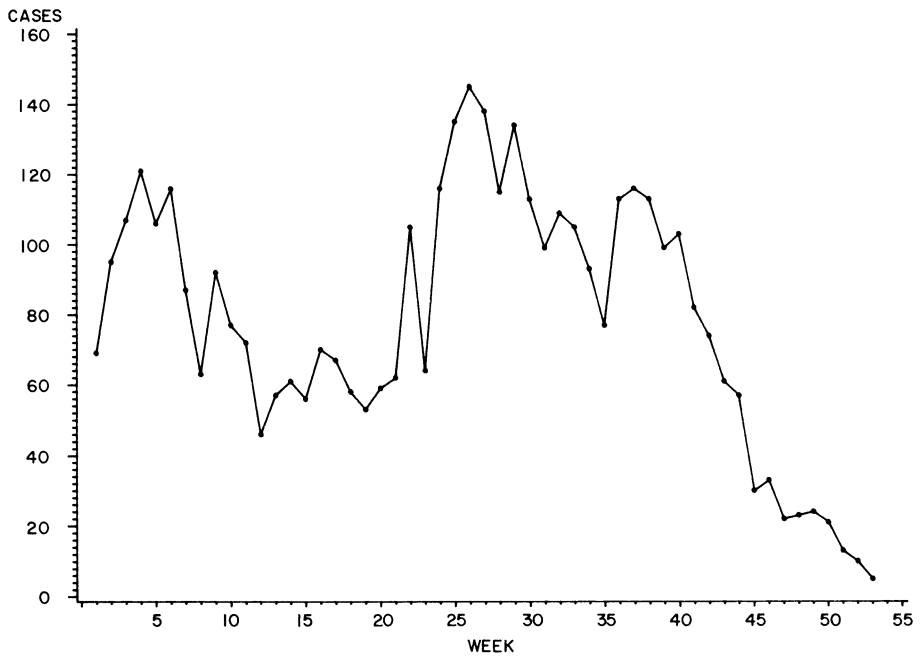


FIGURE 2. Reported and serologically and/or virologically confirmed dengue cases by month of onset, Puerto Rico, 1982

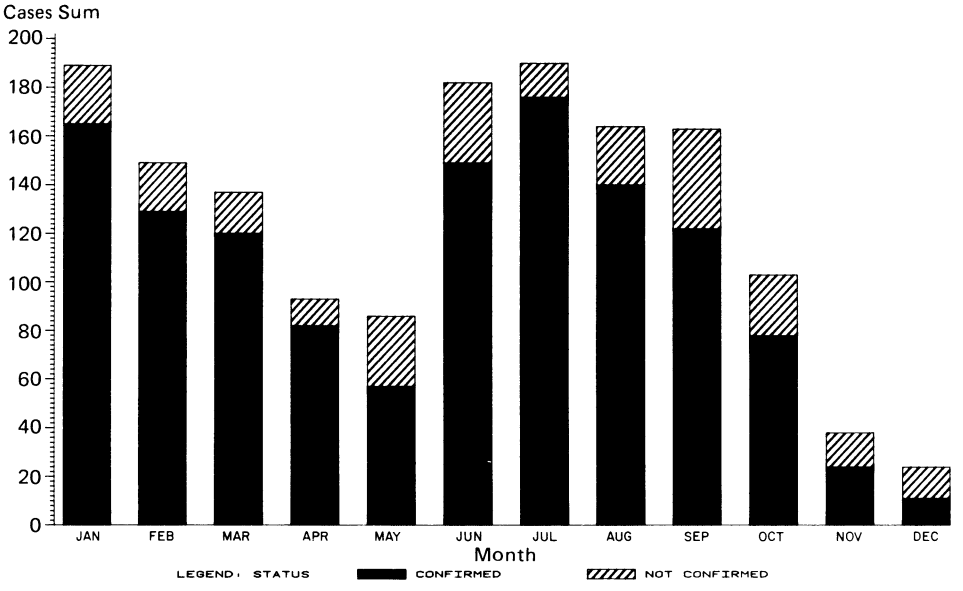
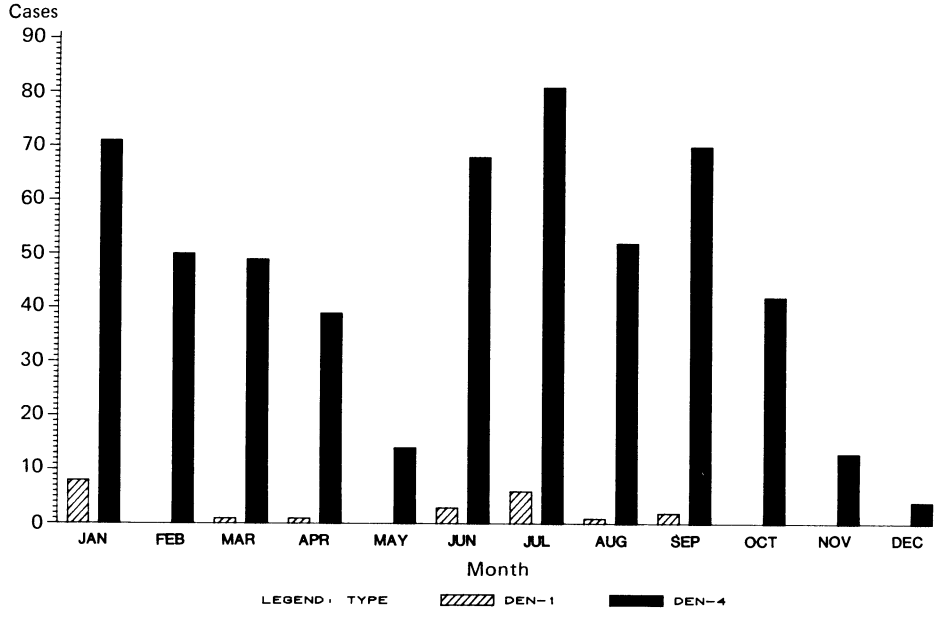


FIGURE 3. Dengue viruses isolated and identified, by month, Puerto Rico, 1982



The clinical illness associated with dengue 4 infection in Puerto Rico in 1982 was generally mild and of the classic type. While there were patients with confirmed dengue and a variety of hemorrhagic manifestations, none in 1982 met the World Health Organization's criteria for dengue hemorrhagic fever. Nevertheless, severe and fatal illness associated with confirmed dengue did occur in Puerto Rico in 1982.

Imported dengue continues to be a potential threat to the United States. In 1982, 144 cases of dengue-like illness were reported to CDC by 28 states and the District of Columbia (Table 1). The travel history of persons with suspected cases included all parts of Asia, the Pacific and Caribbean islands, Central and South America, and Africa. Forty-five cases, imported into 14 states, were confirmed as dengue fever. Eight of these confirmed cases were imported into southern states where the *Aedes aegypti* mosquito, the principal vector of dengue, is still found. Most of the rest occurred in the eastern half of the United States, where another potential vector, *Aedes triseriatus*, is common. The virus types imported were dengue 1, 2, and 4.

TABLE 1. Reported cases of dengue-like illness, United States, 1982

State	Number of cases reported	Number of cases confirmed*	Travel history for patients with confirmed cases
Alabama†	7	-	-
Arizona	2	-	-
Arkansas†	2	-	-
California	3	3	South America, Jamaica Philippines
Colorado	1	-	-
Connecticut	2	2	Jamaica, Puerto Rico
D. C.	2	-	-
Florida†	2	-	-
Georgia†	11	2	French Guiana, Kenya
Hawaii†	2	-	-
Idaho	1	-	-
Illinois	11	2	Dominican Republic, India
Indiana	3	-	-
Maryland	2	-	-
Massachusetts	16	5	Burma, China, Jamaica, El Salvador, Sri Lanka
Michigan	2	1	Puerto Rico
Minnesota	3	-	-
Mississippi†	1	-	-
Missouri	6	-	-
Nebraska	1	1	Thailand
New Jersey	5	2	Puerto Rico
New York	31	11	Suriname, Puerto Rico, India
Ohio	4	3	Puerto Rico, Sri Lanka
Oklahoma	1	1	-
North Dakota	1	-	-
Pennsylvania	7	5	-
Texas†	12	5	Suriname; Michoacan, Mexico; Tamaulipas, Mexico
Virginia	2	2	Venezuela, India
Vermont	1	-	-
Total	144	45	

*Confirmed either serologically or virologically.

†States with *Aedes aegypti* during much of the year.

Conclusion

In the past decade, epidemic dengue activity has increased in most areas of the tropics. In part, this reflects an increased frequency of air travel by humans, which provides the ideal mechanism for movement of dengue viruses between population centers of the world. Preventing dengue depends on controlling its principal vector mosquito, *Aedes aegypti.* Concurrent with the increased epidemic activity in the tropics has been an increase in numbers of imported cases of dengue into the United States. Many of these cases are imported into states where competent mosquito vectors are found, underscoring the need for effective surveillance, especially during periods of increased dengue activity in the tropics.

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Plague in the United States, 1983

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Introduction

Bubonic plague is a flea-transmitted disease of rodents transmissible to humans (and other mammalian species) by vector fleas or by direct-contact contamination from infected animals. Humans and mammals other than rodents become infected fortuitously and are not involved in the plague maintenance cycle; however, they can and often do play an intermediary epidemiologic role. For example, domestic pets may serve as a bridge for infection between rodents and humans, either by transporting infective fleas into the home environment (both dogs and cats) or by direct-contact contamination from a severely ill pet (especially cats). Dogs usually do not become clinically ill when infected.

Human cases are relatively rare in the United States, but numbers have increased substantially during the past decade and for the period 1974-1983 averaged about 19/year. The fatality rate has remained high (16% of all reported cases) despite the availability of effective antibiotic therapy. In enzootic plague areas, health-care providers could probably reduce this fatality rate by treating patients promptly on strong suspicion of exposure to plague rather than basing treatment on laboratory confirmation of infection (*1*). Although plague is known to occur in rodents and fleas in 15 western states, human cases are most prevalent in the Southwest (Arizona, southern Colorado, and New Mexico) and the Pacific states (California and southern Oregon) (*2*). During the past decade, cases of plague have occurred in persons ranging in age from 1 week to 79 years, but the most cases have been in children and adolescents < 20 years of age. The case fatality ratio is highest for persons > 55 years of age. Diagnosis of and therapy for plague, its clinical course, epidemiology, and ecology have been discussed in detail elsewhere (*3*), and 1982 cases have been summarized by Barnes and Poland (*1*).

Methods

As required by international health regulations (*4*), all human plague cases are reportable internationally as well as at the local, state, and federal levels. All reported U.S. cases are confirmed at CDC. An active surveillance program is conducted by CDC in collaboration with state and other federal agencies in the western states (*2*). Serologic surveys of rodents, wild carnivores, and domestic dogs are a major component of the program, which is designed to detect plague and to provide a basis for implementing control programs to prevent human exposure. Criteria used to classify reported cases, and the surveys, strategies, and methods used are described in a recent Surveillance Summary (*1*).

Results

More cases of human plague (40) were reported and confirmed in the United States during 1983 than in any year since 1920 (Table 1). The United States averaged about one plague case/year from 1950 until 1965, when an outbreak of seven cases occurred on the Navajo Reservation (*5*) (Figure 1). Since 1965, there has been no year without a human plague case, and since 1974 the United States has averaged 19 cases/year.

TABLE 1. Epidemiologic features of confirmed human plague cases in the United States, 1983

Case number	Date of onset	Age	Sex	Race	Course	State	County	Presumptive source
1	04/21	19	M	AI	B RAX	NM	McKinley	DC/rabbit
2	04/28	22	M	AI	B LAX	NM	McKinley	DC/rabbit
3	05/01	39	M	AI	B RAX	AZ	Navajo	DC/rabbit
4	05/11	22	M	C	B/P RAX	AZ	Coconino	FB/antelope gr. sq. fleas
5*	05/13	18	M	AI	B/P LAX	AZ	Apache	FB/rock sq. fleas
6	05/19	11	F	C	B LING	NM	Grant	FB/rock sq. fleas
7	05/24	58	F	AI	S	AZ	Coconino	Unknown/unknown
8*	05/26	65	M	AI	B/S RAX	AZ	Coconino	DC/rabbit
9	06/02	57	M	AI	B RING	AZ	Apache	FB/antelope gr. sq. fleas
10	06/03	63	M	C	B	NM	San Miguel	FB/rock sq. fleas
11	06/07	12	F	C	B	NM	Rio Arriba	FB/rock sq. fleas
12	06/04	13	M	C	B lng	UT	Tooele	Unknown/unknown
13*	06/06	9	M	C	B/S CERV	OR	Klamath	DC/unknown
14	06/13	21	M	AI	B RING	NM	Santa Fe	FB/unknown
15*	06/13	5	M	AI	B/S	AZ	Apache	FB/antelope gr. sq. fleas
16	06/15	5	M	C	S	NM	Rio Arriba	FB/rock sq. fleas
17	06/18	61	M	C	B lng	NM	Santa Fe	FB/rock sq. fleas
18	06/20	58	F	C	S	NM	Santa Fe	FB/rock sq. fleas
19	06/19	45	F	AI	B/P	NM	McKinley	FB/rock sq. fleas
20	05/21	2	F	C	B Ax	NM	San Miguel	FB/rock sq. fleas
21	06/26 (H)	71	F	C	B/S	NM	Taos	Unknown
22	07/11	37	M	C	B RING	NM	Santa Fe	FB/rock sq. fleas

TABLE 1. Epidemiologic features of confirmed human plague cases in the United States, 1983 (Continued)

Case number	Date of onset	Age	Sex	Race	Course	State	County	Presumptive source
23	07/10	15	F	AI	B	NM	McKinley	FB/pr. dog fleas
24	07/12	30	M	C	B LING	CA	Shasta	FB/unknown
25	07/11	8	F	AI	B LING	NM	McKinley	FB/pr. dog fleas
26	07/03	44	M	AI	B Ing	AZ	Apache	FB/unknown
27	07/23	41	M	AI	B Ing	NM	McKinley	FB/unknown
28	07/25	60	F	AI	S	NM	Cibola	Unknown
29	07/27	14	M	AI	B CERV	AZ	Apache	Unknown
30*	07/28	13	F	C	B/P Ing	NM	Santa Fe	FB/rock sq. fleas
31	07/27	58	M	C	S	NM	Santa Fe	FB/rock sq. fleas
32	07/31	9	M	AI	B	NM	McKinley	FB/pr. dog fleas
33	08/04	34	F	AI	S	NM	McKinley	FB/rock sq. fleas
34	08/12	25	F	AI	B (pregnant)	NM	Santa Fe	FB/rock sq. fleas
35*	08/13	13	M	C	B	NM	Colfax	FB/gr. sq. fleas
36	08/12	36	M	C	B Ing	NM	Bernalillo	FB/unknown
37	08/29	14	M	AI	B	AZ	Navajo	Unknown
38	09/14	9	F	AI	B Ing	NM	Cibola	Unknown
39	10/03	14	M	C	B Ax	NM	McKinley	FB/pr. dog fleas carried by cat
40	12/11	33	M	C	B Ax	CO	Rio Blanco	DC/rabbit

Abbreviation—ONSET: (H) - date of hospitalization; RACE: AI - American Indian; C - Caucasian; COURSE: B - bubonic; RAX, LAX - right, left axillary node; RING, LING - right, left inguinal node; CERV - cervical node; B/P - bubonic with secondary pneumonia; B/S - bubonic with septicemia; S - septicemia; SOURCE: DC - direct contact; FB - flea bite.

*Fatal.

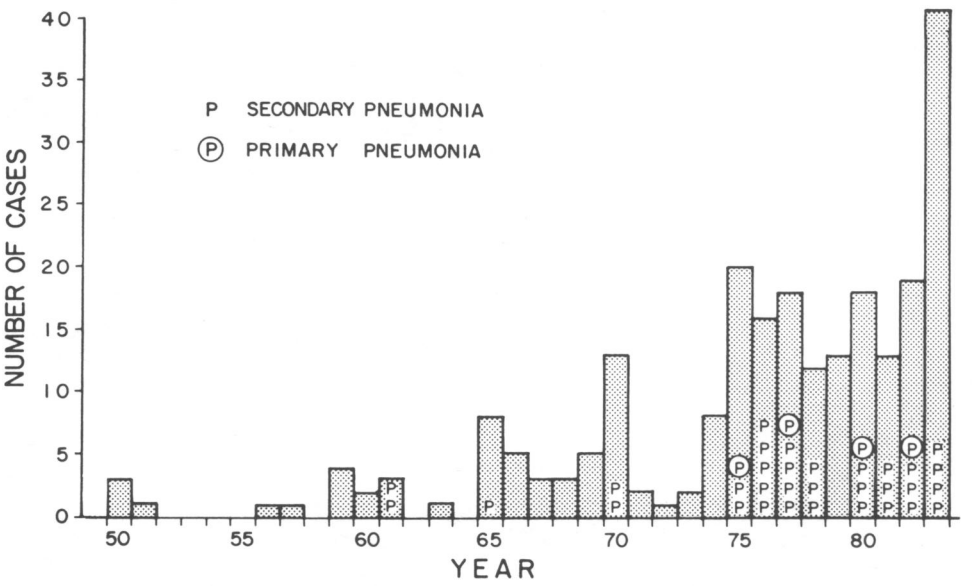
Six (15%) of the 40 patients in 1983 died (Table 1): five of the six were < 20 years of age, and the other was a person 65 years of age. Patients ranged in age from 2 to 71 years, but, as in previous years, younger people were most often the victims, with eight cases (20%) in the 0-9 age group and 10 (25%) in the 10-19 age group. Distribution of cases by sex was not even, as it had been in recent years: 26 (65%) patients were male, and 14 (35%) were female. Four patients (10%) developed secondary plague pneumonia and thus became potentially infective to others via the respiratory route. Five (12.5%) of the 40 patients had primary plague septicemia, and the others had bubonic plague.

In 1983, New Mexico had 26 cases and Arizona had 10—a record number for each state. California, Colorado, Oregon, and Utah each had one case (Figure 2). One New Mexico patient traveled to South Carolina before the onset of her fatal illness. Cases that occurred near Page, Arizona (Patients 4 and 8, Table 1) and in Grant County, New Mexico (Patient 6) were acquired in climatic situations that are hotter and more arid than those usually associated with human plague infection in the United States.

Twenty-one (52.5%) of the 40 cases occurred in American Indians; 19 were in Navajos and 2 were in Upper Rio Grande Pueblos. Two cases from the Ramah Navajo, a separate reservation, are included in the Navajo data. In 1982, nine (47.4%) of 19 and in 1981, six (46.2%) of 13 U.S. cases occurred in American Indians, also principally Navajos. The attack rate for Navajos in 1983, using Indian Health Service population figures, was 12.1/100,000. The attack rate for the grouped Pueblo populations was 6.0/100,000.

At least five (21.1%) of the 19 Navajo cases were acquired by direct-contact contamination while the patients were hunting rabbits or rodents (Patients 1, 2, 3, 5, 8, Table 1). This represents a higher proportion of cases acquired in this manner than in past years (*2,6*). Rabbits and prairie dogs are frequently killed or captured on the Navajo reservation to feed to sheep dogs and are also prepared and eaten by people. The majority of Navajo cases, however, occurred as a result of flea-bite transmission, as in past years.

FIGURE 1. Reported human plague and plague pneumonia, United States, 1950-1983



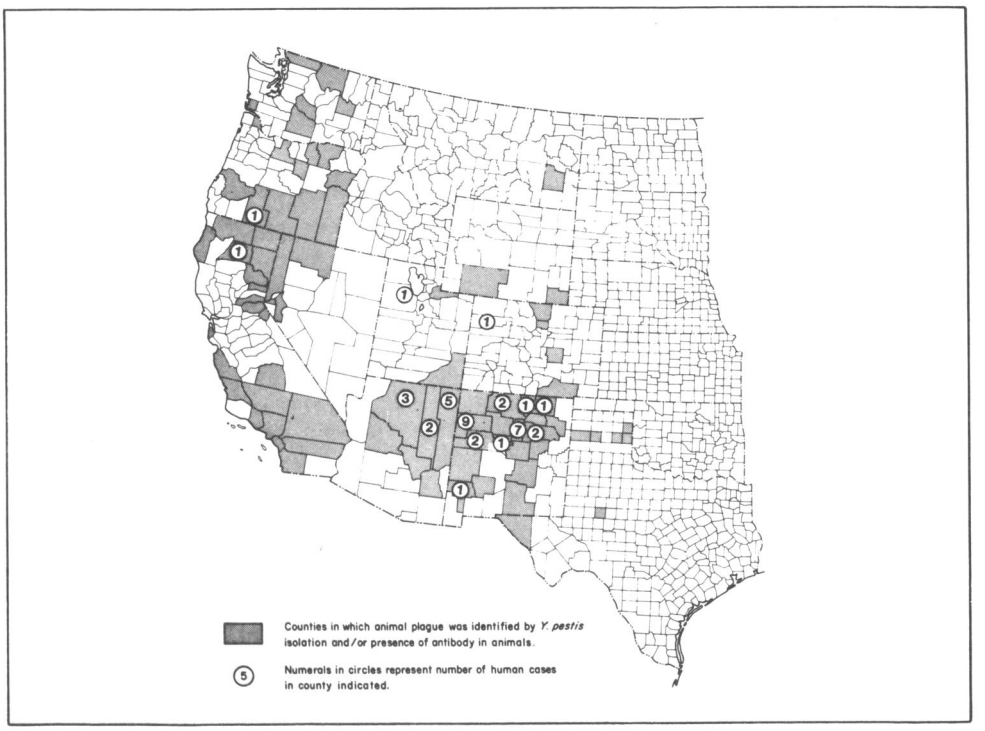
Animal plague was detected by surveillance programs in 11 states. Very little survey work was done in Idaho, Montana, Utah, or Wyoming, and none was done in Kansas, Oklahoma, or the Dakotas. Serum samples from a substantial number of wild carnivores were submitted from west Texas, where epizootic plague was observed to be less widespread than in 1982. During 1983, wild carnivores with high antibody titers to *Yersinia pestis* were found in areas of coastal California, Oregon, and Washington ranging from semidesert to wet temperate rain forest, once again demonstrating the broad adaptability of *Y. pestis*.

Early-season serologic evidence that dogs had been exposed to plague also increased dramatically in 1983. Of 1,195 dog sera collected on the Navajo Reservation (including 11 from the Ramah Navajo), 305 (26%) had antibody titers to *Y. pestis*, and 253 (21.2%) had titers of $\geqslant$ 128, indicative of recent exposure to plague.

Discussion

The widespread occurrence of plague in animals and the record number of human plague cases in 1983 show a continuation of the extensive epizootics in the Southwest that were responsible for 17 of 19 cases reported in the United States in 1982 (*1*). The factors and interactions responsible for increased human exposure in 1983 are not well understood. One reasonable hypothesis is that prolonged cool, moist weather in spring and early summer increased the longevity of adult vector fleas, thus giving them more time to incubate the organism, find a new host, and transmit the disease. The unusually mild winter preceding the plague season may have contributed to greater survival (overwintering) of rodent populations, thus

FIGURE 2. Geographic distribution of human and animal plague, United States, 1983



providing a larger host population base entering the cool spring/summer plague amplification season. It has also been postulated that the increased exposure of Navajos may have occurred because a reduction in federal entitlement programs caused them to rely more on hunting to provide food for themselves and their sheep dogs. This theory is supported somewhat by the fact that five of the Navajo plague cases in 1983 were acquired by direct contact with animals while hunting rather than by the usual flea-bite source of infection.

The possibility of plague pneumonia and the occurrence of undiagnosed and untreated fatal cases continue to be of particular concern to public health officials. About the same number of patients (4) developed pneumonic plague in 1983 as in any of the past 8 years, but the proportion was sharply lower (10% in 1983, compared with an 8-year annual average of 22%). Four of the six patients who died in 1983 did so less than 24 hours after plague was suspected or specific therapy was started. Two of those four had been ill for 3 to 4 days. One was diagnosed as a probable plague case on the second day of illness during his second visit to the physician. He died 6 hours after initiation of intravenous gentamicin therapy, approximately 36 hours after onset of his symptoms. Such a fulminating course is uncommon.

One other fatality was unusual in that it did not occur until several weeks after the patient's acute illness. An 18-year-old Indian man who had developed bubonic plague with secondary plague pneumonia was treated and appeared to be clinically improved. However, he never regained sufficient pulmonary function to sustain life, and he died of cardiorespiratory failure 1 month after onset of plague symptoms. This course is unique among the 32 plague patients who have developed pulmonary disease in the past 8 years. While some plague patients with pneumonia have had extensive pulmonary disease and cavitary disease developed in three patients, all surviving patients had made complete functional and radiographic resolution. The possibility of a superinfection with an agent more commonly associated with a necrotizing pulmonary process was suspected but could not be proved in this patient. A postmortem examination was not allowed.

Delays in suspecting human plague occurred several times in 1983. Reasons for these delays included: 1) failure of the patient to develop a suggestive bubo; 2) development of lymphadenitis, suggesting an upper respiratory infection (suspected streptococcal pharyngitis); 3) clinical picture and history strongly suggesting another diagnosis (heat stroke in an elderly sheepherder with septicemic plague); 4) onset of symptoms while the patient was in a part of the United States where plague does not occur; and 5) failure to elicit a history of activity or animal contact that might suggest a potential plague exposure.

In 1983, physicians in plague-endemic southwestern states tended to treat suspected plague patients on clinical and epidemiologic grounds without awaiting supportive laboratory diagnosis. This approach was taken with four patients from plague-endemic areas in Apache County, Arizona, and McKinley County, New Mexico, for whom plague was seriously considered but was not high in the differential diagnosis. Appropriate diagnostic specimens were taken, and tetracycline therapy was initiated on an outpatient basis. Two of the four subsequently were determined by laboratory testing not to have had plague. Two were confirmed to have had plague but both had improved when reexamined 2 days after outpatient therapy was started. Neither required hospitalization, and both made a complete clinical recovery. Close public health and clinical surveillance was carried out on these four patients and should be incorporated into outpatient management whenever plague is suspected (1).

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State and Territorial Epidemiologists and State Laboratory Directors

The contributions of the State and Territorial Epidemiologists and the State Laboratory Directors to this report are gratefully acknowledged. The persons listed were in the positions shown as of April 1, 1984.

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