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Trends in Health in the United States

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The National Center for Health Statistics (NCHS) conducts a variety of surveys designed to provide cross-sectional estimates of the prevalence of various factors measuring the health of Americans. When these cross-sectional estimates are put together and plotted over time, they provide a picture of the trends in the health of the population. However, differences in methodology, completeness of coverage, validity and reliability of the information, and changing attitudes about health and illness influence these trend patterns and sometimes make them difficult to interpret.

Six different measures of the health of Americans discussed include trends in life expectancy, which is related to the total mortality rate; trends in mortality by specific causes; trends in morbidity or the prevalence of various illnesses, including both acute and chronic conditions; trends in the estimates of various types of disabilities and impairments in the population; trends in expeditures for medical care and services; and finally, some assessments of trends in several risk factors and physiological characteristics obtained by direct measurements of individuals.

Life expectancy in the United States has risen dramatically in the 20th century. In 1900, white men and white women had a life expectancy somewhat under 50 years, with women having a slight advantage over men. For men and women of other races the life expectancy was just about 34 years. Life expectancy for all four groups improved through the first half of the century with only occasional blips in the curve, but between 1950 and approximately 1970 the life expectancy curves at birth showed very little change for men and improved only slightly for women. However, since 1970 life expectancy at birth has continued to improve at about the same rates that it did in the first half of the century (Fig. 1).

The improvements in life expectancy have been influenced not only by the control of infectious diseases and other factors which influenced infant mortality but also by improvements in life expectancy at older ages. Life expectancy at age 20 has improved steadily for both men and women, with the improvement for women being considerably larger than that for men. Whereas a 20-year-old woman could expect to outlive her male contemporaries by only 3 years in 1900, by 1980 women aged 20 could expect to outlive males aged 20 by over 7 years. Since the 1930s we have also seen an improvement in life expectancy at the older ages (Fig. 2). Men and women had essentially the same life expectancy at age 65 in the early part of this century, approximately 12 years, but since 1930 both sexes have shown an improvement, with women aged 65 now outliving men aged 65 by about 6 years.

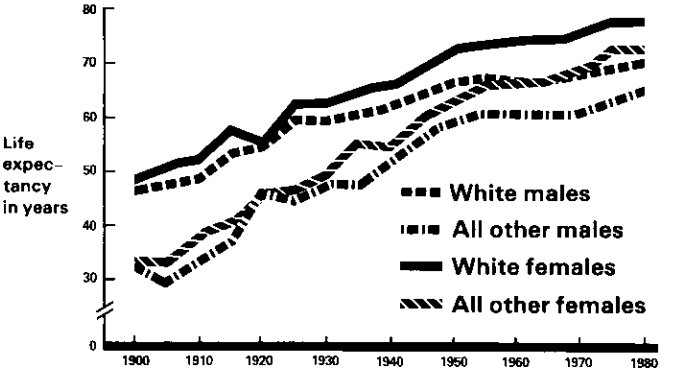

FIGURE 1. Life expectancy by sex and color, 1900–1977.

This improvement in life expectancy, of course, has been predicted on a decline in the total mortality rate. However, the decline in mortality has not been uniform for all causes or for all segments of the population. Since 1950 the age-adjusted death rate for all causes has fallen by about one-third. The decline for cardiovascular disease mortality, however, has been almost 44%, nearly twice as great as the decline for other causes of death. The decline for cardiovascular mortality has been particularly striking since the late 1960s and although there seems to be a slight increase from 1979 to 1980, it appears that the decline is still continuing in the 1980s. Within the broad category of cardiovascular diseases, the decline for stroke has been particularly striking, amounting to almost 50% since 1968, compared with a drop of about 30% for coronary heart disease and only slightly more than 10% for noncardiovascular diseases (Fig. 3).

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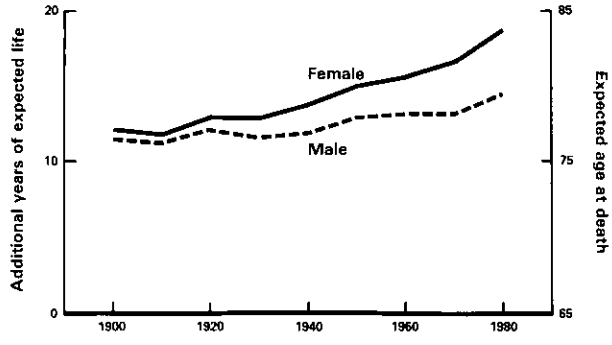
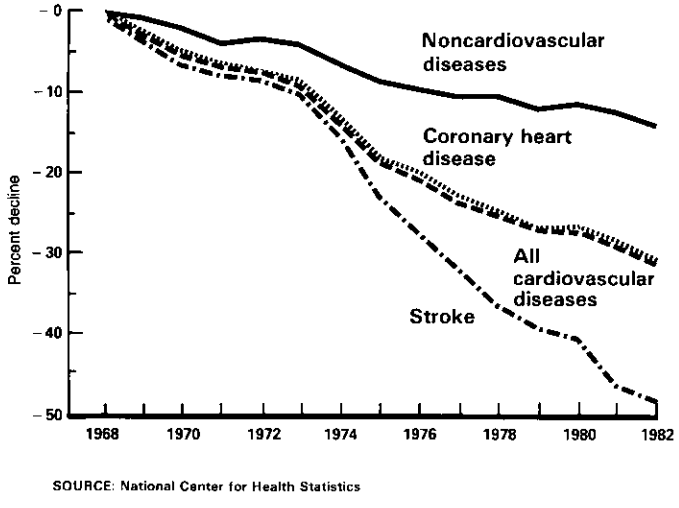


FIGURE 2. Life expectancy at age 65, 1900–1980.



SOURCE: National Center for Health Statistics

FIGURE 3. Percent decline in age-adjusted death rates.

Thus, whereas in 1968, 54% of all deaths in the United States were due to cardiovascular diseases, of which 35% were coronary heart disease and 11% were strokes, by 1982 only 49%—less than half—of all the deaths were cardiovascular, with 28% being due to coronary heart disease, and 8% to stroke. Cancer mortality, on the other hand, which had accounted for only 1 death in 6 in 1968, now accounts for more than 1 death in 5 (Fig. 4).

Heart disease is no longer the leading cause of death under the age of 65 (Fig. 5). Whereas in 1968 there had been more heart disease than cancer deaths in each of the age groups under 65, this situation no longer obtained in 1982. For the age group 35–44, the number of cancer deaths among both men and women exceeded those for heart disease in 1975. Accidents still accounted for more deaths in this age group than either heart disease or cancer. At ages 45–54 the lines crossed in approximately 1981, with cancer now outranking heart disease in this age group. At ages 55–64 the gap between heart disease deaths and cancer deaths narrowed steadily during the last decade and a half and although heart disease still causes somewhat more deaths than cancer in this age group, we anticipate that these lines will cross in the next year or two.

When trends in mortality are examined by specific causes in greater detail, a number of different patterns emerge, but just a few will be discussed in this paper. Figure 6 shows the marked decline in heart disease mortality for women aged 50–54 since 1960. The deaths from breast cancer have remained essentially stable during this 20-year period. On the other hand, deaths from cancer of the trachea, bronchus, and lungs have been rising steadily in women during these two decades, and fairly soon we expect that there will be more deaths from lung cancer among women than deaths from cancer of the breast. On the other hand, cancer of the uterine cervix has been declining steadily, and deaths from motor vehicle accidents, which had been increasing slightly through the 1960s, showed a marked decline, as they did in most age groups and for both sexes, after the imposition of the national 55-mile per hour speed limit.

Trends in mortality by specific causes are particularly interesting by race. The age group 55–64 illustrates some of these trends. There has been a fairly steady drop in mortality from heart disease at these ages for both white and black women (Fig. 7). However, white women still have a mortality that is less than half the rate of black women. Black men have about a 20% higher mortality rate from heart disease than white men. The decline has continued in all four groups (the apparent leveling off for black men seems to be a temporary phenomenon).

As stated earlier, the decline in deaths from stroke has been dramatic. The decline in mortality from stroke was apparent for all four groups, but black men still have about three times the rate of white men, and black women have almost three times the rate of white women (Fig. 8). For all four groups, however, the death rate from stroke at this age is only about one-third what it was in 1950. It is worth stopping at this point to emphasize an important factor of this decline in mortality about which we do not have much data. Specifically, it is not known if there has been a corresponding decline in the incidence of heart disease or stroke. Thus, we do not know whether the decline is due to improvements

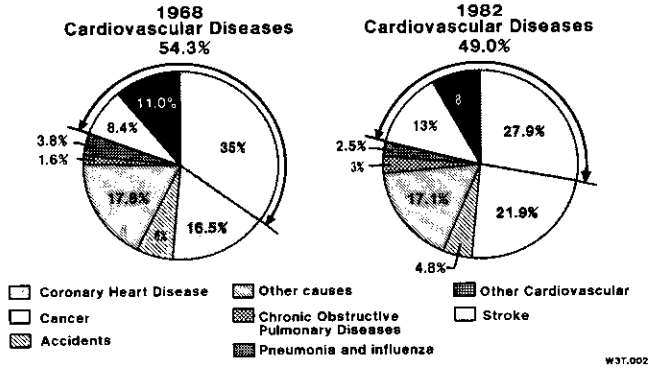


FIGURE 4. Deaths by cause as percentage of total deaths.

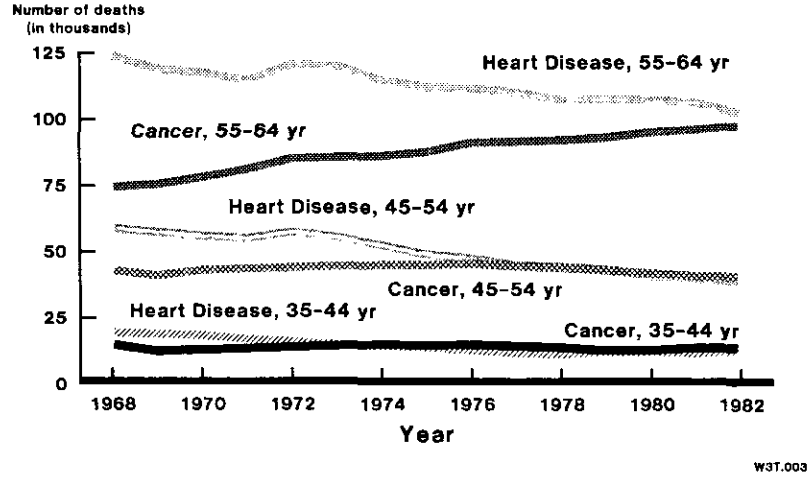


FIGURE 5. *Deaths from heart disease and cancer for selected age groups.*

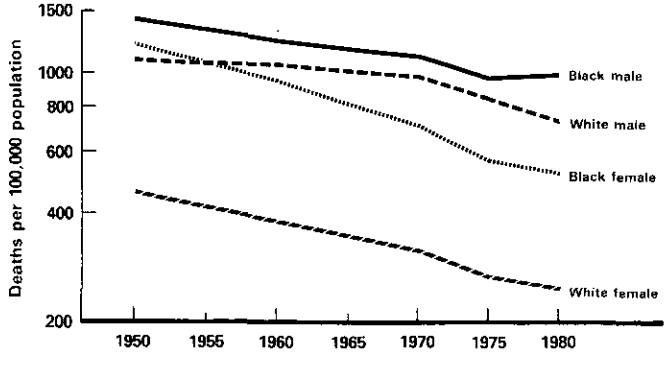


FIGURE 6. Death rates for selected causes, women ages 50–54, 1960–1980.

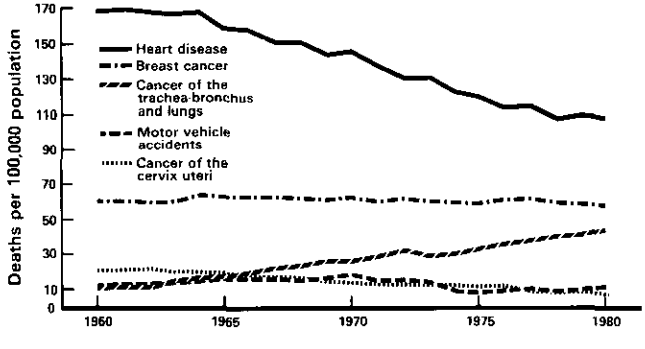


FIGURE 7. Deaths from heart disease, ages 55–64.

in preventing stroke and heart attacks or whether it is due to improvements in keeping stroke and cardiac victims alive and perhaps, therefore, building up the prevalent cases of these diseases, with or without residua of their illnesses, in the population. This will be important to remember when we later consider some measures of the prevalence of various conditions in the population.

Whereas there has been a marked improvement in heart disease and stroke mortality in the last 30 years, this is not the situation with regard to deaths from malignant neoplasms (Fig. 9). In the age range 55–64, only black women can be said to have shown any evidence of a decline in mortality from malignant neoplasms, and this amounted to barely 10% over the 30-year period. For black males there was an increase of more than 60% in the death rate from malignant neoplasms at this age, and for white males there was an increase of nearly 20%. The rates for white females had shown a drop between 1950 and 1960, but the 1980 levels are just about where they were in 1950.

For many neoplasms the death rates have dropped during the last 30 years, but for cancers of the respiratory system there has been a marked increase which nullifies the declines in deaths from neoplasms at other sites. For white men, deaths from respiratory cancers more than doubled between 1950 and 1970 and, although they are still increasing, the rate seemed to plateau between 1970 and 1980 (Fig. 10). For black men mortality from respiratory cancers has quadrupled in the last 30 years and only recently has there been any evidence of a tendency for the rate of increase to abate somewhat. For women the situation seems even more dismal. Both white and black women ages 55–64 have shown more than a fivefold increase in mortality from respiratory cancers between 1950 and 1980, and there is little evidence that the upward slope of the mortality curve is abating at all.

The data presented up to now are based on the National Vital Statistics Cooperative Program, which obtains information on all deaths occurring in the United States. The remainder of the measures of trends in health in the U.S. population presented here are based on data obtained not for the entire population but for carefully selected national samples. The chief survey supported by the National Center for Health Statistics for obtaining data on the prevalence of acute and chronic condi-

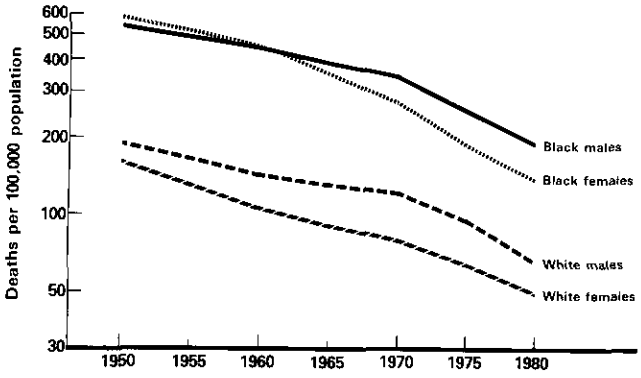


FIGURE 8. Deaths from stroke, ages 55–64.

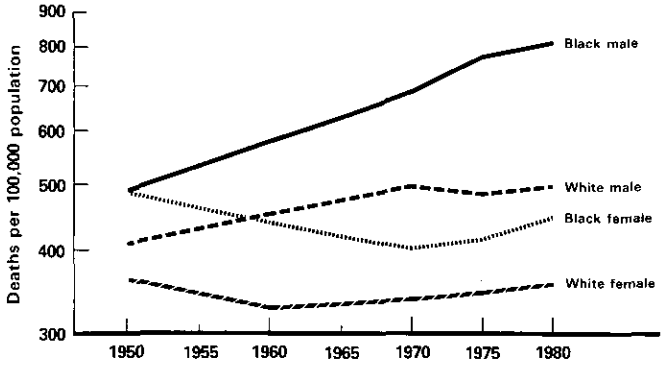


FIGURE 9. Deaths from malignant neoplasms, ages 55–64.

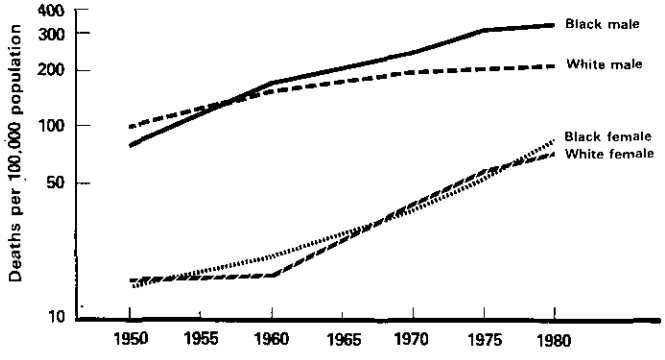


FIGURE 10. Deaths from malignant neoplasms of the respiratory system, ages 55–64.

tions in the noninstitutionalized population of the United States is the National Health Interview Survey (NHIS). The NHIS is based on interviews in about 40,000 households each year covering more than 110,000 individuals. Respondents are asked about illnesses and injuries during the two weeks prior to the interview and about the existence of selected chronic conditions during the preceding year. They are also asked about short and long term disabilities, about use of medical services, and other questions about their health status.

Figure 11 shows the incidence of all acute conditions and of acute respiratory conditions per hundred persons per quarter from 1975 through 1981. The marked seasonality of these trends with the peaks in winter from colds and flu epidemics can be clearly recognized, but one of the most noteworthy aspects is the striking constancy of the level of the incidence of acute conditions during these 7 years. This pattern has persisted for over 20 years, with very little fluctuation in the overall level of acute conditions in the population of the United States. Although there have been several flu epidemics in the past 25 years, we did not experience any of the devastating epidemics that have occurred previously and, most noticeably, the Swine Flu Epidemic which was anticipated in 1976 and 1977 never did occur.

However, this has not been the situation with regard to chronic conditions. Figure 12 shows the trends based on data from the National Health Interview Survey for the period from 1960 to 1981. In contrast to the marked decline in mortality, which was shown previously, and in contrast to the stability of trends in acute conditions, there has been a marked increase in the reported prevalence of most of the chronic conditions. Wilson and Drury (*1*) have recently reviewed some of these data in great detail and have offered possible explanations for these apparent trends. Some of the increase may be due to improved methodology used in the surveys, such as better interviewing techniques for eliciting chronic conditions. Some of the increase in prevalence could be due to better survival of patients with these conditions, which would go along with the decrease in the mortality rates. A third possibility is the increase in use of physician's services over time, with better diagnoses of conditions and better informing of patients that they have these conditions. These and other factors are just possibilities, however, since there have been few, if any, direct studies that would shed much light on which of these factors are operating. Unfortunately, there have been few populations available for direct observation of these conditions during the last two decades and those that have been available, such as the Framingham Study, have been too small to shed much information on the year-to-year trends in these conditions.

Another indicator of the trends in morbidity in the United States can be obtained from the National Hospital Discharge Survey. This survey collects information on over 300,000 hospital discharges from a sample of over 600 hospitals in the United States. There has been an increased use of hospital services for most conditions. Figure 13 illustrates trends in discharges from short-stay hospitals for diseases of the heart from 1965 to 1980. In each age/sex group there has been approximately a 70% increase in the rate of discharges per 1,000 population for diseases of the heart. Obviously, this is in marked contrast to the trends in mortality. Although these trends are consistent with an improvement in survival rates from heart attacks and other cardiac conditions, this cannot be the full explanation.

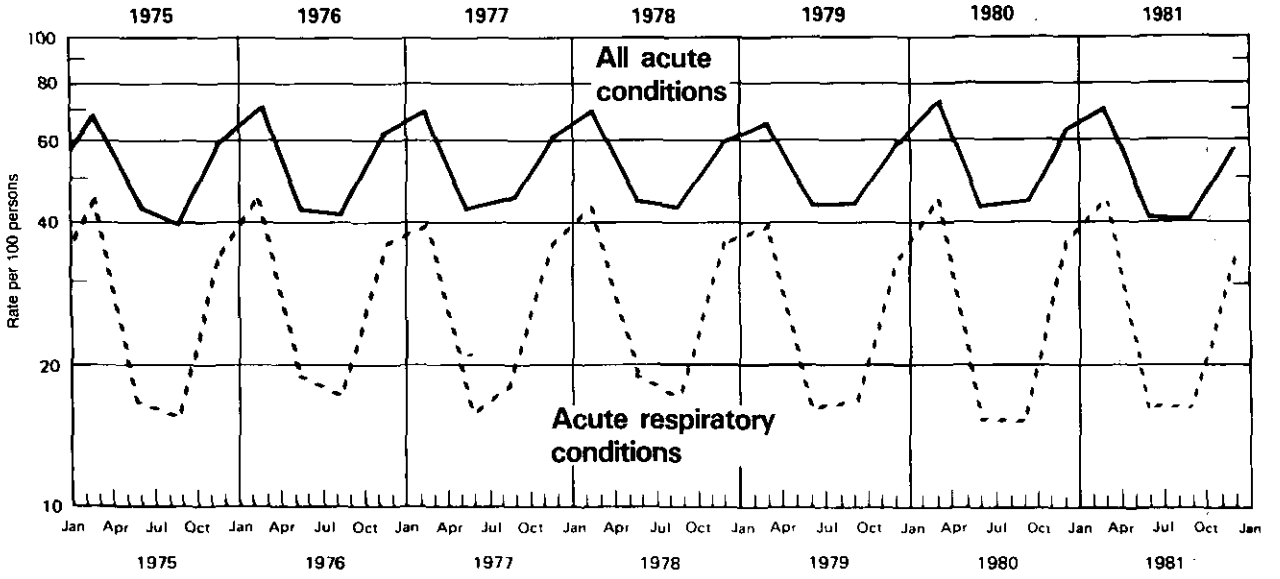


FIGURE 11. Incidence of all acute conditions and acute respiratory conditions per 100 persons per quarter.

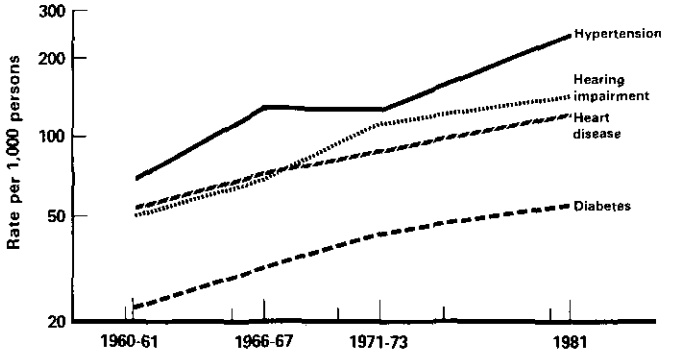


FIGURE 12. Prevalence of selected chronic conditions as reported in health interviews, ages 45–64.

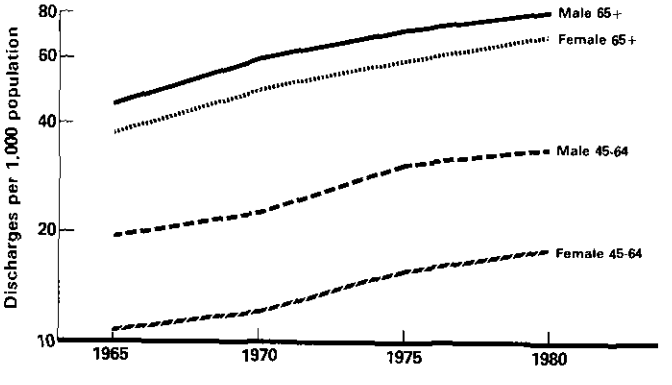


FIGURE 13. Discharges from short-stay hospitals, diseases of the heart 1965–1980.

Some of the increased use of hospitals reflects readmissions for the same or subsequent heart conditions. Some of it may reflect greater utilization of hospitals for more minor conditions or for conditions which would have been merely suspect in previous years. However, it is difficult to claim that these trends support the notions of a decrease in the incidence of heart conditions during the past two decades.

Another measure of health in the population that is closely associated with prevalence of disease is the reported disability from disease. Figure 14 shows disability from acute conditions as reported on the National Health Interview Survey. Similar to the previous findings for the incidence of acute conditions, there has been a remarkable stability in the year-to-year patterns for disability days associated with these illnesses. The seasonal variability is marked but the overall levels of disability both for total restricted activity days and for bed disability days have been remarkably constant for the last 7 years.

With regard to disability due to chronic conditions, a different concept is used, i.e., limitation of activity, which is defined in terms of ability to perform one's major activity, e.g., work, housework, or going to school. Figure 15 shows the trends in limitation of activity during the last two decades. The three age-sex groups shown are examples to give some indication of the range of variations observed in the data for both sexes and for different age groups. For males aged 45–64 there has been more than a doubling in the percentage who are unable to perform their major activity, which is usually taken to mean unable to work. On the other hand, for women aged 17–44 with regard to all degrees of limitation, including those unable to perform their major activity, which can be either outside employment or

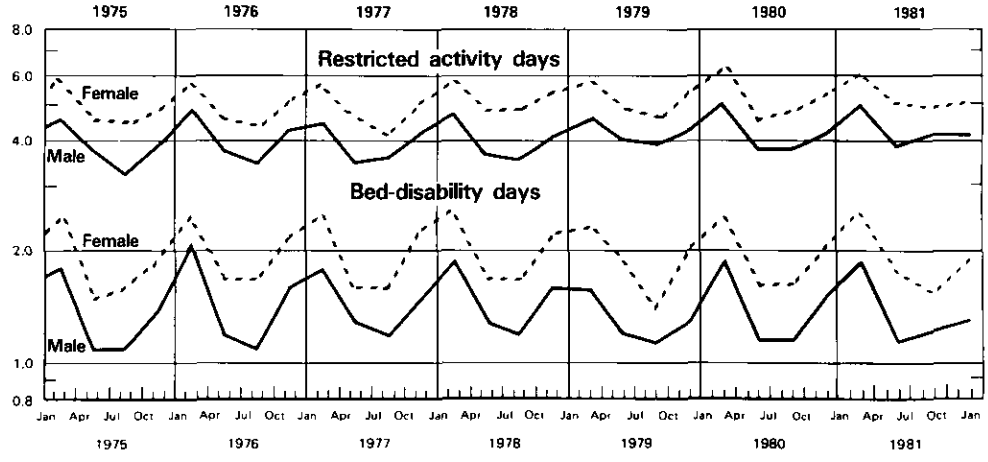


FIGURE 14. Disability days per person per quarter.

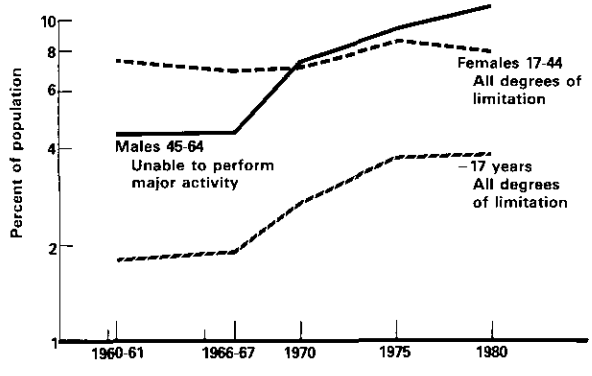


FIGURE 15. Limitation of activity due to chronic conditions.

housework or various other lesser limitations of activity, the trend has been essentially flat for the last two decades. For the youngest segment of the population, those under age 17, there has been a doubling of the rates of all degrees of limitation during these years.

These trends in limitations of activity, including changes in the chronic conditions causing the limitations, have recently been analyzed by Colvez and Blanchet (*2*) and by Newacheck, Burdetti, and McManus (*3*). Some of this increase in limitation of activity may be real but it is felt by many that most of the increase is an artifact due to various factors operating during the last 20 years. Again, a variety of explanations are possible but direct evidence to evaluate any of them is quite meager. Some of the factors that have to be considered are changes in the methodology in health survey procedures, as discussed by Wilson and Drury (*1*). These changes usually reflect improvements in survey and questionnaire design so that the increased level may actually be a truer reflection of what has been going on all along with underreporting in previous years due to deficiencies in the methodology. The apparent increased prevalence of chronic disease may be related to other factors, as mentioned previously, including better diagnosis, earlier diagnosis, and improved survival after a condition is diagnosed and treated. A third set of factors relates to the social and economic environment that has changed gradually over the last 20 years. With increased availability of disability benefits, people are more apt to accept limitations on their major activities or even retire if they can qualify for these disability benefits or early retirement. There may also have been a change in the social attitude about work itself, so that people are no longer reluctant to retire early. There may have been a change in the job structure of the population so that people who would ordinarily have taken lighter jobs if they were found to have a disabling condition and who would still report that they were able to work, now no longer have the opportunity to engage in such jobs and cease working altogether. It is difficult to find direct evidence to support any of these explanations, and one must therefore interpret with caution these trends in morbidity which do not parallel the continuing improved trends in mortality.

A fifth set of indicators of health trends in the United States is based on utilization of health services and expenditures for health care. In the last 30 years there has been a tremendous increase in the proportion of the gross national product expended for health services and care (Fig. 16). In 1950 the health bill in the United States was 12.7 billion dollars, or 4.4% of the gross national product. In 1982 the health outlay was over 300 billion dollars, or 10.5% of the gross national product, representing a 2.5-fold increase. This increase in the proportion of the gross national product expended for health care represents a marked shift in the allocation of our national resources for health care. About a third of the increase since 1950 in our total national health care expenditures is a result of an increase in the utilization rates and quality improvements; over half of the increase is due to price rises or inflation, and only a small proportion is the result of population growth.

As mentioned previously, there has been an increase over the past two decades in the use of hospitals for

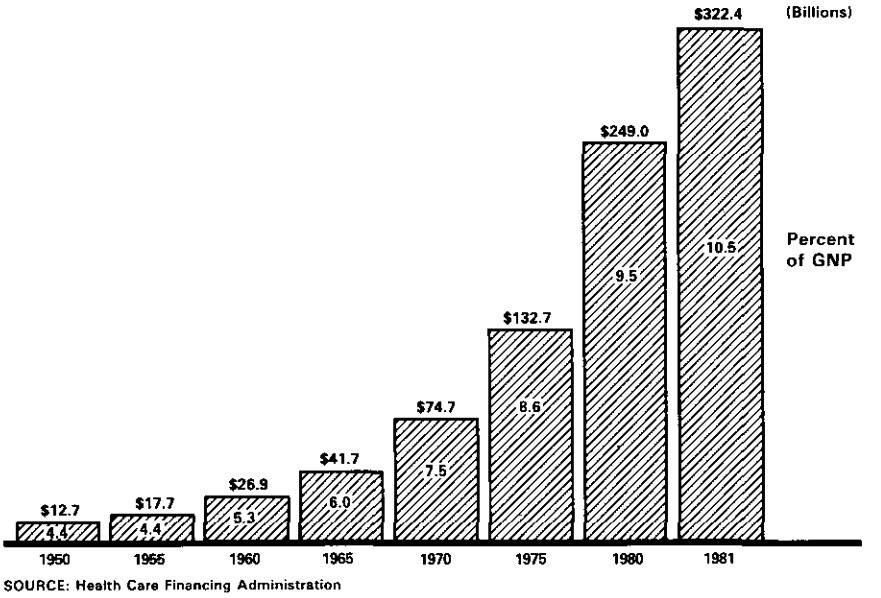


FIGURE 16. National health expenditures as a percent of GNP, selected years, 1950–1982.

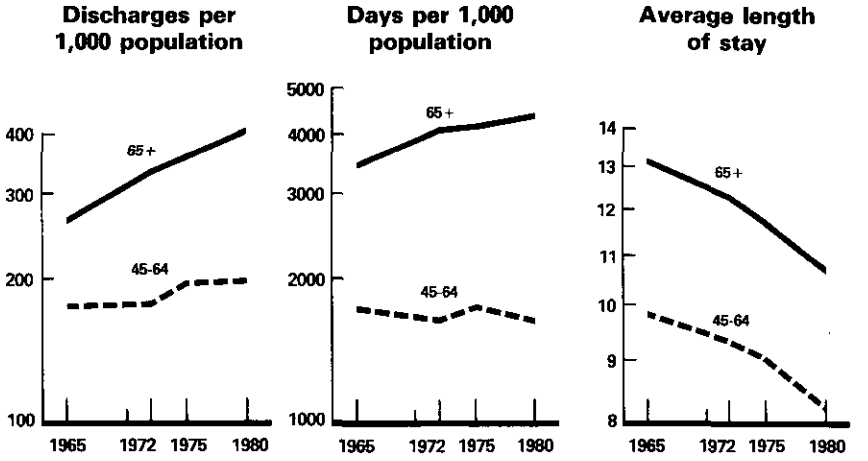


FIGURE 17. Hospital utilization.

heart disease among the middle-aged and elderly. However, the pattern of hospital utilization for these two age groups for all causes is somewhat different. Most of the increase in the rates occurred during the late 1960s, i.e., following the implementation of the Medicare and Medicaid programs (Fig. 17). The total number of days of care for those 65 years also increased markedly following the enactment of Medicare. On the other hand, both age groups have experienced a continuous decline in the average length of stay per hospitalization.

Trends in ambulatory care for persons aged 45 to 64 and 65 years and over are shown in Figure 18. Although these trends appear to have been stable, there have been complex trends in the use of ambulatory services by socioeconomic level, age, and race which have re-

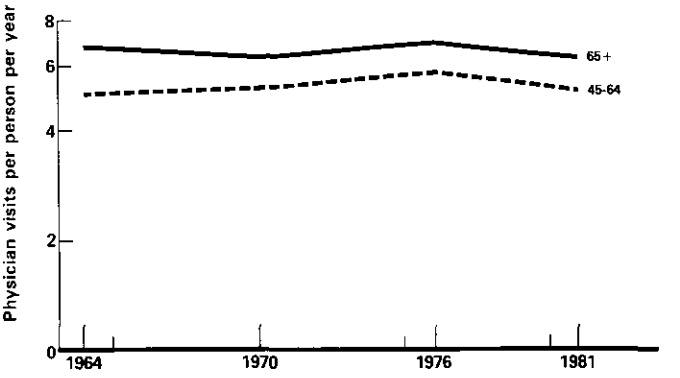


FIGURE 18. Ambulatory care.

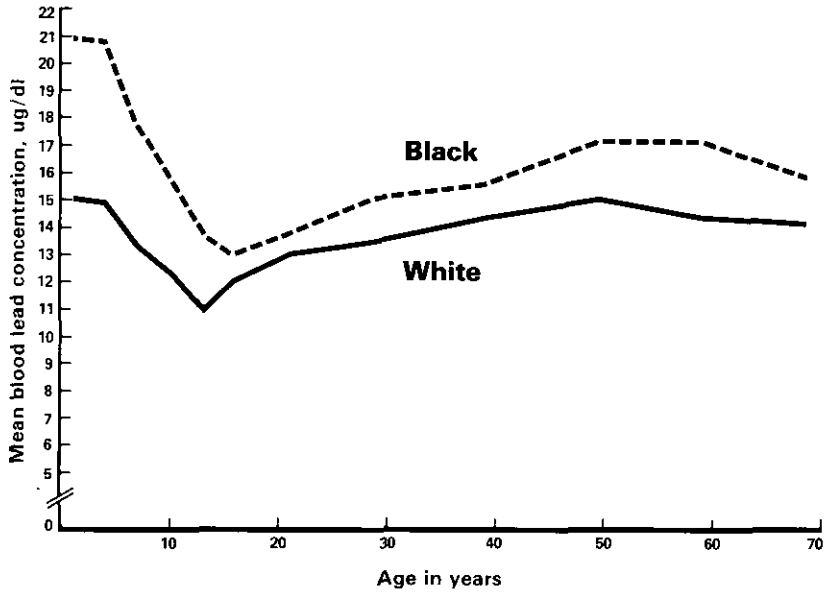


FIGURE 19. Blood lead levels by race and age: United States, NHANES II, 1976–1980.

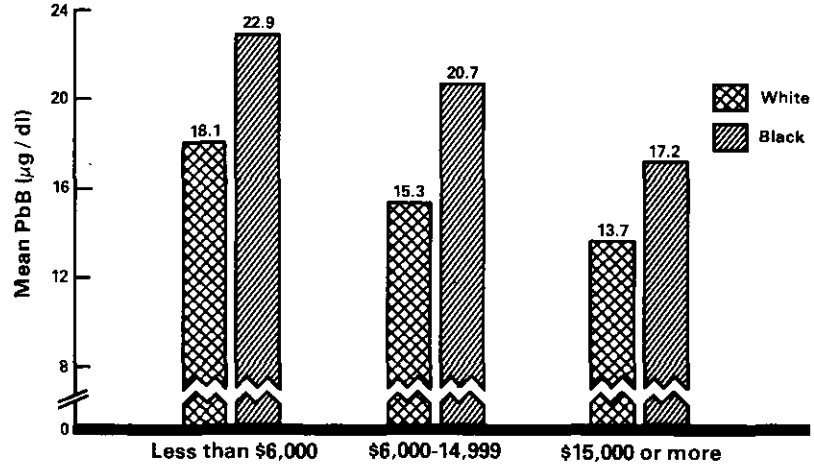


FIGURE 20. Mean blood lead levels (PbB) of children ages 6 months-5 years by annual family income: United States, 1976–1980.

sulted from changes over the past two decades in levels of health insurance coverage, third-party payments, Medicaid, and Medicare.

The sixth and final measure of health trends in the United States to be discussed is a measurement of risk factors and physiological characteristics in the population. The first example, which is quite relevant to the topic of this symposium, is that of blood lead levels in the population. Figure 19 shows the levels of lead measured in the blood in the participants of the second National Health and Nutrition Examination Survey (NHANES II) in 1976 to 1980 varied by age and race. It is presumed that the high levels under the age of 5 are due to ingestion of lead-containing substances such as paint from walls and toys by young children and from exposure to ambient lead from playing outdoors. The decrease thereafter probably reflects some excretion of lead from the body as the children are no longer as greatly exposed, and then subsequently, from the teenage period to old age, there is a gradual buildup as lead from environmental sources of exposure begin to accumulate in the kidney and other parts of the body. The NHANES II data also show that mean blood levels in children vary by family income as well as by race (Fig. 20). The socioeconomic differences are undoubtedly related to the differential environmental exposures that exist for social classes in the United States.

The NHANES II lasted 4 years and during that period there was an estimated 37% decline in blood lead levels in the overall population (Fig. 21). This decrease occurred, with some minor variation, for both blacks and whites, for men and women, and in each age group,

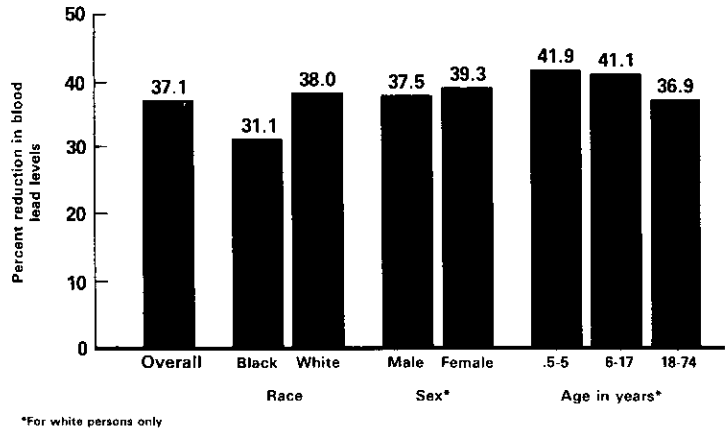


FIGURE 21. Percent reduction in blood lead levels: United States, February 1976 to February 1980.

in particular among children under the age of 5. It was generally believed that the main reason for this decline was a drop in the amount of gasoline containing lead which was produced in the United States during this 4-year period and that the reduction in inhaled lead from the ambient air resulted in the lower blood lead levels (Fig. 22). The evidence from the National Health and Nutrition Examination Survey, along with other evidence which has gradually been accumulating, gives ample credence to the recently introduced proposal to ban the production of leaded gasoline in order to improve the health of Americans.

A second example of measures of physiological characteristics and risk factors are the trends in smoking habits of Americans in the last 20 years (Fig. 23). The first surveys taken after the Surgeon General's Report on Smoking in 1964 showed that half of all adult males and about a third of all adult females were smokers. Since then there has been a gradual decrease in the prevalence of smoking among men and women. Teenage boys during the last 20 years have also shown a marked decrease in the tendency to assume the cigarette smoking habit. Teenage girls, however, were gradually increasing their cigarette consumption until, in the late 1970s, they were smoking at a greater rate than teenage boys. The most recent surveys have reported that the trend for teenage girls may be reversing and paralleling the downward trend seen in the other three groups.

The summary for this paper is taken from a recent article by Wilson and Drury (*1*)."Although the health of the nation may be improving, with few exceptions, it is difficult to document this improvement from the disease and disability statistics traditionally used to indicate health status at the national level. (One notable exception is the marked reduction in childhood diseases.) Judgments that the health of Americans is improving are generally based on the recent declines in mortality, increased access to medical care, better maternal and child health care, more effective medical technology and medical care, along with changes in health practices generally considered to have a favorable impact on health, such as reduced cigarette smoking, improved diet, and increased exercise. Illness and disability time series, however, provide a more ambiguous data base for evaluating improvements in health status because changes in health indicators do not always clearly

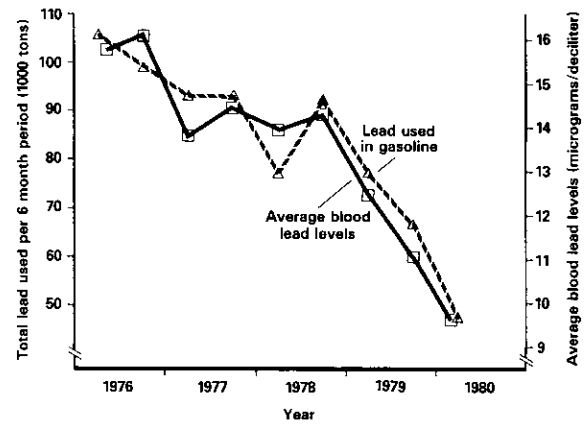


FIGURE 22. Lead used in gasoline production and average NHANES II blood lead levels (February 1976–February 1980).

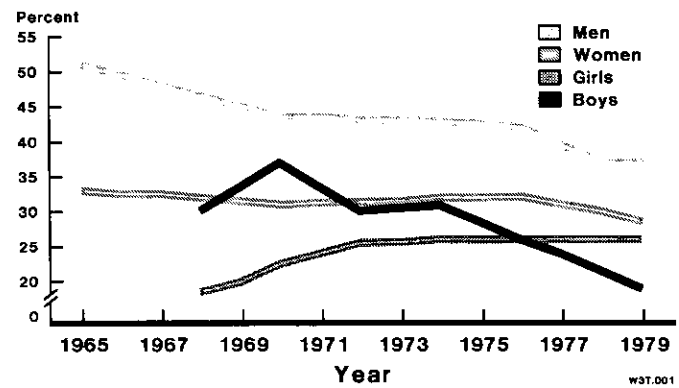


FIGURE 23. Percent of population smoking.

reflect changes in the health phenomena they are purported to measure."

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