

# MMWR

MORBIDITY AND MORTALITY WEEKLY REPORT

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## Perspectives in Disease Prevention and Health Promotion

### **A Strategic Plan for the Elimination of Tuberculosis in the United States**

In 1987, the Department of Health and Human Services (DHHS) established the Advisory Committee for the Elimination of Tuberculosis (ACET) to "provide recommendations for the development of new technology, application of prevention and control methods, and management of state and local tuberculosis programs targeted toward the elimination of tuberculosis as a public health problem." In response to this charge, the ACET completed a strategic plan for the elimination of tuberculosis (TB) in the United States with advice and consultation from a large number of persons and organizations. The following is a summary of the plan. The complete plan has been published as an *MMWR* supplement (1).

**The plan urges the establishment of a national goal of TB elimination (an incidence of <1 case per million population) by the year 2010, with an interim target of an incidence of 3.5 cases per 100,000 population by the year 2000.** The plan cites three factors that favor the achievement of this goal: 1) TB is retreating into focal geographic areas and demographically well-defined groups; 2) biotechnology can potentially generate better diagnostic, therapeutic, and preventive modalities; and 3) new computer, telecommunications, and other technologies will enhance the transfer of these new biotechnologies into clinical and public health practice. A three-step plan of action is proposed:

- Step 1. More effective use of existing prevention and control methods, especially in high-risk populations;
- Step 2. The development and evaluation of new technologies for diagnosis, treatment, and prevention; and
- Step 3. The rapid assessment and transfer of newly developed technologies into clinical and public health practice.

Current problems cited in the plan include deficiencies in identifying and reporting TB cases and contacts, the failure to fully use prevention interventions, the failure of many patients to complete prescribed therapy, and the failure to adequately assess the effectiveness of community prevention and control programs.

Recommended priorities for action include 1) identifying and screening high-risk population groups within each health jurisdiction and 2) making adequate and

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appropriate treatment and prophylaxis more widely available. Elimination of TB in the United States depends on the identification of groups at high risk for infection and disease. These groups vary through time, by place, and by personal characteristics. In 1987, the identifiable groups at high risk included HIV-infected persons, the homeless, immigrants and refugees from high-prevalence countries, intravenous-drug abusers, and residents of correctional institutions and nursing homes. Blacks, Hispanics, and Native Americans are also at high risk; the higher risk in these minority populations appears to be primarily related to socioeconomic status (2). However, because the epidemiology of TB changes, populations now at high risk may decline in risk over time, and groups not currently identified to be at risk may become at risk. Therefore, the plan urges CDC and state and local health departments to continue and to strengthen TB surveillance activities and to further improve their ability to define groups at high risk for TB.

In addition to identifying high-risk populations, health-care providers must extend TB screening, treatment, and prevention programs to these groups. For such programs to be optimally effective, high-risk groups and health-care providers for these groups should be involved in designing, implementing, and promoting these programs.

To increase the proportion of patients who complete therapy, the plan recommends several actions, including the more widespread use of the newer short-course treatment regimens (3). In addition, for each new case of TB, a specific health-care provider should be responsible for assuring that patients and their contacts are educated about TB and its treatment, that therapy is continued and completed, and that appropriate contact examination and preventive treatment are conducted. The use of directly observed therapy is strongly encouraged. Quarantine measures, including temporary institutionalization, are recommended only in those rare instances when an infectious patient refuses to comply with self-administered or directly observed therapy.

The implementation of these recommendations will require an increase in the number of health department outreach staff who are members of the populations they serve. During the past few years, this approach has proven successful in public health practice and is more cost-effective than alternative approaches such as long-term hospitalization (CDC, unpublished data).

Intensified use of existing technologies as outlined above is essential in moving the nation toward elimination; however, this strategy alone will not be sufficient to reach the goal. It is crucial that new technologies be developed. The plan points out that recent developments in biotechnology are revolutionizing the diagnosis, treatment, and prevention of other infectious diseases and that, by applying these new techniques to TB, it should be possible to develop the new tools needed to eliminate TB (4).

The highest priorities for new technology development are 1) the development of alternative approaches to prevention of disease among persons already infected and 2) the development of a more rapid and effective test for identifying persons infected with living tubercle bacilli. Research efforts directed toward developing a more reliably effective TB vaccine, more rapid and accurate diagnostic tests, and more effective and rapidly-acting drugs are also needed.

Finally, new technologies must be assessed and put into clinical and public health practice in a timely fashion. The plan points out that federal agencies; professional

*TB – Continued*

societies; and schools of medicine, nursing, and public health all have a role in assessing and implementing new technologies and that both public and private funds will be needed to support demonstration projects for technology assessment and implementation.

Health departments, medical and nursing schools, schools of public health, voluntary agencies, professional societies, and minority advocacy groups share responsibilities for educating health-care providers and high-risk groups about the manifestations, methods of diagnosis, treatment, and prevention of tuberculosis. The plan recommends national, regional, and state conferences for health-care professionals to focus attention on TB and to teach modern approaches to its control and eventual elimination.

The plan suggests that advisory committees be established in the states and major metropolitan areas to develop more specific strategies and tactics for TB elimination in each health jurisdiction and to review progress toward elimination. These reviews should include evaluations of morbidity and mortality data, the adequacy of case reporting and casefinding procedures, and the quality of treatment and prevention activities. Interested constituencies, such as lung associations, minority organizations, and professional societies, should be represented on these advisory committees.

The ACET states that it is bringing this plan to the attention of the medical community and the public to stimulate positive and constructive discussion and action, to increase the level of TB awareness, and to encourage a commitment toward the elimination of TB.

*Reported by: Div of Tuberculosis Control, Center for Prevention Svcs, CDC.*

**Editorial Note:** The TB elimination plan developed by the ACET provides a roadmap to guide the TB elimination effort for the next 2 decades. Consequently, the plan is being distributed to a wide variety of public, private, and voluntary groups with the request that they actively join in identifying and supporting steps essential to eliminating this disease within their respective jurisdictions.

Although the occurrence of TB in the United States has declined during the past 35 years, the disease persists as a public health problem in this country. From 1953 through 1987, the number of reported cases decreased from 84,517 to 22,255, and the annual incidence of TB decreased from 53.0 to 9.3 cases per 100,000 population (5). The reduction has been substantially greater among whites than among other races; as a result, the proportion of cases occurring in nonwhites has risen from 24% in 1953 to 49% in 1987 (6). Today, TB among non-Hispanic whites is predominantly a disease of the elderly; among minorities, it is primarily concentrated in young adults. In 1987, the median age of non-Hispanic whites with TB was 62 years; for minority patients, the median age was 39 years (6).

Foreign-born persons constituted 24% of patients in 1987, and the risk among immigrants from Asia is especially high, particularly in the first years after arrival in the United States (5). The risk for immigrants serves as a reminder that TB persists as a global health problem of enormous dimension. Throughout the world, approximately 7–9 million new cases are diagnosed each year, and the disease is estimated to cause approximately 3 million deaths annually (7). An estimated 2 billion persons in the world have latent tuberculous infection (International Union Against Tuberculosis, Paris, personal communication, 1988), making it one of the most prevalent infections in the world. Through the development of new technology, the TB

*TB – Continued*

elimination effort in the United States can potentially contribute to the solution of the global TB problem.

In the United States, new cases occur primarily among persons with longstanding *Mycobacterium tuberculosis* infection rather than among persons with recent infection. An estimated 10 million persons have longstanding tuberculous infection (CDC, unpublished data). Major progress toward elimination can be achieved by targeting TB screening and preventive therapy programs toward groups of persons with *M. tuberculosis* infection who are at high risk for developing clinical disease.

To accomplish this objective, health department TB-control programs must be maintained, strengthened, and continually evaluated to assure the most beneficial use of available resources. CDC will continue to assist health departments by providing technical and financial assistance, training and educational resources, and surveillance and epidemiologic assistance and by conducting applied and operational research. CDC will continue to work with advisory groups, other federal agencies, state and local health departments, minority organizations, and other organizations to develop more specific strategies and tactics for implementing the plan.

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*Progress in Chronic Disease Prevention***Smoking-Attributable Mortality, Morbidity,  
and Economic Costs – California, 1985**

Cigarette smoking remains the single most important preventable cause of death in the United States and has long been implicated as a major risk factor in a variety of chronic diseases, including heart and cerebrovascular diseases, malignant neoplasms, and respiratory and other diseases (1). Smoking is a major health burden and has important economic effects.

To examine the impact of smoking, the California Chronic and Sentinel Disease Surveillance Program (CCSDSP), California Department of Health Services, estimated the health and economic costs associated with this risk factor in California for a single

*Smoking – Continued*

year (1985). The CCSDSP used smoking-attributable fractions (SAFs) for 24 underlying causes of death (based on U.S. prevalence estimates of current and former smokers and neversmokers and relative risk estimates for these groups) to estimate the number of smoking-attributable deaths in 1985 and the number of years of potential life lost (YPLL) to age 80 (2). The CCSDSP also applied these SAFs to 1985 California hospital discharge data to estimate the number of smoking-attributable hospitalizations and their costs. National figures for the ratio of hospital costs to direct costs and the ratio of direct costs to total costs (3) were applied to the California hospital data to estimate these cost components for California.

The CCSDSP determined that in 1985 smoking was directly responsible for 1) 31,289 deaths; 2) 310,018 YPLL; 3) 313,065 hospital discharges; 4) \$4.1 billion in hospital and other medical-care costs; and 5) more than \$7.1 billion in total costs, including health-care and other costs in the state (4). Although 77% of the hospital costs related to smoking were paid for by public funds, only 22% of California's adult population currently smokes (4; California Department of Health Services, unpublished data, 1987).

The CCSDSP also constructed a separate mortality category—smoking-attributable mortality (SAM)—by grouping together all the deaths that were directly related to smoking. Smoking directly accounts for a substantial portion of the three major causes of death—heart diseases, malignant neoplasms, and cerebrovascular diseases—in California and the United States and has been demonstrated or suspected to be a risk factor for a wide variety of other causes of death (1). Therefore, when SAM in California was classified as a separate category of death, it ranked second for men and third for women after heart diseases and malignant neoplasms due to other risk factors (Table 1).

Smoking was responsible for >50% more deaths than were all the following causes combined: unintentional injuries, including motor vehicle collisions and drug-related deaths; homicides; and suicides. Nearly one of every six deaths in the state is attributable to smoking.

*Reported by: GA Kaplan, PhD, WE Wright, PhD, KW Kizer, MD, California Dept of Health Svcs. Office of Surveillance and Analysis, and Office on Smoking and Health, Center for Chronic Disease Prevention and Health Promotion, CDC.*

**Editorial Note:** The CCSDSP has demonstrated that smoking is an important cause of mortality, morbidity, and economic costs in California. The CCSDSP data are supported by patterns demonstrated in other national and state-based studies (2,3,5–7); however, specific differences exist among findings in these studies and probably reflect differences in methodologic assumptions, study population and subgroup composition, overall mortality experience, and estimates of life expectancies and smoking prevalences.

In an attempt to capture morbidity and related costs, CCSDSP has also applied SAFs to estimate the number of hospital discharges for persons with smoking-attributable illnesses. They have adopted the working assumption that SAFs derived from the cohort studies investigating smoking-related mortality may be useful surrogates for hospital discharge SAFs (the latter not being available from other studies). Although some of the methodologic issues of estimating discharges of persons hospitalized for smoking-attributable illnesses require further consideration, CCSDSP's results suggest that hospital discharges for persons with smoking-related illnesses represent a large health and financial burden for the state.

*Smoking – Continued*

CCSDSP's findings may underestimate actual smoking-related mortality, morbidity, and associated costs. Its results are based on relative risk estimates from prospective studies completed within the past several decades rather than on estimates extrapolated from more recent or ongoing studies (1). More recent studies have yielded substantially higher relative risk estimates for several smoking-related diseases than did the earlier studies, especially for women. The earlier studies also lacked stable estimates for several diseases currently presumed to be related to smoking. Similarly, deaths from smoking-caused fires and other injury-related deaths have not been considered. Finally, although recent evidence shows an increased risk for lung cancer and respiratory diseases in nonsmokers due to involuntary (passive) smoking (1), lack of statewide data to estimate involuntary smoking exposures makes determination of smoking-related deaths in such persons difficult.

By grouping SAM from all causes into one category, CCSDSP has demonstrated that SAM actually ranks among the top three categories of death (after subtracting smoking-related deaths from the other causes). As a separate mortality category, SAM is the second leading cause of death for men and the third for women. However, unlike other categories of death (e.g., cerebrovascular diseases), the SAM category is unique because eliminating one risk factor—smoking—would eventually eliminate all deaths in this category (i.e., almost one of every six deaths in California).

**TABLE 1. Deaths from selected causes, including smoking, by sex – California, 1985**

| Underlying cause of death*                 | Men               |                  | Women             |                  | Total              |                  |
|--------------------------------------------|-------------------|------------------|-------------------|------------------|--------------------|------------------|
|                                            | No.               | (%)              | No.               | (%)              | No.                | (%)              |
| Diseases of the heart†                     | 30,475            | (28.6)           | 30,799            | (32.3)           | 61,274             | (30.4)           |
| Malignant neoplasms†                       | 15,953            | (15.0)           | 17,632            | (18.5)           | 33,585             | (16.6)           |
| <b>Smoking-attributable mortality‡</b>     | <b>19,627</b>     | <b>(18.4)</b>    | <b>11,662</b>     | <b>(12.2)</b>    | <b>31,289</b>      | <b>(15.5)</b>    |
| Cerebrovascular diseases†                  | 5,330             | ( 5.0)           | 8,035             | ( 8.4)           | 13,365             | ( 6.6)           |
| Unintentional injuries<br>(motor vehicles) | 7,299<br>( 3,781) | ( 6.9)<br>[ 3.6] | 3,081<br>( 1,515) | ( 3.2)<br>[ 1.6] | 10,380<br>( 5,296) | ( 5.1)<br>[ 2.6] |
| Pneumonia and influenza†                   | 2,977             | ( 2.8)           | 3,912             | ( 4.1)           | 6,889              | ( 3.4)           |
| Chronic liver disease<br>and cirrhosis     | 2,558             | ( 2.4)           | 1,407             | ( 1.5)           | 3,965              | ( 2.0)           |
| Suicide                                    | 2,878             | ( 2.7)           | 904               | ( 0.9)           | 3,782              | ( 1.9)           |
| Diabetes mellitus                          | 1,335             | ( 1.2)           | 1,662             | ( 1.7)           | 2,997              | ( 1.5)           |
| Homicide                                   | 2,170             | ( 2.0)           | 648               | ( 0.7)           | 2,818              | ( 1.4)           |
| Chronic obstructive<br>pulmonary disease†  | 960               | ( 0.9)           | 1,407             | ( 1.5)           | 2,367              | ( 1.2)           |
| All other causes†                          | 14,806            | (13.9)           | 14,298            | (15.0)           | 29,104             | (14.4)           |

\*Deaths are for all ages.

†Excludes smoking-attributable deaths.

‡Includes smoking-attributable deaths from diseases of the heart, malignant neoplasms, cerebrovascular diseases, pneumonia and influenza, and chronic obstructive pulmonary disease.

Source: California Chronic and Sentinel Disease Surveillance Program, California Department of Health Services.

*Smoking – Continued*

Calculation of the impact of smoking and associated diseases on the health and economic status of a state can be used to guide prevention efforts and intervention strategies. In November 1988, a unique opportunity to support prevention of smoking-related morbidity and mortality in California emerged in the form of a proposition to increase the excise tax on cigarettes sold in the state by 25¢ per pack. Because increasing the price of cigarettes decreases smoking—especially among adolescents (1)—sponsors of the proposition sought both to decrease smoking and generate revenues for potential use in smoking prevention and health promotion efforts.

This tax increase on cigarettes was approved by a majority (58%) of the California voters and became effective January 1, 1989. The \$650 million in expected revenue per year will be allocated, subject to concurrence by the California legislature, for the following: health education and stop-smoking campaigns especially directed at children, research into tobacco-related diseases, reimbursing hospitals and physicians for uncompensated care (including tobacco-related illnesses), and other areas of research and prevention. An intervention against tobacco use of this magnitude is unique and represents an important opportunity to demonstrate the impact of such a commitment of resources to the antismoking campaign.

CDC is collaborating with state health departments to establish surveillance systems for chronic diseases. Goals of these systems are to estimate the occurrence of these diseases, the prevalences of associated risk factors in the population, and related medical and economic costs. By using surveillance information to guide prevention efforts, public health departments can assist residents of their states in promoting health and preventing chronic disease morbidity and mortality.

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## **Hospitalization Rates for Ischemic Heart Disease – United States, 1970–1986**

Ischemic heart disease (IHD) is the leading cause of death in the United States. Of all chronic diseases, it contributes the most to the health-care burden, including hospitalizations (1). This report describes national trends in hospitalization rates by sex from 1970 through 1986 for IHD and its component diagnoses.

## Ischemic Heart Disease — Continued

The annual number of hospitalizations was determined from the first-listed diagnosis in the National Hospital Discharge Survey (NHDS) (2) of CDC's National Center for Health Statistics (NCHS).\* NCHS obtains these data from a multistage, stratified cluster sample of nonfederal short-stay hospitals in the 50 states and the District of Columbia. The NHDS collects approximately 200,000 records per year. Each year, 8800–11,600 patients in the sample were hospitalized with a first-listed diagnosis of IHD. Population estimates were determined from data provided by the Bureau of the Census (5) and Demo-Detail† (6).

The general category of IHD includes all hospitalized persons with a first-listed diagnosis of 410 through 414 under both ICDA-8 and ICD-9-CM (3,4). This grouping

\*Diagnoses for 1970–1978 are based on the *International Classification of Diseases (ICD), Eighth Revision, Adapted (ICDA-8)* (3); those for 1979–1986, on the *ICD, Ninth Revision, Clinical Modification (ICD-9-CM)* (4).

†This file contains midyear estimates of the population by race, sex, and age for 1980–1986. Use of trade names is for identification only and does not imply endorsement by the Public Health Service or the U.S. Department of Health and Human Services.

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**TABLE I. Summary — cases of specified notifiable diseases, United States**

| Disease                                          | 16th Week Ending |                |                  | Cumulative, 16th Week Ending |                |                  |
|--------------------------------------------------|------------------|----------------|------------------|------------------------------|----------------|------------------|
|                                                  | April 22, 1989   | April 23, 1988 | Median 1984-1988 | April 22, 1989               | April 23, 1988 | Median 1984-1988 |
| Acquired Immunodeficiency Syndrome (AIDS)        | 1,223            | U*             | 279              | 10,594                       | 9,640          | 3,870            |
| Aseptic meningitis                               | 67               | 82             | 78               | 1,184                        | 1,247          | 1,247            |
| Encephalitis: Primary (arthropod-borne & unspec) | 12               | 12             | 12               | 185                          | 210            | 255              |
| Post-infectious                                  | 2                | 1              | 2                | 23                           | 27             | 29               |
| Gonorrhea: Civilian                              | 11,959           | 12,371         | 15,632           | 197,388                      | 204,927        | 249,112          |
| Military                                         | 164              | 235            | 342              | 3,373                        | 3,817          | 5,365            |
| Hepatitis: Type A                                | 601              | 370            | 423              | 10,182                       | 7,656          | 6,916            |
| Type B                                           | 360              | 479            | 493              | 6,205                        | 6,484          | 7,526            |
| Non A, Non B                                     | 50               | 41             | 73               | 699                          | 789            | 1,039            |
| Unspecified                                      | 33               | 52             | 92               | 753                          | 659            | 1,434            |
| Legionellosis                                    | 18               | 14             | 11               | 262                          | 257            | 194              |
| Leprosy                                          | 1                | 4              | 4                | 42                           | 54             | 63               |
| Malaria                                          | 15               | 19             | 16               | 298                          | 214            | 210              |
| Measles: Total†                                  | 253              | 46             | 113              | 2,856                        | 718            | 882              |
| Indigenous                                       | 241              | 43             | 79               | 2,673                        | 620            | 776              |
| Imported                                         | 12               | 7              | 12               | 183                          | 98             | 106              |
| Meningococcal infections                         | 73               | 77             | 68               | 1,082                        | 1,160          | 1,115            |
| Mumps                                            | 162              | 106            | 93               | 1,721                        | 1,713          | 1,291            |
| Pertussis                                        | 25               | 15             | 33               | 515                          | 704            | 651              |
| Rubella (German measles)                         | 4                | 3              | 7                | 85                           | 65             | 122              |
| Syphilis (Primary & Secondary): Civilian         | 659              | 728            | 552              | 12,233                       | 11,333         | 8,704            |
| Military                                         | -                | -              | 3                | 91                           | 63             | 63               |
| Toxic Shock syndrome                             | 6                | 3              | 3                | 101                          | 100            | 110              |
| Tuberculosis                                     | 414              | 376            | 430              | 5,641                        | 5,596          | 5,852            |
| Tularemia                                        | 1                | 2              | 1                | 14                           | 28             | 26               |
| Typhoid Fever                                    | 8                | 5              | 5                | 117                          | 105            | 87               |
| Typhus fever, tick-borne (RMSF)                  | 2                | 2              | 4                | 26                           | 21             | 22               |
| Rabies, animal                                   | 115              | 91             | 115              | 1,288                        | 1,160          | 1,466            |

**TABLE II. Notifiable diseases of low frequency, United States**

|                                        | Cum. 1989 |                          | Cum. 1989 |
|----------------------------------------|-----------|--------------------------|-----------|
| Anthrax                                | -         | Leptospirosis (Hawaii 1) | 36        |
| Botulism: Foodborne                    | 6         | Plague                   | -         |
| Infant                                 | 3         | Poliomyelitis, Paralytic | -         |
| Other                                  | 3         | Psittacosis (Ga. 1)      | 31        |
| Brucellosis (Mich. 2, Okla. 1, Nev. 1) | 11        | Rabies, human            | -         |
| Cholera                                | -         | Tetanus (Ga. 1)          | 14        |
| Congenital rubella syndrome            | 1         | Trichinosis (Hawaii 1)   | 9         |
| Congenital syphilis, ages <1 year      | -         |                          |           |
| Diphtheria                             | -         |                          |           |

\*Because AIDS cases are not received weekly from all reporting areas, comparison of weekly figures may be misleading.

†Twelve of the 253 reported cases for this week were imported from a foreign country or can be directly traceable to a known internationally imported case within two generations.

TABLE III. Cases of specified notifiable diseases, United States, weeks ending April 22, 1989 and April 23, 1988 (16th Week)

| Reporting Area | AIDS   | Aseptic<br>Mening-<br>itis | Encephalitis |                      | Gonorrhea<br>(Civilian) |              | Hepatitis (Viral), by type |              |              |                  | Legionel-<br>losis | Leprosy |              |              |
|----------------|--------|----------------------------|--------------|----------------------|-------------------------|--------------|----------------------------|--------------|--------------|------------------|--------------------|---------|--------------|--------------|
|                |        |                            | Primary      | Post-in-<br>fectious | Cum.                    |              | A                          | B            | NA,NB        | Unspeci-<br>fied |                    |         | Cum.<br>1989 | Cum.<br>1989 |
|                |        |                            |              |                      | Cum.<br>1989            | Cum.<br>1989 | Cum.<br>1989               | Cum.<br>1989 | Cum.<br>1989 | Cum.<br>1989     |                    |         |              |              |
| UNITED STATES  | 10,594 | 1,184                      | 185          | 23                   | 197,388                 | 204,927      | 10,182                     | 6,205        | 699          | 753              | 262                | 42      |              |              |
| NEW ENGLAND    | 469    | 49                         | 4            | 1                    | 5,565                   | 6,182        | 213                        | 344          | 31           | 30               | 20                 | 3       |              |              |
| Maine          | 24     | 2                          | 1            | -                    | 86                      | 147          | 4                          | 15           | 3            | 1                | 3                  | -       |              |              |
| N.H.           | 10     | 1                          | -            | -                    | 58                      | 100          | 27                         | 21           | 6            | 3                | -                  | -       |              |              |
| Vt.            | 4      | -                          | -            | -                    | 24                      | 49           | 9                          | 24           | 3            | -                | -                  | -       |              |              |
| Mass.          | 262    | 21                         | 1            | 1                    | 2,108                   | 2,189        | 77                         | 203          | 12           | 20               | 12                 | 3       |              |              |
| R.I.           | 22     | 17                         | -            | -                    | 474                     | 550          | 5                          | 30           | 2            | 2                | 5                  | -       |              |              |
| Conn.          | 147    | 8                          | 2            | -                    | 2,815                   | 3,147        | 91                         | 51           | 5            | 4                | -                  | -       |              |              |
| MID. ATLANTIC  | 3,275  | 177                        | 35           | 2                    | 28,499                  | 32,490       | 1,437                      | 991          | 70           | 87               | 72                 | 3       |              |              |
| Upstate N.Y.   | 439    | 72                         | 9            | 1                    | 5,038                   | 3,939        | 347                        | 234          | 25           | 3                | 23                 | 1       |              |              |
| N.Y. City      | 1,684  | 25                         | 2            | 1                    | 12,137                  | 15,000       | 111                        | 302          | 13           | 69               | 8                  | -       |              |              |
| N.J.           | 764    | -                          | 24           | -                    | 4,385                   | 4,481        | 146                        | 181          | 11           | 5                | 8                  | 1       |              |              |
| Pa.            | 388    | 80                         | -            | -                    | 6,939                   | 9,070        | 833                        | 274          | 21           | 10               | 33                 | 1       |              |              |
| E.N. CENTRAL   | 820    | 162                        | 59           | -                    | 34,634                  | 32,612       | 568                        | 711          | 69           | 26               | 70                 | 1       |              |              |
| Ohio           | 143    | 48                         | 15           | -                    | 9,238                   | 7,586        | 123                        | 179          | 11           | 3                | 42                 | -       |              |              |
| Ind.           | 169    | 47                         | 19           | -                    | 2,265                   | 2,514        | 35                         | 122          | 9            | 8                | 13                 | 1       |              |              |
| Ill.           | 326    | 4                          | 2            | -                    | 10,723                  | 9,233        | 253                        | 94           | 13           | 8                | -                  | -       |              |              |
| Mich.          | 151    | 53                         | 18           | -                    | 9,974                   | 10,515       | 110                        | 224          | 24           | 7                | 11                 | -       |              |              |
| Wis.           | 31     | 10                         | 5            | -                    | 2,434                   | 2,764        | 47                         | 92           | 12           | -                | 4                  | -       |              |              |
| W.N. CENTRAL   | 213    | 46                         | 5            | 2                    | 8,798                   | 8,062        | 311                        | 233          | 21           | 3                | 6                  | 1       |              |              |
| Minn.          | 56     | 5                          | -            | 1                    | 894                     | 1,116        | 29                         | 39           | 3            | 2                | 2                  | -       |              |              |
| Iowa           | 24     | 8                          | 2            | -                    | 666                     | 592          | 26                         | 14           | 4            | -                | 2                  | -       |              |              |
| Mo.            | 108    | 15                         | -            | -                    | 5,333                   | 4,571        | 178                        | 154          | 9            | 1                | -                  | -       |              |              |
| N. Dak.        | 3      | 3                          | 1            | -                    | 39                      | 61           | 3                          | 8            | 2            | -                | -                  | -       |              |              |
| S. Dak.        | 3      | 3                          | 1            | -                    | 84                      | 173          | 2                          | 3            | 3            | -                | -                  | -       |              |              |
| Nebr.          | 8      | 3                          | 1            | -                    | 502                     | 471          | 46                         | 10           | -            | -                | 2                  | 1       |              |              |
| Kans.          | 11     | 9                          | -            | 1                    | 1,280                   | 1,078        | 27                         | 5            | -            | -                | -                  | -       |              |              |
| S. ATLANTIC    | 2,153  | 266                        | 24           | 4                    | 55,838                  | 56,842       | 804                        | 1,285        | 100          | 110              | 33                 | -       |              |              |
| Del.           | 34     | 8                          | 1            | -                    | 932                     | 834          | 18                         | 47           | -            | 1                | 3                  | -       |              |              |
| Md.            | 239    | 29                         | 4            | -                    | 6,464                   | 6,007        | 186                        | 230          | 12           | 13               | 10                 | -       |              |              |
| D.C.           | 157    | 5                          | -            | -                    | 3,527                   | 3,792        | 2                          | 6            | 1            | -                | -                  | -       |              |              |
| Va.            | 204    | 57                         | 12           | -                    | 4,684                   | 4,065        | 60                         | 92           | 17           | 57               | 1                  | -       |              |              |
| W. Va.         | 13     | 2                          | 3            | -                    | 431                     | 506          | 8                          | 25           | 2            | 1                | -                  | -       |              |              |
| N.C.           | 156    | 34                         | -            | 1                    | 8,068                   | 8,628        | 155                        | 341          | 36           | -                | 8                  | -       |              |              |
| S.C.           | 85     | 8                          | -            | -                    | 5,048                   | 4,157        | 13                         | 151          | 3            | 5                | 2                  | -       |              |              |
| Ga.            | 298    | 21                         | 1            | -                    | 10,885                  | 11,067       | 119                        | 130          | 7            | 4                | 3                  | -       |              |              |
| Fla.           | 967    | 102                        | 3            | 3                    | 15,799                  | 17,786       | 243                        | 263          | 22           | 29               | 6                  | -       |              |              |
| E.S. CENTRAL   | 970    | 121                        | 12           | 1                    | 16,812                  | 15,705       | 95                         | 433          | 54           | 1                | 6                  | -       |              |              |
| Ky.            | 42     | 32                         | 3            | 1                    | 1,534                   | 1,266        | 44                         | 121          | 19           | -                | 1                  | -       |              |              |
| Tenn.          | 94     | 15                         | -            | -                    | 5,532                   | 5,209        | 21                         | 232          | 14           | -                | 3                  | -       |              |              |
| Ala.           | 69     | 59                         | 9            | -                    | 5,469                   | 5,434        | 23                         | 74           | 20           | 1                | 2                  | -       |              |              |
| Miss.          | 65     | 15                         | -            | -                    | 4,277                   | 3,796        | 7                          | 6            | 1            | -                | -                  | -       |              |              |
| W.S. CENTRAL   | 981    | 75                         | 18           | 1                    | 21,204                  | 23,319       | 1,163                      | 556          | 45           | 180              | 16                 | 9       |              |              |
| Ark.           | 24     | 3                          | -            | -                    | 1,966                   | 2,099        | 68                         | 24           | 2            | 2                | 1                  | -       |              |              |
| La.            | 145    | 8                          | 1            | -                    | 4,452                   | 5,072        | 82                         | 93           | 5            | 1                | 4                  | -       |              |              |
| Okla.          | 50     | 13                         | 6            | -                    | 1,955                   | 2,063        | 137                        | 59           | 8            | 8                | 8                  | -       |              |              |
| Tex.           | 762    | 51                         | 11           | 1                    | 12,831                  | 14,085       | 876                        | 380          | 30           | 169              | 3                  | 9       |              |              |
| MOUNTAIN       | 295    | 42                         | 6            | 1                    | 3,991                   | 4,215        | 1,538                      | 388          | 78           | 65               | 15                 | 1       |              |              |
| Mont.          | 1      | -                          | -            | -                    | 59                      | 126          | 13                         | 14           | 1            | -                | 2                  | 1       |              |              |
| Idaho          | 8      | -                          | -            | -                    | 70                      | 119          | 64                         | 27           | 5            | 2                | -                  | -       |              |              |
| Wyo.           | 6      | -                          | -            | -                    | 40                      | 72           | 7                          | 1            | -            | -                | -                  | -       |              |              |
| Colo.          | 111    | 13                         | 1            | 1                    | 843                     | 1,001        | 228                        | 68           | 27           | 33               | 2                  | -       |              |              |
| N. Mex.        | 23     | 4                          | -            | -                    | 426                     | 415          | 184                        | 65           | 17           | 1                | -                  | -       |              |              |
| Ariz.          | 61     | 20                         | 2            | -                    | 1,477                   | 1,404        | 815                        | 134          | 14           | 25               | 7                  | -       |              |              |
| Utah           | 16     | 4                          | 1            | -                    | 148                     | 208          | 97                         | 27           | 9            | 3                | 3                  | -       |              |              |
| Nev.           | 69     | 1                          | 2            | -                    | 928                     | 870          | 130                        | 52           | 5            | 1                | 1                  | -       |              |              |
| PACIFIC        | 2,118  | 246                        | 22           | 11                   | 22,047                  | 25,500       | 4,053                      | 1,264        | 231          | 251              | 24                 | 24      |              |              |
| Wash.          | 197    | -                          | -            | -                    | 1,908                   | 2,136        | 850                        | 220          | 60           | 11               | 2                  | 1       |              |              |
| Oreg.          | 71     | -                          | -            | -                    | 867                     | 918          | 690                        | 124          | 29           | 6                | 1                  | -       |              |              |
| Calif.         | 1,821  | 229                        | 19           | 11                   | 18,839                  | 21,860       | 2,136                      | 902          | 137          | 230              | 19                 | 19      |              |              |
| Alaska         | 4      | -                          | 2            | -                    | 288                     | 345          | 336                        | 16           | 5            | 2                | 1                  | -       |              |              |
| Hawaii         | 25     | 17                         | 1            | -                    | 145                     | 241          | 41                         | 2            | -            | 2                | 1                  | 4       |              |              |
| Guam           | -      | -                          | -            | -                    | -                       | 45           | -                          | -            | -            | -                | -                  | -       |              |              |
| P.R.           | 494    | 33                         | 1            | -                    | 268                     | 475          | 30                         | 71           | 5            | 7                | -                  | 4       |              |              |
| V.I.           | 15     | -                          | -            | -                    | 177                     | 116          | -                          | 4            | -            | -                | -                  | -       |              |              |
| Amer. Samoa    | -      | -                          | -            | -                    | -                       | 19           | -                          | -            | -            | -                | -                  | -       |              |              |
| C.N.M.I.       | -      | -                          | -            | -                    | -                       | 16           | -                          | -            | -            | -                | -                  | -       |              |              |

N: Not notifiable

U: Unavailable

C.N.M.I.: Commonwealth of the Northern Mariana Islands

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending April 22, 1989 and April 23, 1988 (16th Week)

| Reporting Area | Malaria | Measles (Rubeola) |           |                |           |           | Meningococcal Infections | Mumps |           | Pertussis |           |           | Rubella |           |           |
|----------------|---------|-------------------|-----------|----------------|-----------|-----------|--------------------------|-------|-----------|-----------|-----------|-----------|---------|-----------|-----------|
|                |         | Indigenous        |           | Imported*      |           | Total     |                          | 1989  | Cum. 1989 | 1989      | Cum. 1989 | Cum. 1988 | 1989    | Cum. 1989 | Cum. 1988 |
|                |         | 1989              | Cum. 1989 | 1989           | Cum. 1989 | Cum. 1988 |                          |       |           |           |           |           |         |           |           |
| UNITED STATES  | 298     | 241               | 2,673     | 12             | 183       | 718       | 1,082                    | 162   | 1,721     | 25        | 515       | 704       | 4       | 85        | 65        |
| NEW ENGLAND    | 17      | -                 | 22        | -              | 5         | 45        | 83                       | 1     | 13        | -         | 15        | 76        | -       | -         | -         |
| Maine          | -       | -                 | -         | -              | -         | -         | 11                       | -     | -         | -         | 4         | 11        | -       | -         | -         |
| N.H.           | 1       | -                 | 1         | -              | -         | 43        | 10                       | 1     | 10        | -         | 5         | 21        | -       | -         | -         |
| Vt.            | -       | -                 | 1         | -              | -         | -         | 5                        | -     | -         | -         | 2         | 1         | -       | -         | -         |
| Mass.          | 11      | -                 | -         | -              | 3         | 1         | 37                       | -     | 2         | -         | -         | 33        | -       | -         | -         |
| R.I.           | 3       | -                 | 18        | -              | 2         | -         | 1                        | -     | -         | -         | 2         | 1         | -       | -         | -         |
| Conn.          | 2       | -                 | 2         | -              | -         | 1         | 19                       | -     | 1         | -         | 2         | 9         | -       | -         | -         |
| MID. ATLANTIC  | 46      | 16                | 108       | 5              | 86        | 188       | 149                      | 6     | 59        | 3         | 40        | 21        | -       | 2         | 5         |
| Upstate N.Y.   | 8       | 3                 | 8         | 4 <sup>1</sup> | 72        | 2         | 41                       | 3     | 20        | 3         | 21        | 8         | -       | 1         | 1         |
| N.Y. City      | 15      | 1                 | 21        | -              | 13        | 18        | 20                       | 2     | 5         | -         | 1         | 1         | -       | 1         | 2         |
| N.J.           | 9       | -                 | 58        | -              | -         | -         | 33                       | -     | 11        | -         | 14        | 2         | -       | -         | 1         |
| Pa.            | 14      | 12                | 21        | 1 <sup>5</sup> | 1         | 168       | 55                       | 1     | 23        | -         | 4         | 10        | -       | -         | 1         |
| E.N. CENTRAL   | 15      | 129               | 446       | -              | 38        | 49        | 114                      | 10    | 154       | 1         | 27        | 81        | -       | 7         | 20        |
| Ohio           | 6       | 104               | 287       | -              | 35        | 3         | 59                       | -     | 8         | -         | 1         | 16        | -       | 2         | -         |
| Ind.           | 2       | -                 | -         | -              | -         | -         | 15                       | 3     | 18        | 1         | 11        | 38        | -       | -         | -         |
| Ill.           | 4       | 25                | 159       | -              | -         | 33        | 13                       | 4     | 56        | -         | -         | 3         | -       | 4         | 16        |
| Mich.          | 1       | -                 | -         | -              | 1         | 13        | 20                       | 3     | 59        | -         | 8         | 13        | -       | -         | 4         |
| Wis.           | 2       | -                 | -         | -              | 2         | -         | 7                        | -     | 13        | -         | 7         | 11        | -       | 1         | -         |
| W.N. CENTRAL   | 7       | 14                | 167       | -              | 1         | -         | 28                       | 13    | 245       | 1         | 15        | 34        | -       | 1         | -         |
| Minn.          | 5       | -                 | -         | -              | -         | -         | 6                        | -     | -         | -         | -         | 5         | -       | -         | -         |
| Iowa           | -       | -                 | -         | -              | -         | -         | -                        | -     | 10        | -         | 6         | 14        | -       | -         | -         |
| Mo.            | 1       | -                 | 132       | -              | -         | -         | 7                        | 2     | 35        | 1         | 7         | 5         | -       | 1         | -         |
| N. Dak.        | 1       | -                 | -         | -              | -         | -         | -                        | -     | -         | -         | -         | 6         | -       | -         | -         |
| S. Dak.        | -       | -                 | -         | -              | -         | -         | 4                        | -     | -         | -         | 1         | 2         | -       | -         | -         |
| Nebr.          | -       | -                 | -         | -              | -         | -         | 9                        | -     | 2         | -         | -         | -         | -       | -         | -         |
| Kans.          | -       | 14                | 35        | -              | 1         | -         | 2                        | 11    | 198       | -         | 1         | 2         | -       | -         | -         |
| S. ATLANTIC    | 57      | 28                | 164       | 2              | 12        | 155       | 177                      | 24    | 274       | 7         | 51        | 64        | -       | 2         | 1         |
| Del.           | 1       | -                 | -         | -              | -         | -         | 1                        | -     | -         | -         | -         | 3         | -       | -         | -         |
| Md.            | 13      | -                 | 5         | 1 <sup>5</sup> | 6         | 3         | 29                       | 10    | 151       | 1         | 5         | 12        | -       | 1         | -         |
| D.C.           | 3       | -                 | -         | -              | 2         | -         | 8                        | 3     | 48        | -         | -         | -         | -       | -         | -         |
| Va.            | 8       | -                 | -         | 1 <sup>5</sup> | 1         | 54        | 21                       | 10    | 43        | -         | 3         | 9         | -       | -         | -         |
| W. Va.         | 1       | -                 | -         | -              | -         | 6         | 8                        | -     | 7         | 1         | 9         | -         | -       | -         | -         |
| N.C.           | 9       | 25                | 143       | -              | -         | 1         | 25                       | -     | 7         | -         | 13        | 22        | -       | -         | -         |
| S.C.           | 1       | -                 | -         | -              | -         | -         | 13                       | -     | 7         | -         | -         | -         | -       | -         | -         |
| Ga.            | 3       | -                 | -         | -              | -         | -         | 29                       | -     | 1         | -         | 4         | 13        | -       | -         | -         |
| Fla.           | 18      | 3                 | 16        | -              | 3         | 91        | 43                       | 1     | 10        | 5         | 17        | 5         | -       | 1         | 1         |
| E.S. CENTRAL   | 3       | 1                 | 4         | -              | -         | 7         | 31                       | 3     | 68        | 3         | 26        | 11        | -       | 1         | -         |
| Ky.            | -       | 1                 | 2         | -              | -         | -         | 19                       | -     | 9         | 1         | 1         | -         | -       | -         | -         |
| Tenn.          | -       | -                 | 1         | -              | -         | -         | 2                        | 2     | 21        | -         | 8         | 7         | -       | 1         | -         |
| Ala.           | 2       | -                 | 1         | -              | -         | -         | 8                        | -     | 5         | 2         | 17        | 2         | -       | -         | -         |
| Miss.          | 1       | -                 | -         | -              | -         | 7         | 2                        | N     | N         | -         | -         | 2         | -       | -         | -         |
| W.S. CENTRAL   | 15      | 50                | 1,447     | 2              | 21        | 9         | 83                       | 92    | 679       | 2         | 20        | 29        | 2       | 11        | 3         |
| Ark.           | -       | -                 | -         | -              | -         | -         | 3                        | 3     | 67        | 2         | 8         | 5         | -       | -         | 2         |
| La.            | 1       | 2                 | 6         | -              | -         | -         | 19                       | 37    | 224       | -         | 4         | 2         | 2       | 5         | -         |
| Okla.          | 1       | -                 | 23        | -              | -         | 8         | 7                        | 14    | 140       | -         | 8         | 22        | -       | 1         | 1         |
| Tex.           | 13      | 48                | 1,418     | 2 <sup>1</sup> | 21        | 1         | 54                       | 38    | 248       | -         | -         | -         | -       | 5         | -         |
| MOUNTAIN       | 12      | 3                 | 16        | 3              | 13        | 109       | 33                       | 4     | 70        | 3         | 244       | 266       | -       | 2         | 2         |
| Mont.          | -       | -                 | 12        | -              | 1         | -         | 1                        | -     | 2         | -         | -         | 1         | -       | 1         | -         |
| Idaho          | 2       | -                 | -         | -              | 1         | -         | -                        | -     | 6         | 1         | 27        | 216       | -       | -         | -         |
| Wyo.           | 1       | -                 | -         | -              | -         | -         | -                        | -     | -         | -         | -         | 1         | -       | -         | -         |
| Colo.          | 1       | 3                 | 3         | -              | 1         | 109       | 12                       | -     | 5         | -         | 17        | 6         | -       | -         | 1         |
| N. Mex.        | 1       | -                 | -         | 3 <sup>5</sup> | 10        | -         | 1                        | N     | N         | -         | 4         | 2         | -       | -         | -         |
| Ariz.          | 4       | -                 | 1         | -              | -         | -         | 17                       | 4     | 50        | 2         | 190       | 18        | -       | -         | -         |
| Utah           | -       | -                 | -         | -              | -         | -         | 2                        | -     | 3         | -         | 5         | 21        | -       | -         | -         |
| Nev.           | 3       | -                 | -         | -              | -         | -         | -                        | -     | 4         | -         | 1         | 1         | -       | 1         | 1         |
| PACIFIC        | 126     | -                 | 299       | -              | 7         | 156       | 384                      | 9     | 159       | 5         | 77        | 122       | 2       | 59        | 34        |
| Wash.          | 5       | -                 | -         | -              | 1         | -         | 35                       | 2     | 13        | 1         | 16        | 26        | -       | -         | -         |
| Oreg.          | 7       | -                 | -         | -              | -         | 1         | 31                       | N     | N         | 2         | 4         | 1         | -       | -         | -         |
| Calif.         | 112     | -                 | 298       | -              | 3         | 153       | 315                      | 7     | 140       | 2         | 55        | 72        | 2       | 45        | 30        |
| Alaska         | 2       | -                 | -         | -              | -         | -         | 2                        | -     | -         | -         | -         | 3         | -       | -         | -         |
| Hawaii         | -       | -                 | 1         | -              | 3         | 2         | 1                        | -     | 6         | -         | 2         | 20        | -       | 14        | 4         |
| Guam           | -       | U                 | -         | U              | -         | 1         | -                        | U     | -         | U         | -         | -         | U       | -         | 1         |
| P.R.           | -       | U                 | 218       | U              | -         | 109       | 2                        | U     | 1         | U         | 2         | 5         | U       | 3         | -         |
| V.I.           | -       | -                 | -         | -              | -         | -         | -                        | -     | 5         | -         | -         | -         | -       | -         | -         |
| Amer. Samoa    | -       | U                 | -         | U              | -         | -         | -                        | U     | -         | U         | -         | -         | U       | -         | -         |
| C.N.M.I.       | -       | U                 | -         | U              | -         | -         | -                        | U     | -         | U         | -         | -         | U       | -         | -         |

\*For measles only, imported cases includes both out-of-state and international importations.

N: Not notifiable U: Unavailable <sup>1</sup>International <sup>2</sup>Out-of-state

**TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending April 22, 1989 and April 23, 1988 (16th Week)**

| Reporting Area | Syphilis (Civilian)<br>(Primary & Secondary) |              | Toxic-<br>shock<br>Syndrome | Tuberculosis |              | Tula-<br>remia | Typhoid<br>Fever | Typhus Fever<br>(Tick-borne)<br>(RMSF) | Rabies,<br>Animal |
|----------------|----------------------------------------------|--------------|-----------------------------|--------------|--------------|----------------|------------------|----------------------------------------|-------------------|
|                | Cum.<br>1989                                 | Cum.<br>1988 | Cum.<br>1989                | Cum.<br>1989 | Cum.<br>1988 | Cum.<br>1989   | Cum.<br>1989     | Cum.<br>1989                           | Cum.<br>1989      |
| UNITED STATES  | 12,233                                       | 11,333       | 101                         | 5,641        | 5,596        | 14             | 117              | 26                                     | 1,288             |
| NEW ENGLAND    | 478                                          | 315          | 2                           | 124          | 109          | -              | 10               | -                                      | 1                 |
| Maine          | 3                                            | 5            | 2                           | 3            | 3            | -              | -                | -                                      | -                 |
| N.H.           | 1                                            | 3            | -                           | 4            | -            | -              | -                | -                                      | -                 |
| Vt.            | -                                            | -            | -                           | 1            | -            | -              | -                | -                                      | -                 |
| Mass.          | 150                                          | 130          | -                           | 64           | 71           | -              | 5                | -                                      | -                 |
| R.I.           | 11                                           | 11           | -                           | 18           | 9            | -              | 4                | -                                      | -                 |
| Conn.          | 313                                          | 166          | -                           | 34           | 26           | -              | 1                | -                                      | 1                 |
| MID. ATLANTIC  | 2,554                                        | 2,272        | 18                          | 1,183        | 1,059        | 1              | 32               | 4                                      | 172               |
| Upstate N.Y.   | 240                                          | 146          | 2                           | 81           | 175          | -              | 3                | 2                                      | 2                 |
| N.Y. City      | 1,292                                        | 1,514        | 2                           | 709          | 497          | -              | 21               | -                                      | -                 |
| N.J.           | 409                                          | 252          | 5                           | 181          | 184          | -              | 6                | -                                      | -                 |
| Pa.            | 613                                          | 360          | 9                           | 212          | 203          | 1              | 2                | 2                                      | 170               |
| E.N. CENTRAL   | 461                                          | 353          | 16                          | 652          | 666          | 1              | 13               | 2                                      | 22                |
| Ohio           | 30                                           | 34           | 7                           | 111          | 120          | -              | 2                | 1                                      | -                 |
| Ind.           | 17                                           | 18           | 4                           | 52           | 74           | -              | 1                | 1                                      | 2                 |
| Ill.           | 212                                          | 192          | -                           | 290          | 270          | -              | 6                | -                                      | 3                 |
| Mich.          | 183                                          | 98           | 5                           | 170          | 164          | -              | 3                | -                                      | 3                 |
| Wis.           | 19                                           | 11           | -                           | 29           | 38           | 1              | 1                | -                                      | 14                |
| W.N. CENTRAL   | 101                                          | 67           | 20                          | 167          | 159          | 3              | 4                | 1                                      | 137               |
| Minn.          | 7                                            | 6            | 5                           | 39           | 29           | -              | 1                | -                                      | 40                |
| Iowa           | 13                                           | 8            | 3                           | 27           | 13           | -              | 2                | 1                                      | 13                |
| Mo.            | 45                                           | 39           | 3                           | 60           | 76           | 3              | 1                | -                                      | 15                |
| N. Dak.        | 1                                            | 1            | -                           | 6            | 4            | -              | -                | -                                      | 10                |
| S. Dak.        | -                                            | -            | 3                           | 9            | 15           | -              | -                | -                                      | 32                |
| Nebr.          | 15                                           | 7            | 5                           | 6            | 4            | -              | -                | -                                      | 11                |
| Kans.          | 20                                           | 6            | 1                           | 20           | 18           | -              | -                | -                                      | 16                |
| S. ATLANTIC    | 4,478                                        | 4,023        | 10                          | 1,208        | 1,282        | 1              | 8                | 13                                     | 418               |
| Del.           | 52                                           | 49           | -                           | 7            | 15           | -              | 1                | -                                      | 10                |
| Md.            | 237                                          | 214          | -                           | 91           | 121          | -              | 1                | 1                                      | 99                |
| D.C.           | 274                                          | 181          | -                           | 53           | 60           | -              | 2                | -                                      | 2                 |
| Va.            | 170                                          | 135          | 1                           | 118          | 135          | 1              | 1                | -                                      | 87                |
| W. Va.         | 4                                            | 1            | -                           | 29           | 31           | -              | -                | -                                      | 24                |
| N.C.           | 275                                          | 243          | 4                           | 115          | 98           | -              | 2                | 11                                     | -                 |
| S.C.           | 224                                          | 199          | 2                           | 123          | 126          | -              | -                | 1                                      | 72                |
| Ga.            | 964                                          | 657          | 2                           | 177          | 201          | -              | -                | -                                      | 69                |
| Fla.           | 2,278                                        | 2,344        | 1                           | 495          | 495          | -              | 1                | -                                      | 55                |
| E.S. CENTRAL   | 773                                          | 581          | 1                           | 470          | 444          | 1              | 1                | 3                                      | 124               |
| Ky.            | 18                                           | 20           | -                           | 130          | 126          | 1              | 1                | 3                                      | 61                |
| Tenn.          | 279                                          | 198          | -                           | 96           | 100          | -              | -                | -                                      | 32                |
| Ala.           | 289                                          | 194          | 1                           | 156          | 143          | -              | -                | -                                      | 31                |
| Miss.          | 187                                          | 169          | -                           | 88           | 75           | -              | -                | -                                      | -                 |
| W.S. CENTRAL   | 1,576                                        | 1,223        | 6                           | 621          | 675          | 4              | 6                | 1                                      | 227               |
| Ark.           | 103                                          | 58           | -                           | 80           | 66           | 2              | -                | -                                      | 32                |
| La.            | 354                                          | 231          | -                           | 61           | 105          | -              | 1                | -                                      | -                 |
| Okla.          | 25                                           | 49           | 4                           | 57           | 66           | 2              | -                | 1                                      | 31                |
| Tex.           | 1,094                                        | 885          | 2                           | 423          | 438          | -              | 5                | -                                      | 164               |
| MOUNTAIN       | 217                                          | 199          | 8                           | 139          | 129          | 1              | 1                | 1                                      | 50                |
| Mont.          | -                                            | 2            | -                           | 4            | -            | -              | -                | -                                      | 27                |
| Idaho          | -                                            | -            | 1                           | 4            | -            | -              | -                | -                                      | -                 |
| Wyo.           | 1                                            | -            | -                           | -            | 1            | -              | -                | -                                      | 11                |
| Colo.          | 40                                           | 30           | -                           | 2            | 20           | 1              | -                | 1                                      | -                 |
| N. Mex.        | 7                                            | 17           | 1                           | 27           | 33           | -              | -                | -                                      | 9                 |
| Ariz.          | 63                                           | 56           | 5                           | 66           | 58           | -              | 1                | -                                      | 2                 |
| Utah           | 8                                            | 7            | -                           | 17           | -            | -              | -                | -                                      | -                 |
| Nev.           | 98                                           | 87           | 1                           | 19           | 17           | -              | -                | -                                      | 1                 |
| PACIFIC        | 1,595                                        | 2,300        | 20                          | 1,077        | 1,073        | 2              | 42               | 1                                      | 137               |
| Wash.          | 91                                           | 73           | 1                           | 62           | 64           | -              | -                | -                                      | -                 |
| Oreg.          | 95                                           | 90           | -                           | 39           | 40           | -              | -                | 1                                      | -                 |
| Calif.         | 1,401                                        | 2,122        | 18                          | 910          | 908          | 2              | 40               | -                                      | 84                |
| Alaska         | 3                                            | 4            | -                           | 14           | 10           | -              | -                | -                                      | 53                |
| Hawaii         | 5                                            | 11           | 1                           | 52           | 51           | -              | 2                | -                                      | -                 |
| Guam           | -                                            | -            | -                           | -            | 7            | -              | -                | -                                      | -                 |
| P.R.           | 147                                          | 195          | -                           | 60           | 63           | -              | -                | -                                      | 13                |
| V.I.           | 1                                            | 1            | -                           | 3            | 3            | -              | -                | -                                      | -                 |
| Amer. Samoa    | -                                            | -            | -                           | -            | 3            | -              | -                | -                                      | -                 |
| C.N.M.I.       | -                                            | 1            | -                           | -            | 8            | -              | -                | -                                      | -                 |

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities,\* week ending  
April 22, 1989 (16th Week)

| Reporting Area      | All Causes, By Age (Years) |       |       |       |      |    | P&I** | Reporting Area        | All Causes, By Age (Years) |          |       |       |       |      | P&I** |
|---------------------|----------------------------|-------|-------|-------|------|----|-------|-----------------------|----------------------------|----------|-------|-------|-------|------|-------|
|                     | All Ages                   | ≥65   | 45-64 | 25-44 | 1-24 | <1 |       |                       | Total                      | All Ages | ≥65   | 45-64 | 25-44 | 1-24 |       |
| NEW ENGLAND         | 643                        | 449   | 118   | 47    | 14   | 15 | 71    | S. ATLANTIC           | 1,437                      | 823      | 306   | 190   | 51    | 67   | 63    |
| Boston, Mass.       | 182                        | 121   | 32    | 16    | 8    | 5  | 32    | Atlanta, Ga.          | 183                        | 105      | 40    | 21    | 9     | 8    | 2     |
| Bridgeport, Conn.   | 33                         | 21    | 8     | 3     | -    | 1  | 2     | Baltimore, Md.        | 329                        | 209      | 65    | 34    | 9     | 12   | 19    |
| Cambridge, Mass.    | 30                         | 25    | 4     | 1     | -    | -  | 5     | Charlotte, N.C.       | 85                         | 54       | 17    | 6     | 5     | 3    | 6     |
| Fall River, Mass.   | 33                         | 28    | 3     | 1     | -    | 1  | -     | Jacksonville, Fla.    | 117                        | 67       | 25    | 15    | 4     | 6    | 8     |
| Hartford, Conn.     | 65                         | 42    | 15    | 7     | -    | 1  | 7     | Miami, Fla.           | 115                        | 56       | 28    | 20    | 7     | 4    | -     |
| Lowell, Mass.       | 25                         | 15    | 6     | 4     | -    | -  | 3     | Norfolk, Va.          | 58                         | 35       | 15    | 5     | 1     | 2    | 3     |
| Lynn, Mass.         | 11                         | 8     | 3     | -     | -    | -  | -     | Richmond, Va.         | 89                         | 58       | 19    | 6     | 3     | 3    | 10    |
| New Bedford, Mass.  | 26                         | 20    | 6     | -     | -    | -  | 2     | Savannah, Ga.         | 39                         | 22       | 9     | 4     | 1     | 3    | 5     |
| New Haven, Conn.    | 40                         | 23    | 11    | 2     | 2    | 2  | 4     | St. Petersburg, Fla.  | 66                         | 45       | 12    | 6     | -     | 3    | 2     |
| Providence, R.I.    | 38                         | 25    | 7     | 3     | -    | 3  | 4     | Tampa, Fla.           | 77                         | 48       | 13    | 7     | 6     | 3    | 2     |
| Somerville, Mass.   | 7                          | 6     | 1     | -     | -    | -  | 1     | Washington, D.C.      | 257                        | 111      | 56    | 64    | 6     | 20   | 6     |
| Springfield, Mass.  | 55                         | 40    | 5     | 6     | 3    | 1  | 4     | Wilmington, Del.      | 22                         | 13       | 7     | 2     | -     | -    | -     |
| Waterbury, Conn.    | 34                         | 26    | 6     | 2     | -    | -  | 3     | E.S. CENTRAL          | 781                        | 512      | 177   | 52    | 23    | 17   | 48    |
| Worcester, Mass.    | 64                         | 49    | 11    | 2     | 1    | 1  | 4     | Birmingham, Ala.      | 123                        | 81       | 28    | 7     | 3     | 4    | 5     |
| MID. ATLANTIC       | 3,309                      | 2,130 | 661   | 338   | 81   | 98 | 220   | Chattanooga, Tenn.    | 63                         | 45       | 11    | 4     | -     | 3    | 8     |
| Albany, N.Y.        | 40                         | 29    | 6     | 3     | -    | 2  | -     | Knoxville, Tenn.      | 83                         | 58       | 14    | 6     | 1     | 4    | 3     |
| Allentown, Pa.      | 24                         | 14    | 9     | 1     | -    | -  | 2     | Louisville, Ky.       | 128                        | 78       | 36    | 8     | 3     | 3    | 6     |
| Buffalo, N.Y.       | 100                        | 70    | 20    | 6     | 1    | 3  | 6     | Memphis, Tenn.        | 154                        | 104      | 30    | 11    | 8     | 1    | 15    |
| Camden, N.J.        | 40                         | 23    | 10    | 2     | 1    | 4  | 3     | Mobile, Ala.          | 43                         | 25       | 14    | 1     | 2     | 1    | 2     |
| Elizabeth, N.J.     | 34                         | 25    | 5     | 2     | 2    | -  | 3     | Montgomery, Ala.      | 57                         | 43       | 9     | 3     | 2     | -    | 3     |
| Erie, Pa.†          | 48                         | 44    | 3     | -     | -    | 1  | 6     | Nashville, Tenn.      | 130                        | 78       | 35    | 12    | 4     | 1    | 6     |
| Jersey City, N.J.   | 65                         | 41    | 15    | 5     | 3    | 1  | 3     | W.S. CENTRAL          | 1,745                      | 1,093    | 368   | 176   | 56    | 50   | 78    |
| N.Y. City, N.Y.     | 1,455                      | 889   | 301   | 189   | 29   | 47 | 83    | Austin, Tex.          | 51                         | 34       | 9     | 5     | 2     | 1    | 2     |
| Newark, N.J.        | 107                        | 50    | 25    | 23    | 5    | 4  | 10    | Baton Rouge, La.      | 37                         | 22       | 8     | 5     | 1     | 1    | 2     |
| Paterson, N.J.      | 17                         | 10    | 6     | 1     | -    | -  | -     | Corpus Christi, Tex.  | 54                         | 37       | 9     | 6     | 2     | -    | 3     |
| Philadelphia, Pa.   | 917                        | 588   | 190   | 87    | 35   | 16 | 62    | Dallas, Tex.          | 164                        | 101      | 38    | 12    | 4     | 9    | 7     |
| Pittsburgh, Pa.†    | 67                         | 39    | 15    | 4     | 2    | 7  | 4     | El Paso, Tex.         | 58                         | 42       | 7     | 6     | 2     | 1    | 4     |
| Reading, Pa.        | 27                         | 20    | 4     | 1     | 1    | 1  | 4     | Fort Worth, Tex.      | 92                         | 59       | 20    | 2     | 4     | 7    | 8     |
| Rochester, N.Y.     | 138                        | 104   | 24    | 4     | 1    | 5  | 12    | Houston, Tex.‡        | 734                        | 436      | 169   | 89    | 24    | 16   | 18    |
| Schenectady, N.Y.   | 36                         | 31    | 3     | 1     | -    | 1  | 8     | Little Rock, Ark.     | 78                         | 48       | 19    | 3     | 4     | 3    | 10    |
| Scranton, Pa.†      | 27                         | 22    | 4     | 1     | -    | -  | 1     | New Orleans, La.      | 151                        | 89       | 33    | 20    | 6     | 3    | -     |
| Syracuse, N.Y.      | 78                         | 58    | 11    | 4     | 1    | 4  | 2     | San Antonio, Tex.     | 184                        | 125      | 30    | 16    | 6     | 6    | 8     |
| Trenton, N.J.       | 38                         | 29    | 5     | 2     | -    | 2  | 2     | Shreveport, La.       | 30                         | 17       | 9     | 1     | 1     | 2    | 5     |
| Utica, N.Y.         | 17                         | 13    | 3     | 1     | -    | -  | 9     | Tulsa, Okla.          | 112                        | 83       | 17    | 11    | -     | 1    | 11    |
| Yonkers, N.Y.       | 34                         | 31    | 2     | 1     | -    | -  | 9     | MOUNTAIN              | 721                        | 467      | 136   | 65    | 29    | 24   | 42    |
| E.N. CENTRAL        | 2,312                      | 1,531 | 456   | 170   | 62   | 93 | 113   | Albuquerque, N. Mex.  | 95                         | 58       | 11    | 12    | 11    | 3    | 9     |
| Akron, Ohio         | 58                         | 35    | 14    | 5     | 3    | 1  | -     | Colo. Springs, Colo.  | 45                         | 31       | 7     | 5     | 2     | -    | 5     |
| Canton, Ohio        | 40                         | 28    | 8     | 4     | -    | -  | 1     | Denver, Colo.         | 138                        | 86       | 25    | 17    | 3     | 7    | 2     |
| Chicago, Ill.‡      | 564                        | 362   | 125   | 45    | 10   | 22 | 16    | Las Vegas, Nev.       | 121                        | 76       | 34    | 6     | 2     | 3    | 11    |
| Cincinnati, Ohio    | 76                         | 52    | 15    | 6     | 1    | 2  | 13    | Ogden, Utah           | 19                         | 13       | 1     | 2     | 1     | 2    | 2     |
| Cleveland, Ohio     | 152                        | 93    | 38    | 11    | 3    | 7  | 6     | Phoenix, Ariz.        | 118                        | 78       | 20    | 11    | 6     | 3    | 2     |
| Columbus, Ohio      | 169                        | 106   | 32    | 17    | 9    | 5  | 1     | Pueblo, Colo.         | 22                         | 19       | 3     | -     | -     | -    | 1     |
| Dayton, Ohio        | 117                        | 81    | 29    | 3     | 3    | 1  | 7     | Salt Lake City, Utah  | 46                         | 26       | 13    | 2     | 2     | 3    | -     |
| Detroit, Mich.      | 250                        | 133   | 54    | 35    | 12   | 16 | 7     | Tucson, Ariz.         | 117                        | 80       | 22    | 10    | 2     | 3    | 10    |
| Evansville, Ind.    | 47                         | 36    | 7     | 3     | -    | 1  | 3     | PACIFIC               | 2,080                      | 1,382    | 386   | 196   | 62    | 46   | 154   |
| Fort Wayne, Ind.    | 55                         | 40    | 10    | 3     | 2    | -  | 3     | Berkeley, Calif.      | 21                         | 12       | 2     | 4     | -     | 3    | 2     |
| Gary, Ind.          | 77                         | 7     | 3     | 3     | 4    | -  | 3     | Fresno, Calif.        | 73                         | 59       | 6     | 4     | 2     | 2    | 14    |
| Grand Rapids, Mich. | 73                         | 49    | 16    | 4     | -    | 4  | 4     | Glendale, Calif.      | 22                         | 16       | 4     | 2     | -     | -    | 2     |
| Indianapolis, Ind.  | 165                        | 111   | 27    | 12    | 3    | 12 | 4     | Honolulu, Hawaii      | 89                         | 64       | 19    | 2     | 1     | 3    | 17    |
| Madison, Wis.       | 52                         | 36    | 7     | 3     | 2    | 4  | 3     | Long Beach, Calif.    | 102                        | 69       | 23    | 5     | 3     | 2    | 12    |
| Milwaukee, Wis.     | 140                        | 111   | 17    | 5     | -    | 7  | 13    | Los Angeles, Calif.   | 583                        | 355      | 113   | 77    | 27    | 3    | 23    |
| Peoria, Ill.        | 51                         | 38    | 7     | -     | 2    | 4  | 8     | Oakland, Calif.‡      | 94                         | 63       | 18    | 9     | 2     | 2    | 5     |
| Rockford, Ill.      | 57                         | 41    | 9     | 2     | 4    | 1  | 7     | Pasadena, Calif.      | 31                         | 22       | 2     | 3     | -     | 4    | 2     |
| South Bend, Ind.    | 59                         | 40    | 18    | 1     | -    | -  | 3     | Portland, Oreg.       | 139                        | 98       | 24    | 9     | 2     | 6    | 7     |
| Toledo, Ohio        | 99                         | 76    | 13    | 5     | 2    | 3  | 8     | Sacramento, Calif.    | 163                        | 108      | 36    | 9     | 4     | 6    | 22    |
| Youngstown, Ohio    | 71                         | 56    | 7     | 3     | 2    | 3  | 7     | San Diego, Calif.     | 146                        | 108      | 15    | 15    | 4     | 4    | 21    |
| W.N. CENTRAL        | 758                        | 568   | 121   | 37    | 13   | 19 | 37    | San Francisco, Calif. | 165                        | 98       | 36    | 26    | 5     | -    | 4     |
| Des Moines, Iowa    | 70                         | 45    | 18    | 3     | 1    | 3  | 3     | San Jose, Calif.      | 177                        | 123      | 30    | 13    | 7     | 4    | 14    |
| Duluth, Minn.       | 24                         | 18    | 4     | 1     | 1    | -  | -     | Seattle, Wash.        | 167                        | 109      | 34    | 14    | 4     | 6    | -     |
| Kansas City, Kans.  | 27                         | 15    | 7     | 4     | -    | 1  | 1     | Spokane, Wash.        | 59                         | 45       | 11    | 2     | 1     | -    | 5     |
| Kansas City, Mo.    | 138                        | 97    | 26    | 8     | 5    | 2  | 10    | Tacoma, Wash.         | 49                         | 33       | 13    | 2     | -     | 1    | 4     |
| Lincoln, Nebr.      | 42                         | 32    | 5     | 3     | 2    | -  | 3     | TOTAL                 | 13,786 <sup>††</sup>       | 8,955    | 2,729 | 1,271 | 391   | 429  | 826   |
| Minneapolis, Minn.  | 167                        | 125   | 25    | 7     | 2    | 8  | 5     |                       |                            |          |       |       |       |      |       |
| Omaha, Nebr.        | 97                         | 74    | 18    | 4     | 1    | -  | 10    |                       |                            |          |       |       |       |      |       |
| St. Louis, Mo.      | 117                        | 102   | 7     | 3     | -    | 5  | 5     |                       |                            |          |       |       |       |      |       |
| St. Paul, Minn.     | 61                         | 48    | 8     | 4     | 1    | -  | -     |                       |                            |          |       |       |       |      |       |
| Wichita, Kans.‡     | 15                         | 12    | 3     | -     | -    | -  | -     |                       |                            |          |       |       |       |      |       |

\*Mortality data in this table are voluntarily reported from 121 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 these 3 Pennsylvania cities, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.

††Total includes unknown ages.

‡Data not available. Figures are estimates based on average of past available 4 weeks.

*Ischemic Heart Disease — Continued*

was subdivided for further analysis as follows: acute myocardial infarction (acute MI, ICDA-8 and ICD-9-CM: 410); other acute and subacute forms of IHD (other acute IHD, ICDA-8 and ICD-9-CM: 411); chronic IHD (ICDA-8: 412; ICD-9-CM: 412, 414); and angina pectoris (ICD-8 and ICD-9-CM: 413).

From 1978 to 1979, hospitalization rates for IHD declined by 98 hospitalizations per 100,000 men (9.5% change) and 113 hospitalizations per 100,000 women (15% change) (Figure 1). These declines—the largest single yearly change from 1970 through 1986—coincided with the discontinuation of ICDA-8 and the adoption of ICD-9-CM. As a result of the change in coding systems, many cases that would have been assigned codes 410–414 in ICDA-8 were assigned to ICD-9-CM codes 402 (hypertensive heart disease) and 429.2 (cardiovascular disease, unspecified) (7).

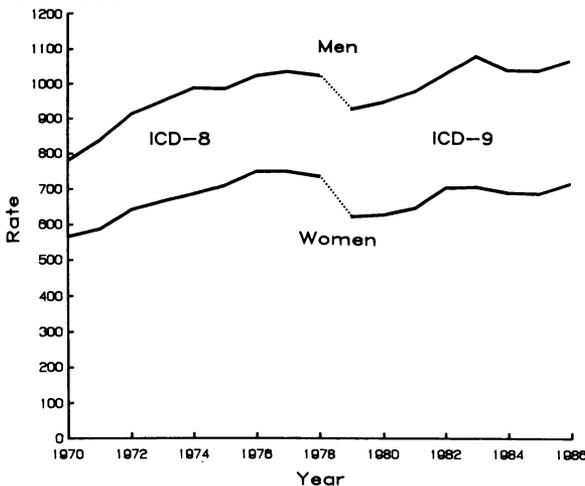
Among men, hospitalization rates per 100,000 ranged from a low of 784 in 1970 to a high of 1066 in 1986; among women, rates ranged from a low of 570 in 1970 to a high of 718 in 1986. If the decrease from 1978 to 1979 is disregarded, the number of hospitalizations per 100,000 men for IHD increased an average of 25 per year from 1970 through 1986. Similarly, the number per 100,000 women for IHD increased an average of 17 per year from 1970 through 1986. The one exception to these trends occurred among men from 1983 to 1984, when the rate declined 39 per 100,000.

From 1970 through 1978, the male-to-female ratio of hospitalization rates was 1.4. The sex ratio of hospitalizations for men was even higher from 1979 through 1986, when it was 1.5.

The changes in hospitalization rates from 1970 through 1986 for IHD obscured important differences among component diseases, in the ratio and difference of hospitalization rates between men and women, and in the pattern of changes over time (Figure 2).

The sex ratio for hospitalization rates varied considerably among the components of IHD and between ICD code periods. Among the component ICD codes of IHD, hospitalization rates for acute MI and chronic IHD were much greater for males than females, a characteristic of IHD as a whole. By contrast, other acute IHD and angina

**FIGURE 1. Hospitalization rates per 100,000 persons for ischemic heart disease — United States, 1970–1986**



*Ischemic Heart Disease – Continued*

pectoris showed small differences in hospitalization rates by sex. Differences between sexes were greater for acute MI, other acute IHD, and angina pectoris from 1970 through 1978 than they were from 1979 through 1986; however, for chronic IHD, these differences were greater during 1979–1986.

Excluding changes in 1978–1979 and 1982–1983, rates for acute MI showed small average yearly increases from 1970 through 1986 of 5 hospitalizations per 100,000 men and 3 per 100,000 women. Since 1983, acute MI hospitalization rates have increased slightly among both men and women despite a decrease in overall hospitalization rates (8). Beginning in 1985, acute MI replaced chronic IHD as the most common primary diagnosis among persons hospitalized for IHD.<sup>5</sup>

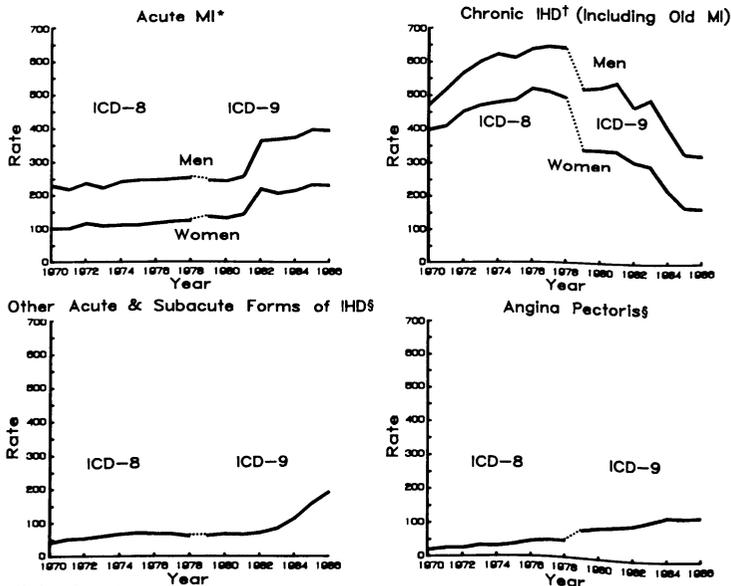
Rates for chronic IHD among both men and women increased through 1976, remained relatively unchanged through 1981, and declined sharply thereafter. From 1981 through 1986, rates declined 40% among men and 50% among women.

Rates for other acute IHD among both men and women were steady through 1982, after which they increased. From 1983 through 1986, hospitalization rates increased 227% among men and 213% among women. For women in 1986, only acute MI exceeded other acute IHD as a first-listed diagnosis among the components of IHD.

Finally, angina pectoris showed very small but consistent average increases of 5 hospitalizations per year from 1970 through 1986. Although angina pectoris remains

<sup>5</sup>As of 1982, NCHS coded acute MI as a first-listed diagnosis whenever it appeared on a hospitalization record with other circulatory diseases and was other than the first entry (9). Thus, the striking increase from 1981 to 1982 in hospitalization rates for acute MI among both men and women resulted from a change in editing procedure by NCHS. Because the original first diagnosis was probably a circulatory condition, the decrease for chronic IHD from 1981 to 1982 also may have been caused by this change.

**FIGURE 2. Hospitalization rates per 100,000 persons for components of ischemic heart disease – United States, 1970–1986**



\*MI = Myocardial infarction.

†IHD = Ischemic heart disease.

§Hospitalizations include both men and women because rates by sex are similar.

*Ischemic Heart Disease — Continued*

the least frequent diagnosis among the IHDs reviewed here, its rate has increased 266% among men and 439% among women over this period (disregarding the change in coding between 1978 and 1979).

*Reported by: Office of Surveillance and Analysis, Center for Chronic Disease Prevention and Health Promotion; Hospital Care Statistics Br, Div of Health Care Statistics, National Center for Health Statistics, CDC.*

**Editorial Note:** Hospitalization rates reflect a variety of influences and often do not correspond to incidence or mortality rates in magnitude or trend (10).

Sex differentials in hospitalization rates for acute MI and chronic IHD are consistent with the incidence and mortality of IHD in general. By contrast, the data show few or no sex differentials in hospitalization rates for other acute IHD and angina pectoris. The lack of a sex differential for these conditions may reflect health-care use differences between men and women for conditions less life-threatening than acute MI, thereby obscuring a real difference in incidence.

Although IHD-associated mortality declined by 20% between 1968 and 1986 (11), hospitalization rates for IHD have increased overall since 1970. The introduction of a prospective payment system based on diagnosis related groups (DRGs) may have influenced hospitalization rates after 1983 (12). Changes in hospital use patterns as well as substantial progress in medical technology increased hospitalization rates for IHD while IHD mortality has declined dramatically (13). Finally, improved survival from bypass surgery among patients with stenosis of the left main coronary artery may have resulted in increased admissions of patients suspected to be at risk for coronary events or advanced disease (14–16).

The continued increasing hospitalization rate for acute MI and the decreasing rate for chronic IHD after 1983 may be related to DRGs. If diagnoses are recorded to maximize hospital reimbursement, then greater specification of diagnosis might be expected. A large decrease in the DRG for atherosclerosis (age >69 years and/or complications or comorbidity) may be associated with increases in three related groups (17). However, a change in coding practices probably does not entirely explain the trends observed for hospitalization for IHD.

In the absence of an overall surveillance system for IHD incidence, it is unclear to what extent mortality declines represent a true decrease in risk and/or improvements in medical care. The observed increase in hospitalization for acute IHD may be a manifestation of improving care or may be related to other features of the health-care system. The ultimate answer, which requires further investigation, will have important policy implications for cardiovascular disease prevention and control.

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Notice to Readers**Fourth National Conference  
on Chronic Disease Prevention and Control**

CDC and the Association of State and Territorial Health Officials will cosponsor the Fourth National Conference on Chronic Disease Prevention and Control: *Implementing Effective Strategies*, September 20–22, 1989, at the Bahia Hotel in San Diego. The conference is open to the public; registration is free.

The conference will build on the strategies identified by the participants at the three previous conferences and will emphasize the interactions among federal, state, and local health departments, voluntary health agencies, professional organizations, and others. The 1989 conference will include plenary sessions that address legislation, surveillance, and year 2000 health objectives. Seven concurrent sessions will focus on screening and quality assurance; evaluation; diabetes and obesity; childhood antecedents of chronic disease; emerging issues, programs, and controversies in chronic disease prevention and control; barriers to risk-factor modification among minorities; and nutrition and cancer.

Additional information is available from Center for Chronic Disease Prevention and Health Promotion, Mailstop C07, CDC, Atlanta, GA 30333; telephone: (404) 639-2249 or FTS 236-2249.

## Progress in Chronic Disease Prevention

### Chronic Disease Reports: Coronary Heart Disease Mortality – United States, 1986

Coronary heart disease (CHD) (*International Classification of Diseases, Ninth Revision, Clinical Modification*, rubrics 410–414, 429.2) accounted for 28% of the 2.1 million U.S. deaths in 1986; 0.2% of the U.S. population died from this cause. Age-adjusted rates varied markedly among states, from a low in Hawaii (166/100,000) to a high in New York (303/100,000) (Figure 1, Table 1). Rates were generally highest in the east and lowest in the west.

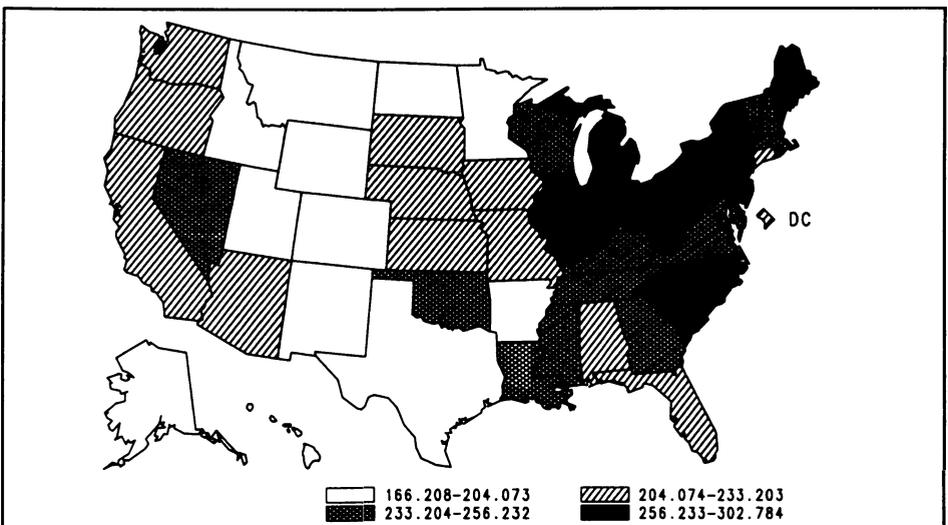
Many alterable risk factors for CHD exist (Table 2). Several are interdependent, and many persons have multiple risk factors. While diabetes is relatively uncommon, smoking, elevated blood pressure, elevated cholesterol, overweight, and inactivity are common at levels known to increase risk of CHD. CHD mortality has declined substantially in recent years (1). Public health interventions to reduce the prevalence of CHD risk factors may further reduce CHD mortality in the U.S. population.

*Reported by: Div of Surveillance and Epidemiologic Studies, Epidemiology Program Office, CDC.*

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### CHRONIC DISEASE REPORTS: CORONARY HEART DISEASE, FIGURE 1. Age-adjusted coronary heart disease mortality rates per 100,000 persons, by quartile – United States, 1986\*



\*U.S. standard age distribution. See *MMWR* 1989;38:191.

*Coronary Heart Disease — Continued***CHRONIC DISEASE REPORTS: CORONARY HEART DISEASE, TABLE 1. Age-adjusted coronary heart disease mortality, by state — United States, 1986**

| <b>State</b>         | <b>Deaths</b>  | <b>Rate per 100,000</b> | <b>Rank by rate</b> |
|----------------------|----------------|-------------------------|---------------------|
| Alabama              | 8,482          | 212.1                   | 35                  |
| Alaska               | 345            | 189.7                   | 48                  |
| Arizona              | 6,582          | 207.1                   | 38                  |
| Arkansas             | 5,500          | 199.4                   | 42                  |
| California           | 55,673         | 229.3                   | 29                  |
| Colorado             | 5,091          | 201.3                   | 41                  |
| Connecticut          | 8,027          | 228.8                   | 30                  |
| Delaware             | 1,620          | 271.6                   | 8                   |
| District of Columbia | 1,349          | 207.1                   | 37                  |
| Florida              | 37,031         | 231.2                   | 28                  |
| Georgia              | 11,863         | 235.3                   | 25                  |
| Hawaii               | 1,403          | 166.2                   | 51                  |
| Idaho                | 1,708          | 190.4                   | 47                  |
| Illinois             | 31,666         | 274.3                   | 5                   |
| Indiana              | 14,039         | 256.2                   | 13                  |
| Iowa                 | 8,172          | 226.5                   | 31                  |
| Kansas               | 5,979          | 207.6                   | 36                  |
| Kentucky             | 9,461          | 254.6                   | 14                  |
| Louisiana            | 8,905          | 241.1                   | 21                  |
| Maine                | 3,435          | 257.4                   | 11                  |
| Maryland             | 9,556          | 247.4                   | 19                  |
| Massachusetts        | 16,178         | 239.0                   | 23                  |
| Michigan             | 25,666         | 298.7                   | 2                   |
| Minnesota            | 9,169          | 198.3                   | 43                  |
| Mississippi          | 6,477          | 252.9                   | 16                  |
| Missouri             | 13,666         | 231.8                   | 27                  |
| Montana              | 1,566          | 195.0                   | 45                  |
| Nebraska             | 3,934          | 204.1                   | 39                  |
| Nevada               | 1,689          | 233.2                   | 26                  |
| New Hampshire        | 2,456          | 240.9                   | 22                  |
| New Jersey           | 22,152         | 277.9                   | 4                   |
| New Mexico           | 2,150          | 184.0                   | 50                  |
| New York             | 58,473         | 302.8                   | 1                   |
| North Carolina       | 15,207         | 258.4                   | 10                  |
| North Dakota         | 1,413          | 191.7                   | 46                  |
| Ohio                 | 29,796         | 273.1                   | 6                   |
| Oklahoma             | 8,488          | 249.3                   | 18                  |
| Oregon               | 6,375          | 221.0                   | 32                  |
| Pennsylvania         | 36,541         | 266.8                   | 9                   |
| Rhode Island         | 3,346          | 283.5                   | 3                   |
| South Carolina       | 7,248          | 256.6                   | 12                  |
| South Dakota         | 1,860          | 216.8                   | 33                  |
| Tennessee            | 12,214         | 254.5                   | 15                  |
| Texas                | 27,396         | 203.0                   | 40                  |
| Utah                 | 2,087          | 189.3                   | 49                  |
| Vermont              | 1,382          | 249.8                   | 17                  |
| Virginia             | 11,726         | 236.5                   | 24                  |
| Washington           | 9,207          | 215.4                   | 34                  |
| West Virginia        | 5,653          | 272.9                   | 7                   |
| Wisconsin            | 13,014         | 245.8                   | 20                  |
| Wyoming              | 695            | 196.5                   | 44                  |
| <b>Total</b>         | <b>593,111</b> | <b>246.0</b>            |                     |

## Coronary Heart Disease — Continued

**CHRONIC DISEASE REPORTS: CORONARY HEART DISEASE, TABLE 2. Coronary heart disease (ICD-9-CM 410–414, 429.2) indices — United States**

| Measure                                     | No.        | Rate per 100,000 |  |  |
|---------------------------------------------|------------|------------------|--|--|
| Mortality (1986)                            | 593,111    | 246              |  |  |
| Prevalence*                                 | 11,193,000 | 4,692            |  |  |
| Hospitalizations†                           | 1,615,320  | 670              |  |  |
| Years of potential life lost before age 65‡ | 1,557,041  | 646              |  |  |

| Risk factor                          | Prevalence (%) <sup>§</sup> | Crude relative risk  | Population-attributable risk (%; nonadditive)** | Estimated preventable deaths (nonadditive) <sup>††</sup> |
|--------------------------------------|-----------------------------|----------------------|-------------------------------------------------|----------------------------------------------------------|
| Smoking (current)                    | 26.5 <sup>§§</sup>          | 1.7 <sup>¶¶</sup>    | 15.6                                            | 92,525                                                   |
| Hypertension                         |                             |                      |                                                 |                                                          |
| (>159 mm Hg)                         | 17.7 <sup>***</sup>         | 2.9 <sup>†††</sup>   | 25.2                                            | 149,464                                                  |
| (140–159 mm Hg)                      | 12.0 <sup>***</sup>         | 1.7 <sup>†††</sup>   | 7.7                                             | 45,670                                                   |
| Diabetes                             | 2.8 <sup>*</sup>            | 2.9 <sup>§§§</sup>   | 5.1                                             | 30,249                                                   |
| Cholesterol                          |                             |                      |                                                 |                                                          |
| (≥240 mg/dL)                         | 24.9 <sup>¶¶¶</sup>         | 3.0 <sup>****</sup>  | 33.2                                            | 196,913                                                  |
| (200–239 mg/dL)                      | 31.1 <sup>¶¶¶</sup>         | 1.7 <sup>****</sup>  | 17.9                                            | 106,167                                                  |
| High-density lipoprotein (<35 mg/dL) | 11.2 <sup>††††</sup>        | 2.4 <sup>§§§§</sup>  | 13.6                                            | 80,663                                                   |
| Inactivity                           | 58.8 <sup>¶¶¶¶</sup>        | 1.9 <sup>*****</sup> | 34.6                                            | 205,216                                                  |
| Overweight                           |                             |                      |                                                 |                                                          |
| MRW ≥130                             | 26.6 <sup>†††††</sup>       | 2.0 <sup>†††††</sup> | 21.0                                            | 124,553                                                  |
| MRW 110–129                          | 41.4 <sup>†††††</sup>       | 1.5 <sup>†††††</sup> | 17.1                                            | 101,422                                                  |

\*NCHS. Current estimates from the National Health Interview Survey: United States, 1987. Hyattsville, Maryland: US Department of Health and Human Services, Public Health Service, CDC, 1988; DHHS publication no. (PHS)88-1594. (Vital and health statistics; series 10, no. 166).

†NCHS. National Hospital Discharge Survey, 1987 [machine-readable public-use data tape] (ICD-9-CM 410, 411, 413, 429.2).

‡CDC. Years of potential life lost before age 65 in 1986. MMWR 1989;38:27–9 (ICD-9-CM 390–398, 402, 404–429).

§Prevalences in different studies and samples of the U.S. population.

\*\*Population-attributable risk (PAR) = percentage of mortality attributable to the specific risk factor. Because persons may be exposed to more than one risk factor, estimated PAR from different risk factors should not be added. CDC. Chronic disease reports in the *Morbidity and Mortality Weekly Report (MMWR)*. MMWR 1989;38(suppl S-1).

††Estimated preventable deaths = PAR x mortality. Because persons may be exposed to more than one risk factor, estimated preventable deaths from different risk factors should not be added.

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*Coronary Heart Disease — Continued*

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††††U.S. adults, 20–64 years of age (Division of Health Examination Statistics, NCHS, unpublished data).

§§§§Framingham sample, whites 49–82 years of age. Gordon T, Castelli WP, Hjortland MC, Kannel WB, Dawber TR. High-density lipoprotein as a protective factor against coronary heart disease: the Framingham study. Am J Med 1977;62:707-14.

††††Persons 18–65 years of age who were either sedentary or irregularly active. Caspersen CJ, Christenson GM, Pollard RA. Status of the 1990 physical fitness and exercise objectives—evidence from NHIS 1985. Public Health Rep 1986;101:587-92.

\*\*\*\*\*Powell KE, Thompson PD, Caspersen CJ, Kendrick JS. Physical activity and the incidence of coronary heart disease. Ann Rev Public Health 1987;8:253-87.

†††††Metropolitan relative weight (MRW) among whites in Framingham study population.  $MRW = (\text{actual weight/desirable weight}) \times 100$ . Recalculated from Hubert HB, Feinlieb M, McNamara PM, Castelli WP. Obesity as an independent risk factor for cardiovascular disease: a 26-year follow-up of participants in the Framingham Heart Study. Circulation 1983;67:968-77.

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