

## 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 An estimated 10 million persons have longstanding tuberculous infection (CDC, unpublished data).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

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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.

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**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.

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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 (7). 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)
Smoking-attributable mortality‡	19,627	(18.4)	11,662	(12.2)	31,289	(15.5)
Cerebrovascular diseases†	5,330	(5.0)	8,035	(8.4)	13,365	(6.6)
Unintentional injuries (motor vehicles)	7,299	(6.9)	3,081	(3.2)	10,380	(5.1)
Pneumonia and influenza†	(3,781)	(3.6)	(1,515)	(1.6)	(5,296)	(2.6)
Chronic liver disease and cirrhosis	2,977	(2.8)	3,912	(4.1)	6,889	(3.4)
Suicide	2,558	(2.4)	1,407	(1.5)	3,965	(2.0)
Diabetes mellitus	2,878	(2.7)	904	(0.9)	3,782	(1.9)
Homicide	1,335	(1.2)	1,662	(1.7)	2,997	(1.5)
Chronic obstructive pulmonary disease†	2,170	(2.0)	648	(0.7)	2,818	(1.4)
All other causes†	960	(0.9)	1,407	(1.5)	2,367	(1.2)
	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.

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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 price of cigarettes sold in the state by 25¢ per pack. Because increasing the price of cigarettes decreases smoking—especially among adolescents (7)—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.