SECTION II.

RISK GROUPS AND RISK FACTORS FOR MORTALITY

Social Context

During the twentieth century, Americans experienced a remarkable decline in deaths due to infectious and communicable diseases and a parallel increase in average life expectancy. This decrease in infectious disease mortality has been attributed to a variety of public health measures, such as better nutrition, improved sanitation, better housing conditions, and clean water (McKeown 1975; McKinlay and McKinlay 1977). Advances in medical technology and health care during this period have also enabled people with serious disability and chronic illnesses to live longer. These historic changes in the health of the nation were addressed in a federal initiative that began in the Carter Administration known as *Healthy People* (U.S. Department of Health, Education and Welfare 1979). *Healthy People* emphasized the importance of risk factors in disease prevention.

The term "risk factor" refers to an inherited characteristic of an individual, an environmental exposure, or some aspect of personal behavior that, based on epidemiologic evidence, is known to be associated with some disease condition or health outcome considered preventable (Last 1988). Aspects of social status, such as age, gender, race/ethnicity, marital status, low socioeconomic status or poverty are often viewed as risk factors because they can serve as powerful predictors or markers of disease risk in a given population. Age, gender, race/ethnicity, low socioeconomic status, and poverty may also be viewed as "risk groups," that is, the main strata by which mortality and morbidity differentials are analyzed.

We use age, gender, race/ethnicity, and year of death to identify subgroups of the Connecticut resident mortality data that are analyzed in this study. We do not analyze other social, environmental, or behavioral risk factors for Connecticut resident mortality, since the available mortality data do not include measurements of these factors. Our interpretation of trends, however, requires that we view these mortality data within the context of knowledge gained from studies linking specific risk factors, whether social, environmental, or behavioral, with certain causes of death. For this reason, we have incorporated evidence from various national and statewide sources in our discussion of cause-specific mortality when appropriate.

The *Healthy People* Initiative

For two decades, the *Healthy People* Initiative has provided us with a framework for understanding the underlying factors that put Americans at risk for premature death with an emphasis on prevention of disease and promotion of health. *Healthy People – The Surgeon General's Report on Health Promotion and Disease Prevention*, released in 1979, heralded a national effort aimed at preventing premature illness, disability, and death. The report *Healthy People* noted that chronic diseases like heart disease, stroke, and cancer were the major causes of death and disability for Americans while injuries were the leading cause of death for those under the age of forty (U.S. Department of Health, Education, and Welfare 1979). Two more reports followed: in 1980,

Promoting Health/Preventing Disease: Objectives for the Nation identified over 200 health objectives for the next ten-year period; and in 1990, *Healthy People 2000: National Health Promotion and Disease Prevention Objectives*, identified health goals and objectives for the year 2000 (U.S. Department of Health and Human Services 1980a; 1990).

Since the 1960's, research studies have documented the relationship between mortality risk and health behaviors, such as eating and sleep patterns, physical activity, obesity, tobacco use, and alcohol consumption (Kannel 1967; Belloc and Breslow 1972; Berkman and Breslow 1983; Leon and Connett 1991; Manson, Wilett, Stampfer, et al. 1995; Goldberg, Larson, and Levy 1996; Kant, Schatzkin, Graubard, et al. 2000). It was estimated that, in 1990, the most important preventable contributors to mortality in the United States were tobacco use, diet and activity patterns, microbial agents, toxic agents, firearm use, sexual behavior, motor vehicle use, and illicit use of drugs (McGinnis and Foege 1993). With the knowledge gained from these studies, health care professionals have been able to formulate sound recommendations for the improved health of Americans (U.S. Department of Health, Education, and Welfare 1979; U.S. Department of Health and Human Services 1986; 1990; 2000).

In January of 2000, the Department of Health and Human Services announced the new national objectives for the year 2010. Referred to as "Healthy People in Healthy Communities," the *Healthy People 2010* goals are to continue the advancement in the quality of life for Americans and to ensure that all Americans benefit from these advancements regardless of their race, ethnicity, gender, disability status, income, or educational level (U.S. Department of Health and Human Services 2000). The goals of *Healthy People 2010* are informed by decades of research showing that individual health and behavior are inextricably linked to the health of the community and environment in which individuals live. An underlying premise of *Healthy People 2010* is that an individual's health must be viewed in the context of his or her community.

The overarching goal of *Healthy People 2010* is to increase quality and years of healthy life. During the twentieth century, life expectancy for persons in every age group has increased. Continued differences, however, in life expectancy between certain population groups—male vs. female, black vs. white, Hispanic vs. non-Hispanic, poor vs. non-poor—underscore the importance of examining their mortality differentials. A key objective of *Healthy People 2010* is the elimination of health disparities among racial and ethnic sub-populations. It is also noted in *Healthy People 2010* that inequalities in income and education underlie many health disparities in the United States.

The objectives of *Healthy People 2010* are focused on the combined effects of several determinants of health: the individual, physical, and social environments, as well as the policies and interventions that promote health, prevent disease, and ensure access to health care. A large body of research has established the relationship of social networks, income and educational level, and neighborhood of residence to mortality risk. Research studies have found that individuals with fewer personal and group relationships (Berkman and Breslow 1983; House, Landis, and Umberson 1981), lower levels of income and education (Syme and Berkman 1976; Lantz, House, Lepkowski, et al. 1998), and those living in poorer neighborhoods (Haan, Kaplan, and Camacho 1987; McCord and Freeman 1990) are at increased risk of death from a variety of causes. More recently, researchers

have examined the association of residential segregation and adult mortality. Polednak (1993) found that residential segregation was positively related to increased mortality due to all causes for black residents but inversely related for whites of 38 major U.S. metropolitan areas. Collins and Williams (1999) found that black social isolation tended to predict higher rates of mortality for African Americans in 107 major U.S. cities. All of these social factors should be considered in efforts to meet the *Healthy People* goal of eliminating health disparities by 2010.

Age-Adjusted Mortality among Connecticut Residents, 1989-1998

This report provides a ten-year retrospective look at mortality among Connecticut residents. It reports differences among various age, gender, and racial/ethnic groups because these social characteristics are so closely linked to mortality risk.

Age-group

Age is the overarching risk factor for mortality. With increasing age, come physiological and social changes in humans that are seen across sub-population groups. Different disease outcomes typically follow age-related patterns and the identification of age risk groups is the first step in designing useful interventions (Kaplan, Haan, and Wallace 1999). Furthermore, it is often difficult to see more subtle patterns in chronic disease progression without accounting for the overpowering effect of age on risk of death. In Connecticut, as in the U.S., the leading cause of death varies by age group. For example, between 1996 to 1998 unintentional injury was the leading cause of death for Connecticut residents under the age of 45, cancer the leading cause for those aged 45 to 74, and heart disease the leading cause for persons 75 years and older. This report classifies Connecticut residents into seven age groups (0-14; 15-24; 25-44; 45-64; 65-74; 75-84; and 85 and older) for the Leading Cause of Death Tables (Appendix V) and 18 five-year age groups (0-4; 5-9; 10-14; 15-19; 20-24; 25-29; 30-34; 35-39; 40-44; 45-49; 50-54; 55-59; 60-64; 65-69; 70-74; 75-79; 80-84; and 85 and older) for age-specific and regression analyses.

Gender

Gender is a key determinant of health status, life expectancy, and mortality risk. In Connecticut, as in the U.S. and all major industrialized nations, females have lower age-adjusted mortality for most causes compared with males. [In many developing countries, women's life span is shorter than men's due to maternal mortality and pregnancy-related risks (Santow 1995).] While these gender differences in mortality may be due, in part, to biological factors, there are a variety of important social factors that underlie these differences. For example, research suggests that American women engage in more help-seeking and preventive health behaviors linked to mortality risk compared with men (Verbrugge 1985).

The factors underlying gender differences in chronic disease mortality due to heart disease, stroke, diabetes, and cancer may be an interaction of both social and biological determinants. For example, biological differences clearly play a role in the development of certain types of cancers, such as prostate and breast cancer. Social factors, such as willingness to seek periodic preventive screening and to take appropriate measures once diagnosed, like dietary change and therapeutic treatments, are also important determinants of mortality risk.

Major gender differences exist in injury mortality as well. For example, Connecticut males are more than three times as likely to die from homicide and more than twice as likely to die from motor vehicle crashes and drug-induced causes as are females. These gender differences in mortality are directly linked to social behaviors such as risk-taking, interpersonal violence, and alcohol and drug use.

Race, Ethnicity, Income, and Education

Race, ethnicity, income, and education are overlapping characteristics. Higher income, for example, is strongly associated with higher education and both are strongly associated with better health status and lower mortality risk. Likewise, black race and Hispanic ethnicity tend to be associated with lower income, lower education, and poorer health outcomes. The independent contributions of lower income, lower education, and minority race/ethnicity to higher mortality risk are not easily disentangled. A vast body of research suggests that a complex interaction of factors including socioeconomic conditions, culture and acculturation, specific behaviors, and environmental conditions account for broad racial and ethnic disparities in health status and mortality (U.S. Department of Health and Human Services 1998a; Freeman 1993; Adler, Boyce, Chesney, et al. 1994).

Although genetic factors underlie observed differences among groups of people, research has pointed out that there is greater genetic variation within racial groups than there is among racial groups (Williams, Lavizzo-Mourey, and Warren 1994). Furthermore, racial and ethnic classifications used in the U.S. are socially, not biologically, constructed categories that have changed historically. Scientific evidence points out that racial and ethnic classifications do not capture biological distinctiveness (Fullilove 1998). Rather, the social construct of race embodies the perceptions and values of, and behavior toward, one group by another (Freeman 1998).

Social class, as measured by income, education, and occupation, is known to be another important determinant of mortality risk (Antonovsky 1967; Syme and Berkman 1976; van Rossum, Shipley, van de Mheen et al. 2000). Higher education tends to lead to higher status occupations, which tend to offer higher personal income. Higher personal income allows for greater leisure time, better access to medical care and technology, better housing in safer neighborhoods, and improved opportunities for education and information regarding healthy behaviors. Area-based measures of socioeconomic status, such as income-level in census tract of residence, have been shown to be associated with all-cause mortality, independent of individual income (Anderson, Sorlie, Backlund, et al. 1997). This report does not describe mortality differences among Connecticut residents by

social class because information on decedent's social class, as measured by income, education, occupation, or residential area, is not currently available for Connecticut resident deaths.

Race and ethnicity are strata by which we analyze Connecticut resident mortality in this report. Although we do not include Connecticut resident income, education, or occupation as variables in our analysis, we have incorporated contextual information on the relationship between socioeconomic factors and cause-specific mortality from national data in the narrative.