The Effects of Medicare on Health Care Utilization and Outcomes

by

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Abstract

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Medicare, which provides health insurance to Americans over the age of 65 and to Americans living with disabilities, is one of the government's largest social programs. It accounts for 12% of federal on- and off-budget outlays, and in fiscal year 1999, $212 billion in Medicare benefits were paid. The largest shares of spending are for inpatient hospital services (48%) and physician services (27%). In 30 years, the number of Americans covered by Medicare will nearly double to 77 million, or 22 percent of the U. S. population.

Perhaps the most important question we can ask about the Medicare program is, what impact does it have on the health of the U.S. population? There is a feature of the Medicare program that can be exploited to shed light on its impacts: its age specificity. Most people become eligible for Medicare suddenly, the day they turn 65. Consequently, the age profiles of health services utilization and health outcomes (morbidity and mortality) can provide revealing evidence about Medicare's impacts.

My objective is to obtain precise estimates of medical utilization and outcomes, by single year of age, for ages close to age 65. The most precise estimates can be obtained by using information obtained from medical providers (hospitals and doctors) pooled over a number of years.

Utilization of ambulatory care and, to a much smaller extent, inpatient care, increases suddenly and significantly at age 65, presumably due to Medicare eligibility. The evidence points to a structural change in the frequency of physician visits precisely at age 65. Attainment of age 65 marks not only an upward shift but also the beginning of a rapid upward trend (up until age 75) of about 2.8% per year in annual visits per capita. The number of physician visits in which at least one drug is prescribed also jumps up at age 65. Reaching age 65 has a strong positive impact on the consumption of hospital services, but most of this impact appears to be the result of postponement of hospitalization in the prior two years.

We also examine whether this increase in utilization lead to an improvement in outcomes—a reduction in morbidity and mortality—relative to what one would expect given the trends in outcomes prior to age 65. The estimates are consistent with the hypothesis that the Medicare-induced increase in health care utilization leads to a reduction in days spent in bed of about 13% and to slower growth in the probability of death after age 65. Physician visits are estimated to have a negative effect on the male death rate, conditional on age and the death rate in the previous year. The short-run elasticity of the death rate with respect to the number of physician visits is -.095, and the long-run elasticity is -.497: a permanent or sustained 10% increase in the number of visits ultimately leads to a 5% reduction in the death rate.

Data on age-specific death probabilities every 10 years back to 1900, i.e. before as well as after Medicare was enacted provide an alternative way to test for the effect of Medicare on longevity, and provide strong support for the hypothesis that Medicare increased the survival rate of the elderly, by about 13%.

Between 1965 and 1967, there was a huge (65%) increase in real per capita public health expenditure. (Figure 1) Medicare, which today provides health insurance to Americans over the age of 65, accounted for more than half (57%) of the 1965-67 increase in public health expenditure.

As Figure 2 reveals, this increase in public health expenditure was offset, to some extent, by a reduction in private health expenditure. I estimate that each additional dollar of public health expenditure "crowded out" about 43 cents of private spending.[1] Nevertheless, enactment of Medicare and Medicaid led to significant increases in per capita health expenditure.

Perhaps the most important question we can ask about the Medicare program is, what impact has it had on the health of the U.S. population? Attempting to answer this question with either individual-level or aggregate data may be fraught with difficulties.

At the individual level, there is often an inverse relationship between medical expenditures and health outcomes: people in poor health have higher medical expenditures. The expenditures may improve their health, but unless a person's health is observable both pre and post expenditure—which is usually not the case—the contribution of expenditure to health cannot be identified.

The Health Care Financing Administration (2000) cites aggregate data to support its argument that "the average life expectancy of elderly Americans has increased, in part, because of Medicare." That claim seems plausible: life expectancy at age 65 increased at

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[1] I calculated this by estimating the following regression:

$$\Delta \ln(Priv_t) = 3.92 - 0.319\, \Delta \ln(Pub_t) - .0020\, t$$

(t=4.24) (3.45) (4.22)

adjusted $R^2 = 0.327$
Sample period: 1961-1998.

$Priv_t$ = real private health expenditure
Pub_t = real public health expenditure

$$\frac{\Delta Priv}{\Delta Pub} = -0.319\, \frac{Priv'}{Pub'} = -.433$$

Priv' = mean real private health expenditure
Pub' = mean real public health expenditure

a faster rate since Medicare than it did before Medicare: 2.0 years during 1970-90 vs. 1.3 years 1950-70, although data on life expectancy at age 65, by sex, reveal that only men experienced faster growth in life expectancy after Medicare than before Medicare. Moreover other factors, such as changes in rates of public and private biomedical innovation and government income security programs, may also have contributed to the acceleration of life expectancy at age 65, making it difficult to isolate the contribution of Medicare from aggregate time-series data.

There is a feature of the Medicare program that can be exploited to shed light on its impacts: its age specificity. Most people become eligible for Medicare suddenly, the day they turn 65. Consequently, the age profiles of health services utilization and health outcomes (morbidity and mortality) can provide revealing evidence about Medicare's impacts.

Changes in utilization and outcomes at age 65

Most Americans become eligible for Medicare benefits upon reaching the age of 65. (In 1990, 90% of Medicare beneficiaries were elderly, as opposed to disabled or ESRD enrollees.) Consequently, comparisons of health utilization and outcomes just before and just after age 65 may be able to shed light on the impact of Medicare. Some variables (e.g. mortality rates) may exhibit trend prior to age 65. In such cases, it is appropriate to examine whether there is a break in the trend at age 65, rather than to test for a pre- vs. post-65 difference in levels.

Medicare eligibility is not the only major event that many people experience at or around the age of 65. Another important event is *retirement*. Indeed, the intent of Medicare was evidently to ensure that people continued to have access to medical care after they retired, and were no longer covered by employer-sponsored health insurance.

From that perspective, if Medicare had exactly accomplished its objectives, one might expect to observe *no difference* between (or no shift in the trend in) utilization and outcomes pre vs. post age 65. Suppose that in the absence of Medicare, a person's medical expenditure would drop significantly upon retirement, assumed to occur at age 65. The objective of Medicare was simply to fill the gap left by the termination of employer-sponsored insurance. This is depicted in Figure 3.

Presumably, policymakers did not intend there to be an upward shift in the age-expenditure profile at age 65. If they believed that medical expenditure before age 65 was too low, they could have designed the program to provide at least some benefits to people younger than 65.

If policymakers wanted people to consume about the same amount of medical services (e.g. physician visits) at age 66 as they had done at age 64, they should have ensured that the out-of-pocket cost was *higher* at age 66. This is because the consumption of medical services requires *two* inputs: purchased medical services (e.g. the physician's time) and the *patient's time.* The opportunity cost (foregone earnings) of the patient's time is much higher before than after retirement. Therefore, if out-of-pocket cost is the same, one would expect people to visit the doctor more after they have retired.

If everyone retired at age 65, when they become eligible for Medicare, it would be almost impossible to distinguish between the effects of retirement and the effects of Medicare from the age profiles of utilization and outcomes. In practice, however, many people retire before reaching the age of Medicare eligibility. According to Social Security Administration data for December 2000, 46% of workers retire by age 62,[2] and 62% of workers retire by age 64. Hence, if there are abrupt changes in utilization and outcomes precisely at age 65, it is unlikely that they can be accounted for by retirement.

<u>The Age-Utilization profile</u>

My objective is to obtain precise estimates of medical utilization and outcomes, by single year of age, for ages close to age 65. Household surveys such as the 1996 Medical Expenditure Panel Survey (MEPS) and its predecessors contain comprehensive information, but the number of individuals of any given age is quite small, resulting in large sampling error. For example, the average number of people per single year of age is only 221 for ages 45-64 in MEPS.

Much more precise estimates can be obtained by using information obtained from medical providers (hospitals and doctors) pooled over a number of years.

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[2] The monthly Social Security benefit is about 25% lower if one retires at age 62 than it is if one retires at age 65. As a general rule, early retirement will give one about the same total Social Security benefits over one's lifetime, but in smaller amounts to take into account the longer period during which they will be received.

A. Hospital discharges

I obtained data on hospital discharges, by age, from the National Hospital Discharge Survey, 1979-1992 Multi-Year Data file. The National Hospital Discharge Survey (NHDS) provides data on inpatient utilization of short-stay, non-Federal hospitals in the United States. The NHDS abstracts both demographic and medical information from the face sheets of the medical records of inpatients selected from a national sample of hospitals. Based on this information, national and regional estimates of characteristics of patients, lengths of stay, diagnoses, and surgical and non-surgical procedures in hospitals of various bed sizes and types of ownership are produced. The 1979-1992 Multi-Year Data file contains records of about 2.8 million non-newborn hospital discharges.

The age profile of hospital discharges is shown in Figure 4. There is a marked discontinuity in the profile at age 65. The "annual" growth rate of hospital discharges is shown in Figure 5. From age 50 to age 62, the number of discharges increases by about 3% per year of age. From age 62 to age 64, the number of discharges is essentially constant (it actually *declines* a little). Between age 64 and age 65, the number of discharges increases 9.5%. Between ages 65 and 74, it increases about 0.5% per year.

This evidence indicates that reaching age 65 has a strong positive impact on the consumption of hospital services. However, much of this impact appears to be the result of postponement of hospitalization in the prior two years. The average annual growth rate from age 62 to 65 is 3.1%. In contrast, the average annual growth rate from age 50 to 62 is 2.3, and from 59 to 62 is 2.4%. Hence the "excess" growth from age 62 to 65 is 0.7-0.8% per year, or about 2.1-2.4% additional discharges by the age of 65.

B. Physician visits

I computed frequencies of physician office visits, by single year of age, by pooling data from National Ambulatory Medical Care Surveys (NAMCS) for each of the 17 years during 1973-1998 in which the survey was conducted.[3] The number of visits surveyed varies from year to year; the 1998 survey contains information from 24,715 patient visits. The pooled data set contains data on approximately 313 thousand visits.

[3] NAMCS was not conducted in 1974, 1982-84, and 1986-88.

Medicare & non-Medicare physician visits per person per year, by age, are shown in Figure 6.[4] Frequencies of physician office visits, by single year of age for ages 61-69, are shown in Figure 7. As in the case of hospital discharges, the evidence points to a structural change in visit frequency precisely at age 65. The average annual number of physician visits is 9.5% higher for ages 65-69 than it is for ages 61-64. Once they are eligible for Medicare, people visit the doctor more often![5]

Figure 8 displays data on physician visits *per capita* (visits in all years divided by population in April 1990), using a wider age window. From age 50 to age 64, annual visits per capita is flat, and even exhibits a tendency to decline from age 58 to age 64. Attainment of age 65 marks not only an upward shift but also the beginning of a rapid upward trend (up until age 75) of about 2.8% per year in annual visits per capita.

Since physicians prescribe at least one drug in about 2/3 of office visits, one would expect the number of "drug visits"—visits in which at least one drug is prescribed—also to jump up at age 65. Figure 9 (based on data for 1985 and 1989-98) confirms that this is the case. The number of drug visits increases 11.3% from age 64 to age 65. The average annual number of drug visits is 19% higher among 65-72 year-olds than it is among 60-64 year-olds.

The Age-Outcomes profile

The evidence just presented indicates that utilization of ambulatory care and, to a much smaller extent, inpatient care, increases suddenly and significantly at age 65, presumably due to Medicare eligibility. We now address the question, does this increase in utilization lead to an improvement in outcomes—a reduction in morbidity and mortality—relative to what one would expect given the trends in outcomes prior to age 65?

A. Bed days

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[4] A Medicare visit is defined as a visit in which Medicare is the expected principal source of payment.

[5] In 1998, the elderly accounted for 23.8% of physician office visits. Medicare was the expected primary source of payment for 19.2% of physician office visits.

Data on one important indicator of morbidity—mean number of days spent in bed in the last 12 months—by age, are available from the National Health Interview Survey (NHIS). The purpose of the NHIS is to obtain information about the amount and distribution of illness, its effects in terms of disability and chronic impairments, and the kinds of health services people receive. I calculated mean annual bed-days from NHIS Person files for the five years 1987-1991. These files contain data on about 142 thousand people between the ages of 50 and 80.

Mean annual bed days, by 5-year age groups, are shown in Figure 10. Mean bed days increases by 0.62 from age 50-54 to age 55-59, and increases even more—by 1.63 days—from age 55-59 to ages 60-64. However mean bed days of 65-69 year-olds is slightly *lower* than that of 60-64 year-olds. If the pre-age-65 trend (14% average quinquennial growth rate) had continued, mean bed days of 65-69 year-olds would have been 15% higher—10.58 days as opposed to 9.21 days. Mean bed days of 70-74 and 75-80 year-olds would also have been about 15% higher. These estimates are consistent with the hypothesis that the Medicare-induced increase in health care utilization at age 65 leads to a reduction in days spent in bed of about 13%.

B. Mortality

To examine the shape of the age-mortality profile, I will use data taken from the period life table. There are two types of life tables—the generation or cohort life table and the period life table. The generation life table provides a ‘‘longitudinal’’ perspective in that it follows the mortality experience of a particular cohort, all persons born in the year 1900, for example, from the moment of birth through consecutive ages in successive calendar years. Based on age-specific death rates observed through consecutive calendar years, the generation life table reflects the mortality experience of an actual cohort from birth until no lives remain in the group. To prepare just a single complete generation life table requires data over many years. It is not feasible to construct generation life tables entirely on the basis of actual data for cohorts born in this century. It is necessary to project data for the incomplete period for cohorts whose life spans are not yet complete.

The better-known period life table may, in contrast, be characterized as ‘‘cross-sectional.’’ Unlike the generation life table, the current life table does not represent the mortality experience of an actual cohort. Rather, the current life table considers a hypothetical cohort and assumes that it is subject to the age-specific death rates observed for an actual population during a particular period. Thus, for example, a current life table for 1995 assumes a hypothetical cohort subject throughout its lifetime to the age-specific death rates prevailing for the actual population in 1995. The current life table may thus be characterized as rendering a ''snapshot'' of current mortality experience, and shows the long-range implications of a set of age-specific death rates that prevailed in a given year.

Period life tables are produced on an annual basis by two different Federal agencies: the National Center for Health Statistics (NCHS) and the Social Security Administration (SSA), Office of the Actuary. Wilkin (1981) discusses the methods used to construct both sets of life tables, and their relative reliability. NCHS tables are primarily based on data obtained from death certificates. Misstatement of the age of the decedent on death certificates is known to be a serious problem. SSA life tables utilize administrative data from the Medicare program. As Wilkin observes, over the years, the Medicare program has accumulated a large quantity of reliable data on the mortality of the aged. The problem of misstatement of age is greatly reduced in this case, because most of the data relate to individuals who have had to verify their dates of birth to become entitled to benefits under the program.[6] The problem of underregistration of deaths is small, because the availability of a small lump-sum death payment on insured workers' accounts encourages survivors and funeral directors to report deaths. The problem of under-enumeration of population is negligible, because the group under observation is defined by program records; thus, the data do not include deaths of unobserved persons. Further, the data are so extensive, covering nearly the entire aged population of the United States, that meaningful analyses can be done over relatively short periods of time (and, hence, trends through time can be accurately detected).

Wilkin concludes that “the Medicare data appear to be more accurate by age and more consistent through time than the NCHS data.” The trustees of the Social Security

[6] Proof of date of birth requires the submission of a public record of birth or a religious record of birth or baptism. Where no such document is available, the individual must submit another document or documents that may serve as the basis for a determination of his date of birth, provided that such evidence is corroborated by other evidence or by information in the records of the Social Security Administration.

system base their projections of income and outlays on SSA life tables rather than NCHS life tables. Therefore I will examine data on age-specific mortality rates from the SSA period life table. In particular, I will use the 1995 SSA period life table.

The table provides data on the probability of dying within one year ("death probability"), by exact age (age = 1, 2, …, 119) and sex. Death probabilities of men, by age, are shown in Figure 11. It seems in this figure that the death probability increases smoothly from about 1% at age 55 to about 5% at age 75. However the appearance of smoothly increasing death probabilities is deceptive. Figure 12 depicts the *percentage increase* in the male death probability from the previous year. From age 50 to age 65, the death probability increases at an increasing rate. Initially, the death rate increases about 8% a year, and the growth rate rises fairly steadily to about 10% by age 65. But between ages 65 and 69, the slope of the curve is quite negative. The probability of death continues to increase, but more slowly than it did up until age 65. As Figure 13 reveals, there is a similar dramatic decline in growth in the probability of death of women after age 65.

Suppose that, instead of declining after age 65, the growth rate of the probability of death for men had continued to grow at the rate it had grown from age 50 to age 65. Then as Figure 14 indicates, the probability that a 65-year-old man would live at least 10 more years would have been 63.5%, rather than the actual probability of 68.6%. The post-65 slowdown in death probability raised the odds of being able to celebrate one's 75th birthday by 5.1 percentage points.[7, 8]

This evidence is consistent with the hypothesis that the Medicare-induced increase in health care utilization at age 65 leads to slower growth in the probability of death after age 65. I performed a formal test of this hypothesis using regression analysis. Using data for ages 51 to 75, I estimated the following regression equation:

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[7] The corresponding increase for women is only about one-third as large, because women's death probabilities at given ages are significantly lower than men's.

[8] In principle, one could calculate the effect of the decline in mortality growth rate on *life expectancy* at age 65, which is perhaps the most interesting summary statistic. However this requires predicting counterfactual mortality rates at advanced ages, a potentially speculative undertaking.

$d_j = -1.86 + .809\, d_{j-1} - .095\, visits_j + .030\, hosp_j + .018\, j$
(t=1.40) (9.68) (3.28) (0.63) (2.54)

where

d_j = the log of the male death rate at age j

$visits_j$ = the log of the number of physician visits at age j

$hosp_j$ = the log of the number of hospital discharges at age j

The hospital coefficient is not statistically significant, but the visits coefficient is highly significant (p-value = .004), indicating that physician visits have a negative effect on the male death rate, conditional on age and the death rate in the previous year. In the "short run," the elasticity of the death rate with respect to the number of physician visits is -.095: a 10% increase in the number of visits leads to an immediate reduction in the death rate of 0.95%. In the "long run," the elasticity of the death rate with respect to the number of physician visits is -.497 (= -.095/ (1 - .809)): a permanent or sustained 10% increase in the number of visits ultimately leads to a 5% reduction in the death rate.

C. Mortality: an alternative approach

The analysis in the previous section was based on age-specific death probabilities in a single year (1995). But data on age-specific death probabilities are available from NCHS (Anderson (1997)) every 10 years back to 1900, i.e. before as well as after Medicare was enacted. Medicare, which began in 1966, primarily benefits people 65 years old and over.[9] Hence 70-year olds in 1970 and 1980 benefited from the program, but 70-year olds in 1960 did not, nor did 60-year olds in any year. An alternative way to test for the effect of Medicare on longevity is to estimate models of the following form:

$$\ln S_{it} = \alpha_i + \delta_i t + \beta \text{ shift} + u_{it} \qquad (1)$$

where S_{it} = the survival rate of age group i in year t (i = 1, 5, 10, 15,…, 100; t = 1900, 1910,…,1990, 1997) and shift is defined in various ways to test for shifts in survival

[9] When it was introduced, 100% of Medicare beneficiaries were elderly; today about 14% of them are non-elderly disabled.

rates.[10] This model allows for both a different mean survival rate and a different trend rate of increase for each of the 21 age groups. If Medicare resulted in an upward shift of the survival of people over 65 after 1966, then the appropriate definition of the shift variable is:

shift = 1 if year > 1966 and age > 65
= 0 otherwise.

When shift is defined in this way, the point estimate (t-statistic) of β is 0.132 (8.28). This provides strong support for the hypothesis that Medicare increased the survival rate of the elderly, by about 13%.

To ensure that this shift corresponds to Medicare as opposed to some other factor(s), we can change the definition of the shift term, i.e. choose an earlier or later year or a different age. The results of this sensitivity analysis are shown in Table 1.

[10] The survival rate is one minus the death rate. Here the survival rate is defined as the 5-year rate, e.g. the probability of surviving from age 65 to 70.

Table 1
Estimates of eq. (1) with alternative definitions of shift variable
(t-statistics in parentheses)

Line	Age criterion	Year criterion	b
1	age > 65	year ≥ 1970	0.131505
			-8.28
2	age > 65	year ≥ 1950	-0.01807
			-0.91
3	age > 65	year ≥ 1960	0.013066
			-0.66
4	age > 65	year ≥ 1980	0.102112
			-6.57
5	40 < age ≤ 65	year ≥ 1970	-0.00407
			-0.2

Lines 2 and 3 indicate that there is no evidence of a shift in the survival rate of people over 65 before 1966 (in either 1950 or 1960). Moreover there is stronger evidence of a shift in 1970 than there is of one in 1980 (Line 4).

Line 5 shows that there is no evidence of a shift in the survival rate of people between the ages of 40 and 65 after 1966. (Although the survival rates of people in this age group increased, there was not a shift in the time trend after 1966, as there was for older people.)

Summary

Medicare, which provides health insurance to Americans over the age of 65 and to Americans living with disabilities, is one of the government's largest social programs. It accounts for 12% of federal on- and off-budget outlays, and in fiscal year 1999, $212 billion in Medicare benefits were paid. The largest shares of spending are for inpatient hospital services (48%) and physician services (27%). In 30 years, the number of Americans covered by Medicare will nearly double to 77 million, or 22 percent of the

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I have attempted to obtain precise estimates of medical utilization and outcomes, by single year of age, for ages close to age 65. The most precise estimates can be obtained by using information obtained from medical providers (hospitals and doctors) pooled over a number of years.

I found that utilization of ambulatory care and, to a much smaller extent, inpatient care, increases suddenly and significantly at age 65, presumably due to Medicare eligibility. The evidence points to a structural change in the frequency of physician visits precisely at age 65. Attainment of age 65 marks not only an upward shift but also the beginning of a rapid upward trend (up until age 75) of about 2.8% per year in annual visits per capita. The number of physician visits in which at least one drug is prescribed also jumps up at age 65. Reaching age 65 has a strong positive impact on the consumption of hospital services, but most of this impact appears to be the result of postponement of hospitalization in the prior two years.

I also examined whether this increase in utilization lead to an improvement in outcomes—a reduction in morbidity and mortality—relative to what one would expect given the trends in outcomes prior to age 65. The estimates were consistent with the hypothesis that the Medicare-induced increase in health care utilization leads to a reduction in days spent in bed of about 13% and to slower growth in the probability of death after age 65. Physician visits are estimated to have a negative effect on the male death rate, conditional on age and the death rate in the previous year. The short-run elasticity of the death rate with respect to the number of physician visits is -.095, and the long-run elasticity is -.497: a permanent or sustained 10% increase in the number of visits ultimately leads to a 5% reduction in the death rate.

Data on age-specific death probabilities every 10 years back to 1900, i.e. before as well as after Medicare was enacted, provide an alternative way to test for the effect of Medicare on longevity, and provide strong support for the hypothesis that Medicare increased the survival rate of the elderly, by about 13%.

References

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Health Care Financing Administration (2000), *Medicare 2000: 35 Years of Improving Americans' Health and Security*, July.

Wilkin, John C. (1981), "Recent Trends in the Mortality of the Aged" *Transactions of the Society of Actuaries*, Volume XXXIII.

Figure 1
Percentage increase from previous year in real per capita public health expenditure

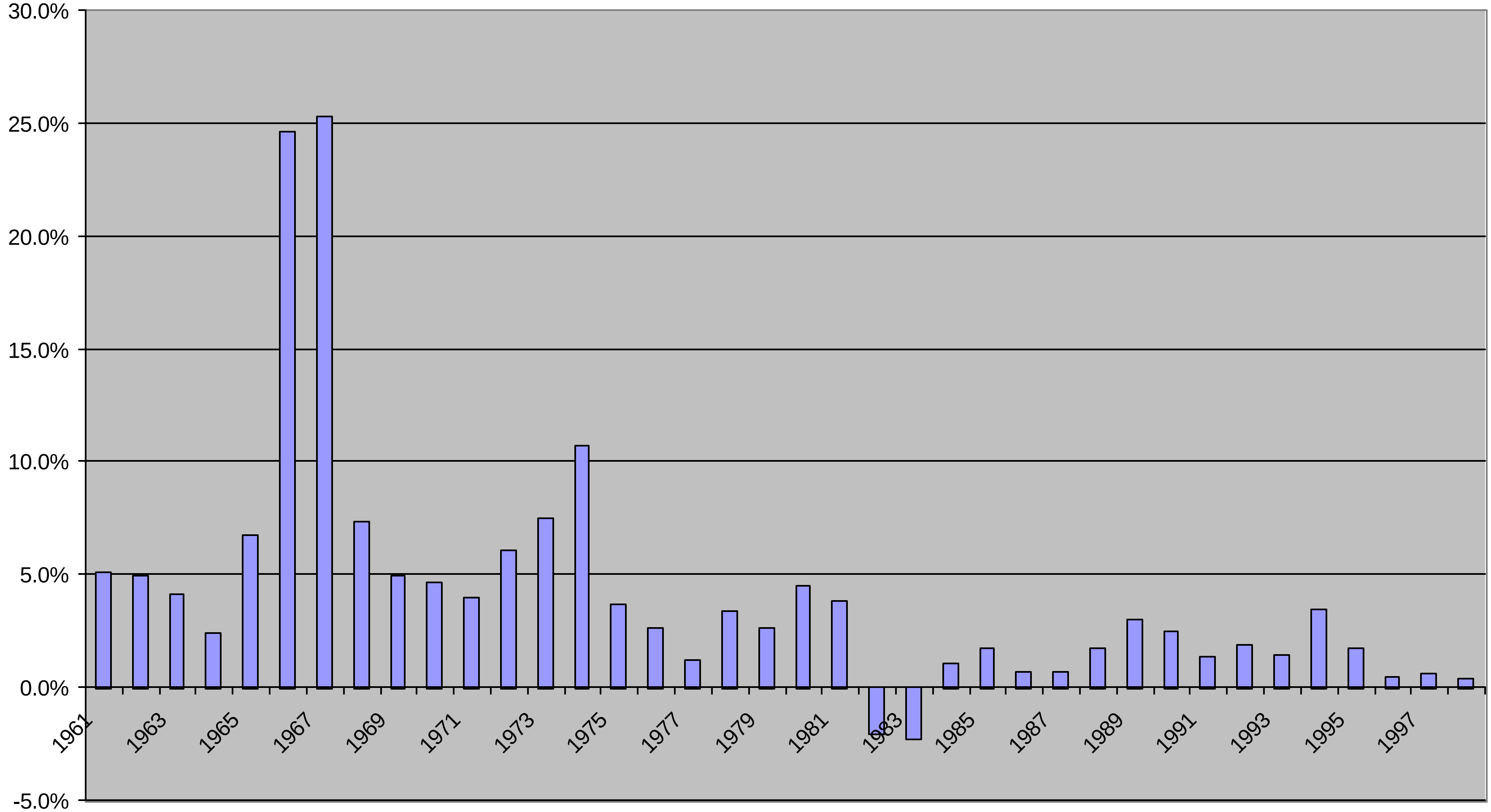


Figure 2
Percentage increase from previous year in real per capita public and private health expenditure

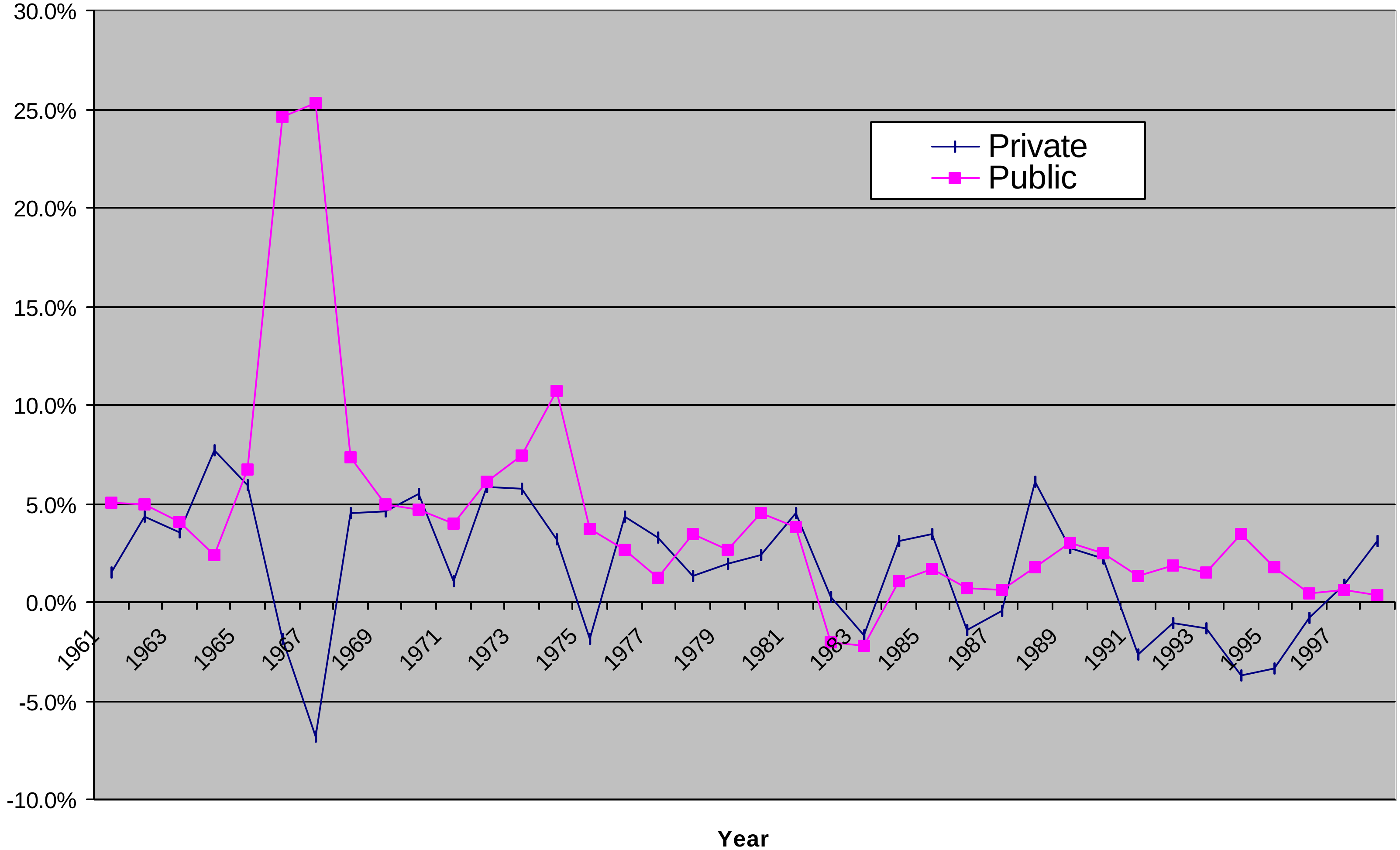


Figure 3
Hypothetical effect of Medicare on age/medical expenditure profile

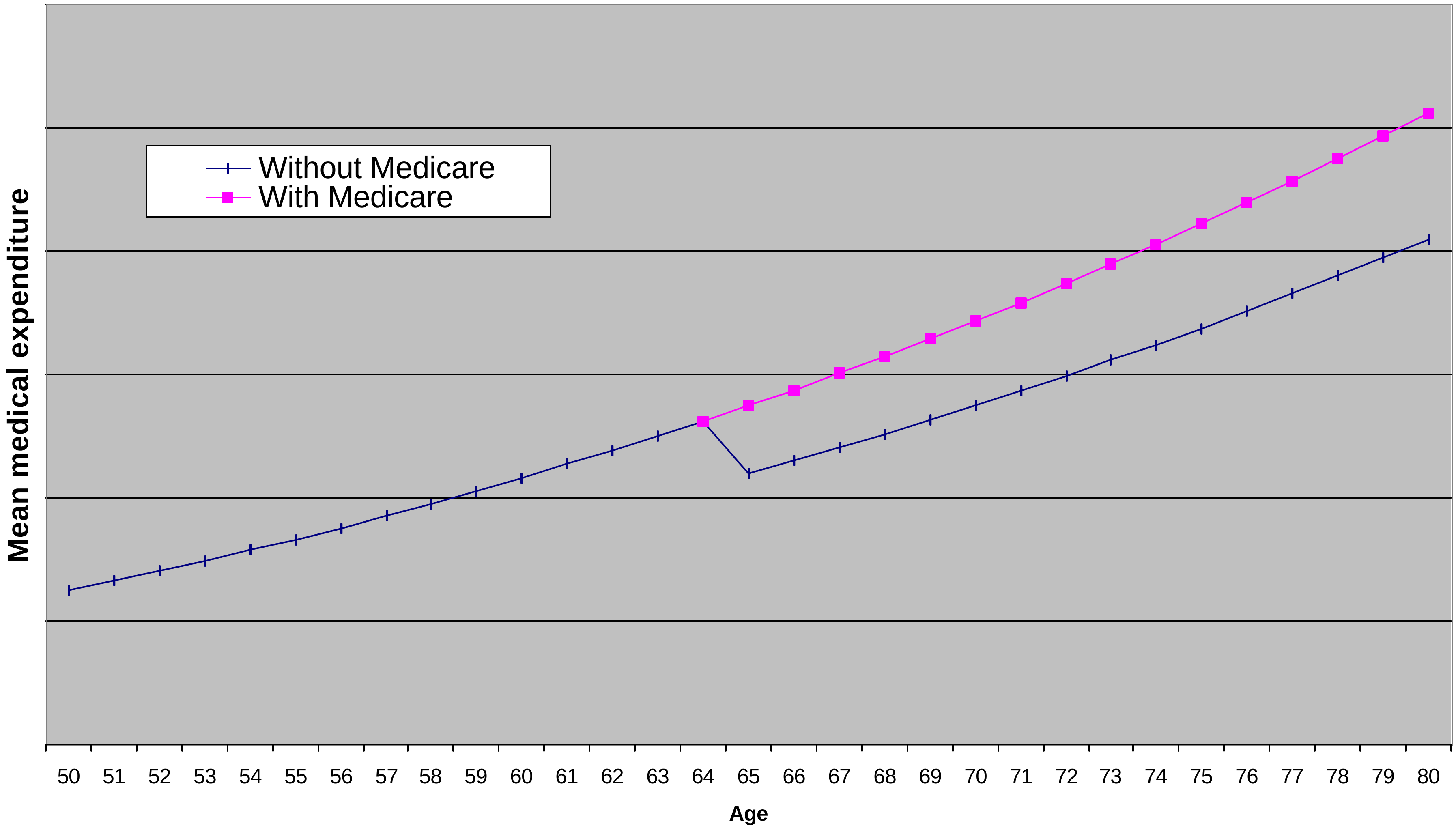


Figure 4
Number of 1979-1992 hospital admissions, by single year of age

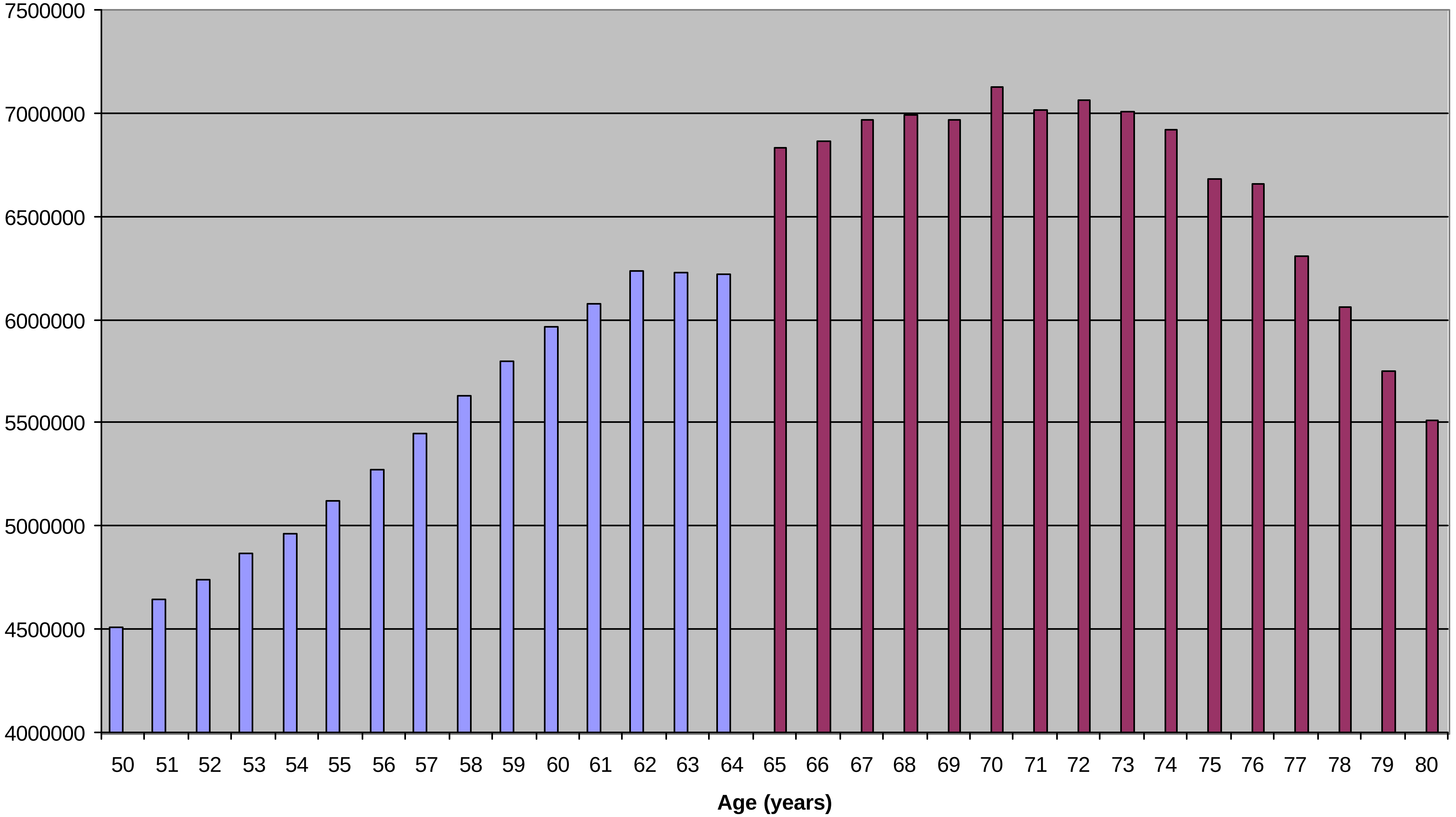


Figure 5
Percentage increase in number of hospital admissions from age t-1 to age t

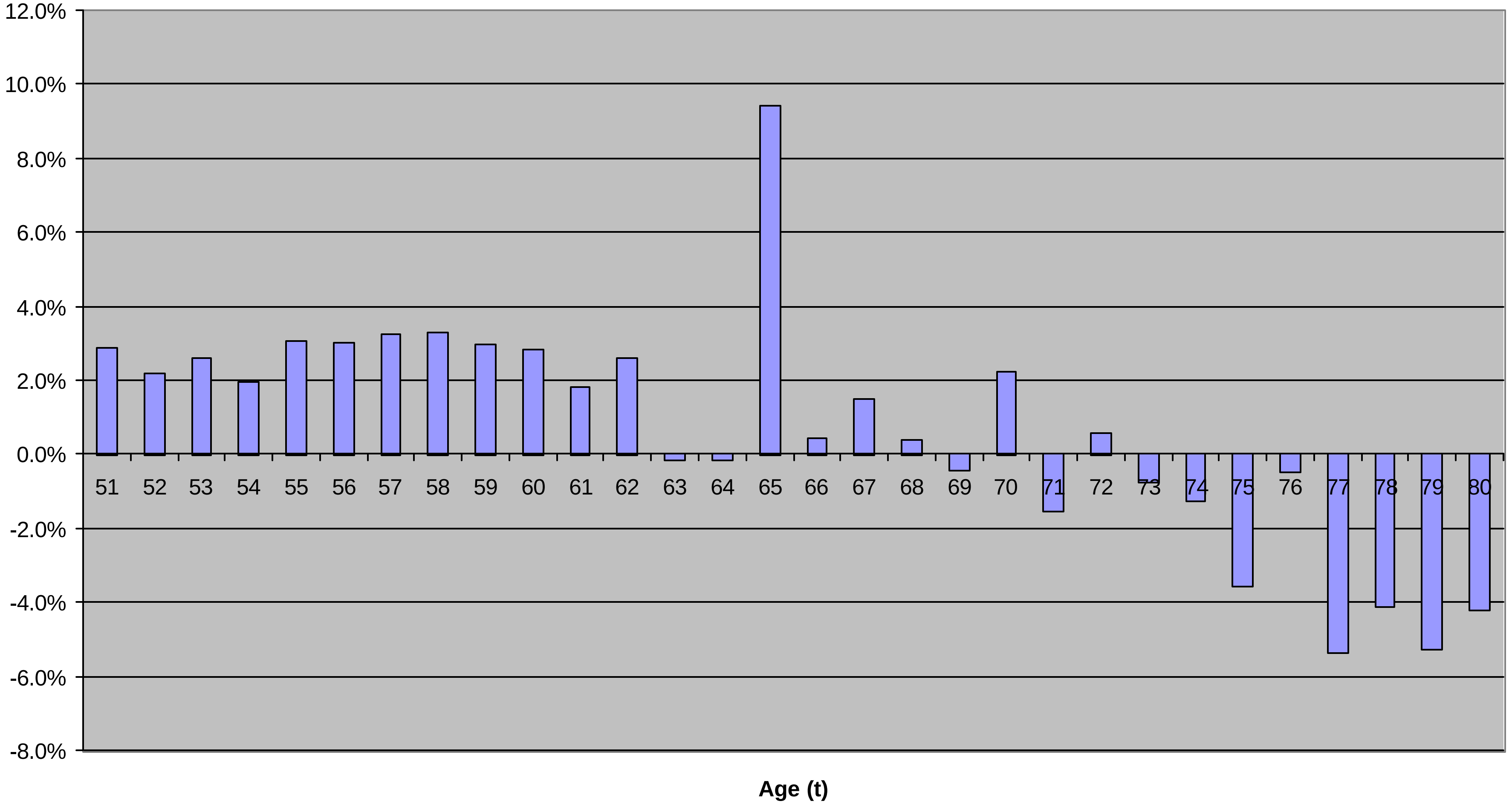
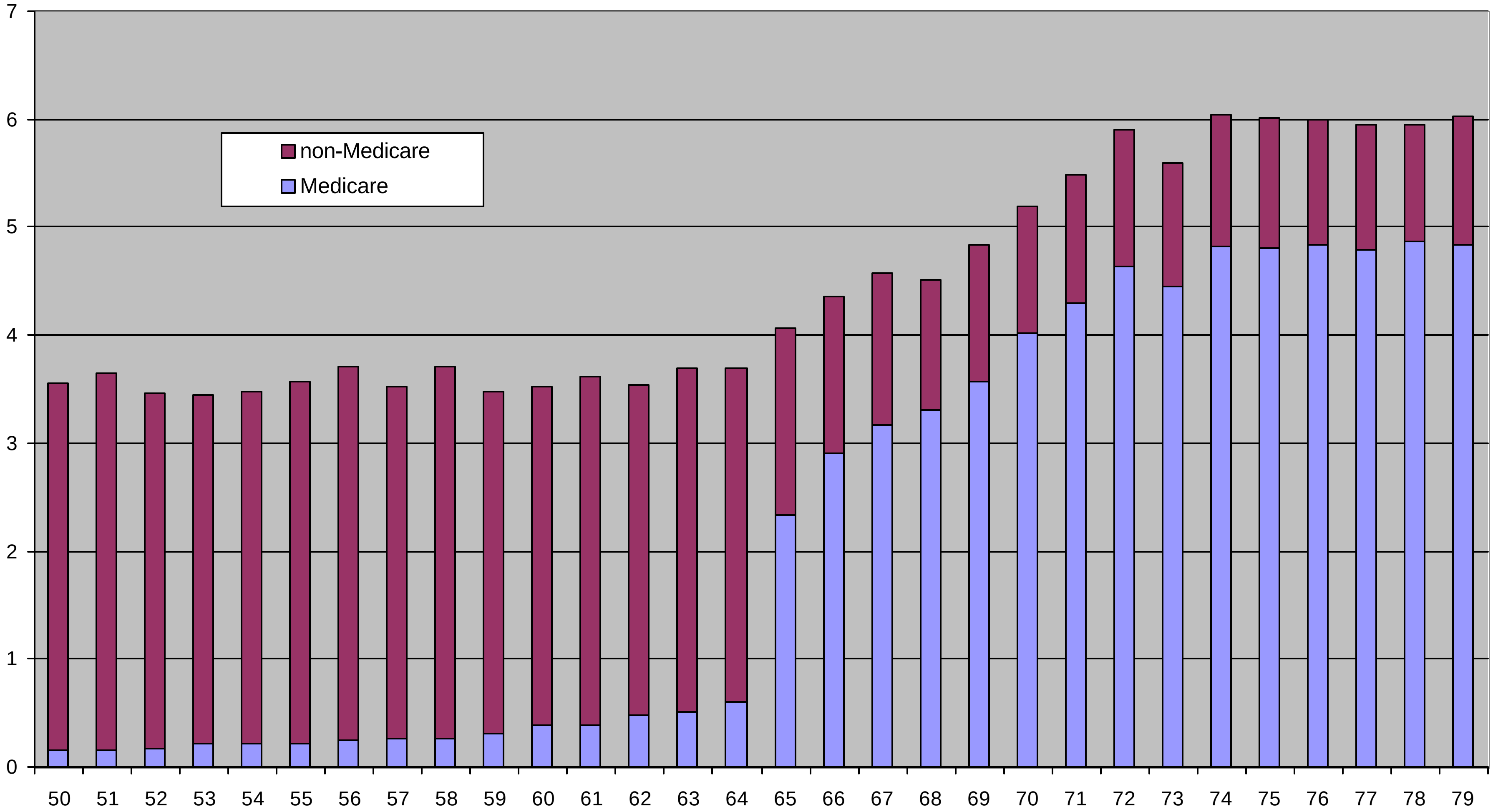


Figure 6
Medicare & non-Medicare physician visits per person per year, by age



A Medicare visit is defined as a visit in which Medicare is the expected principal source of payment.

Figure 7
Number of physician visits, by age

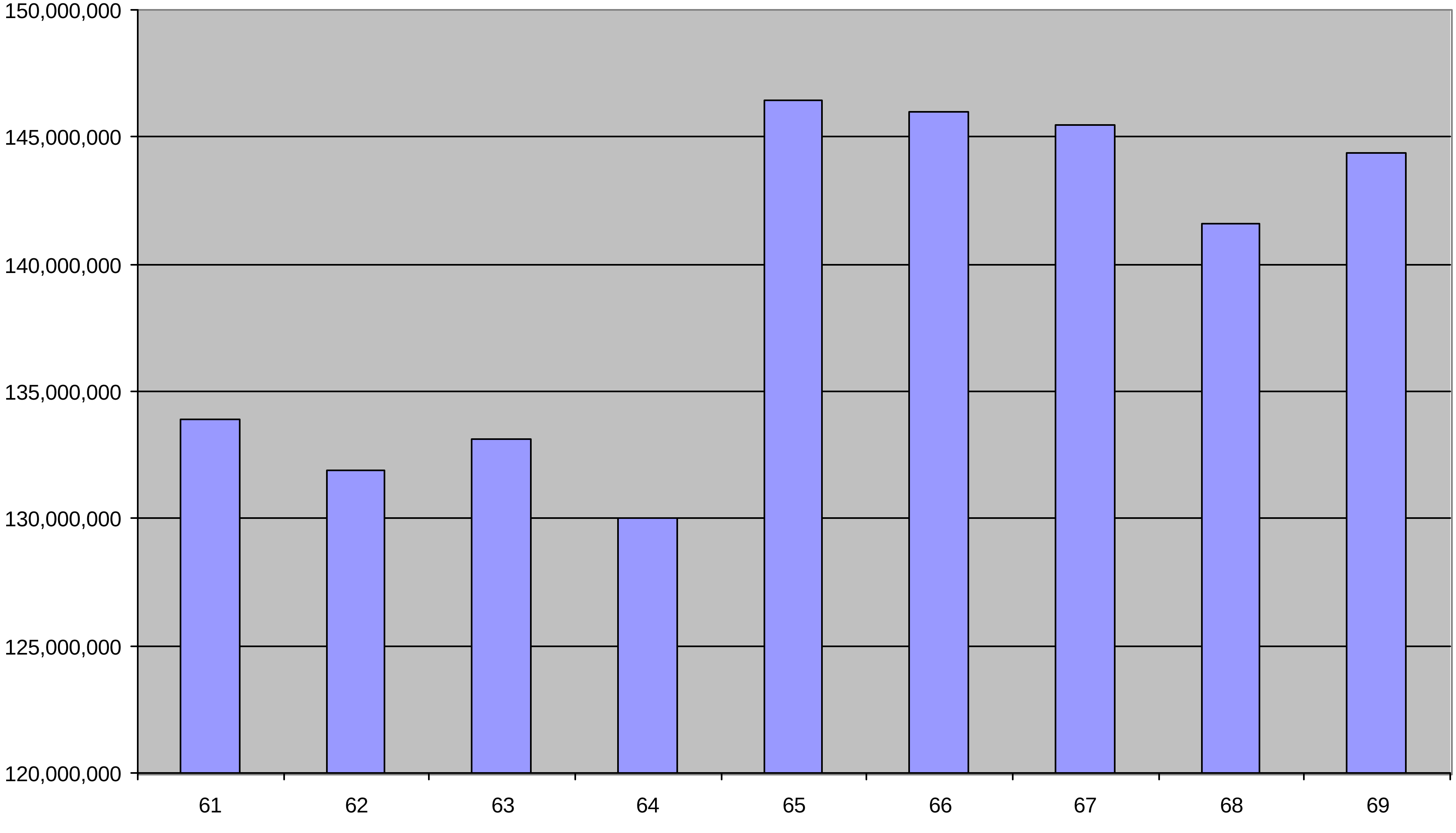


Figure 8
Physician visits per person, by age

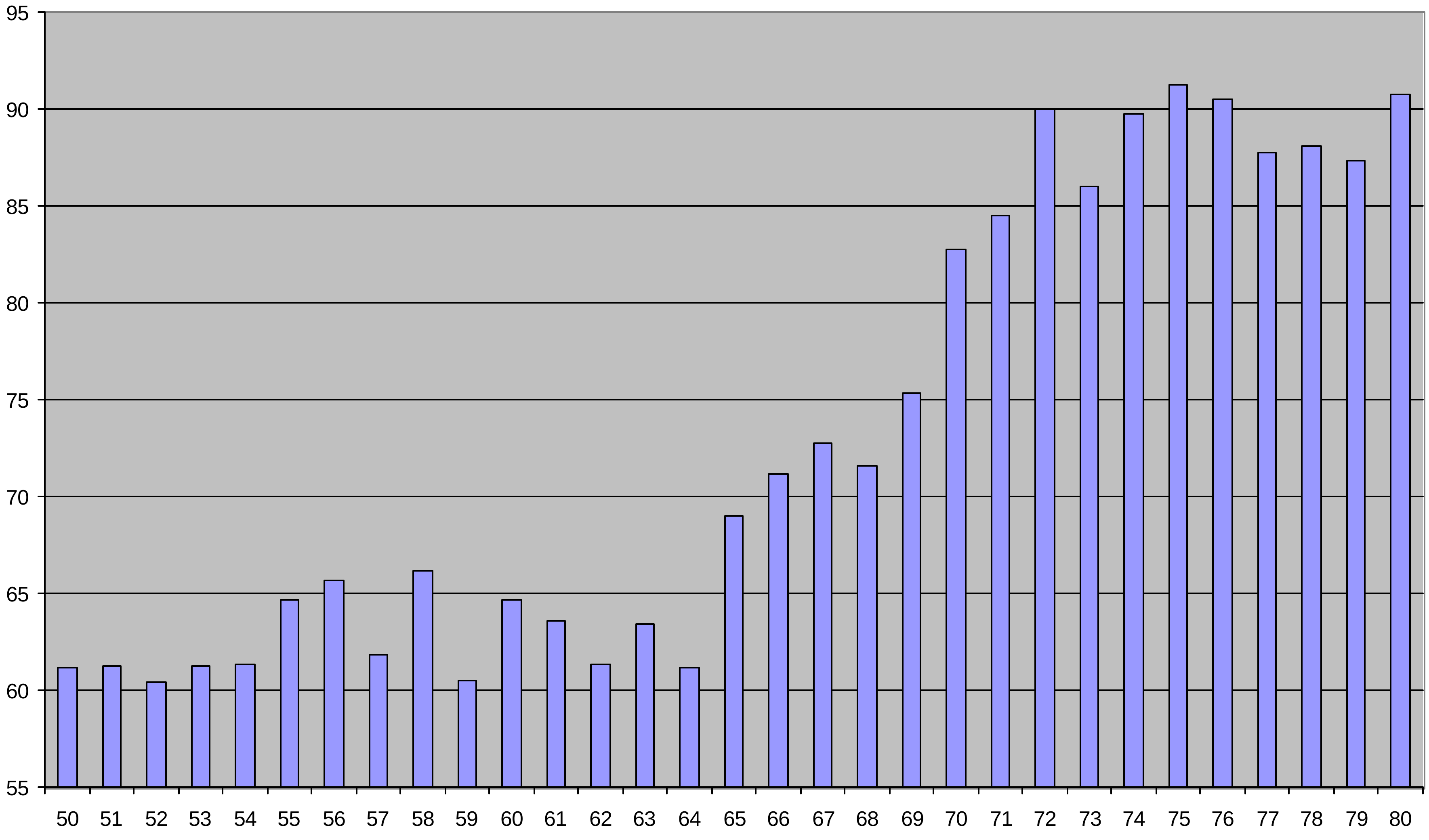


Figure 9
Number of physician visits in which at least one drug was prescribed, 1985 & 1989-1998

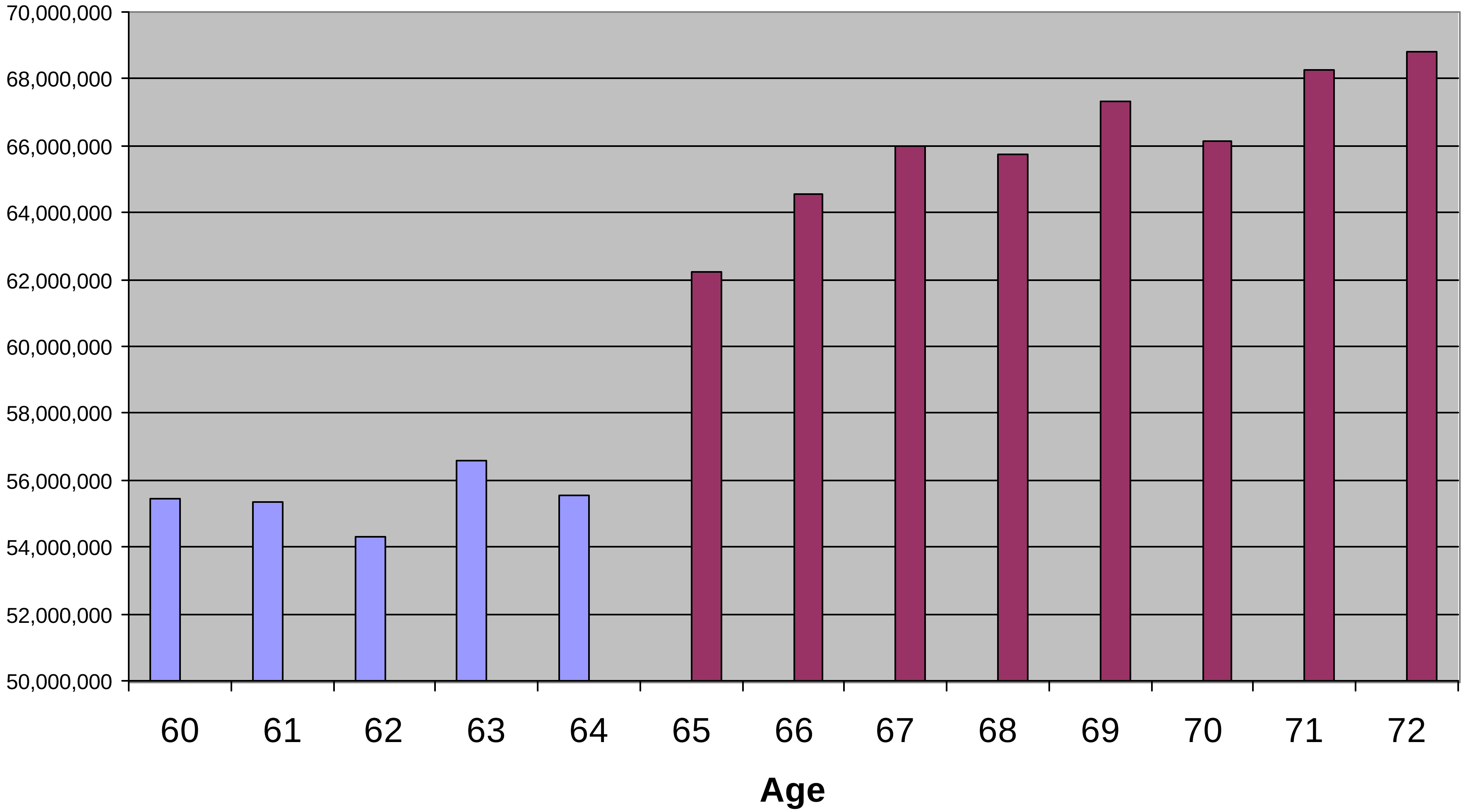


Figure 10
Mean Number of Bed Days in Last 12 months, by Age

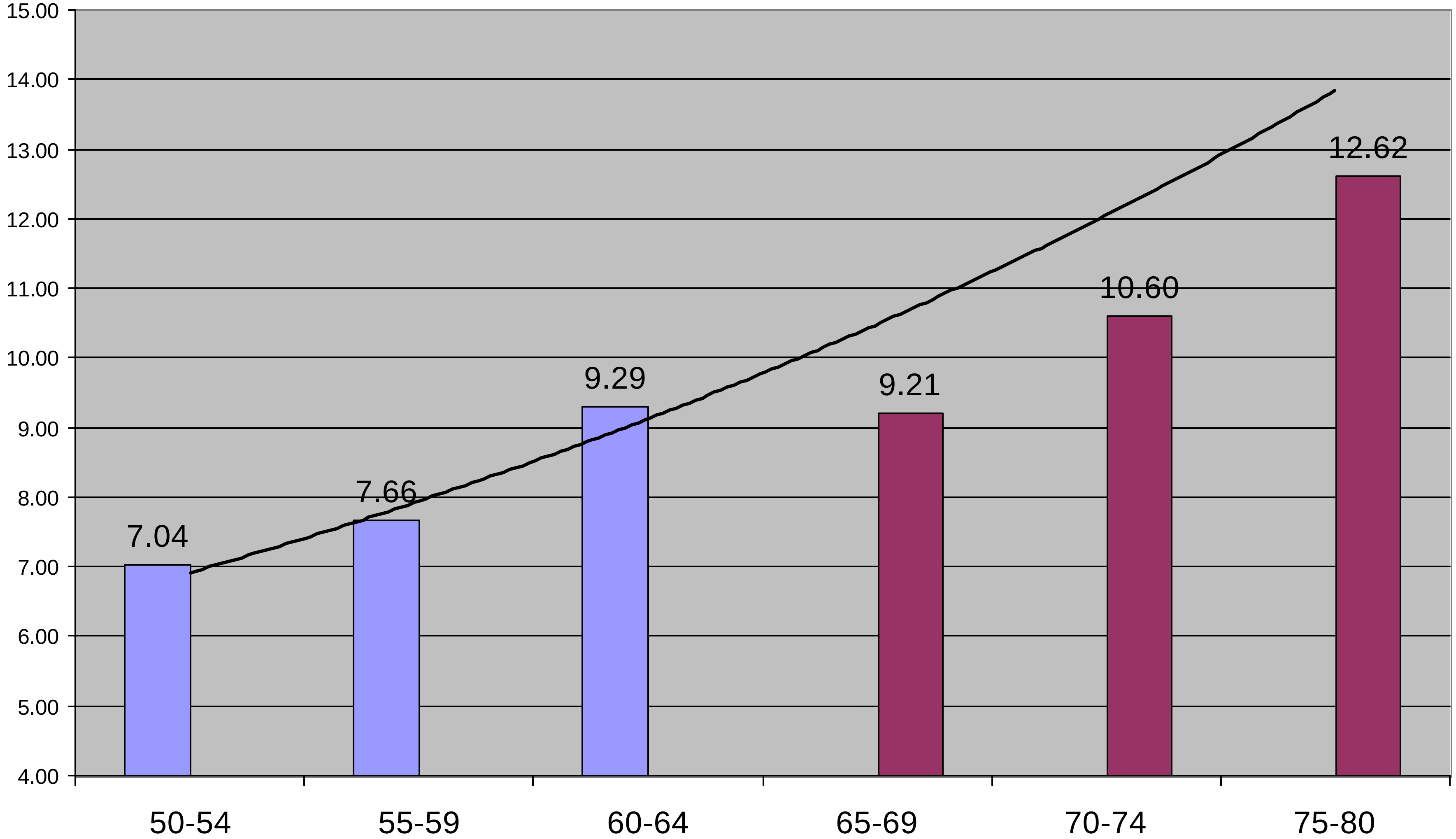


Figure 11
1995 death probability of men, by age

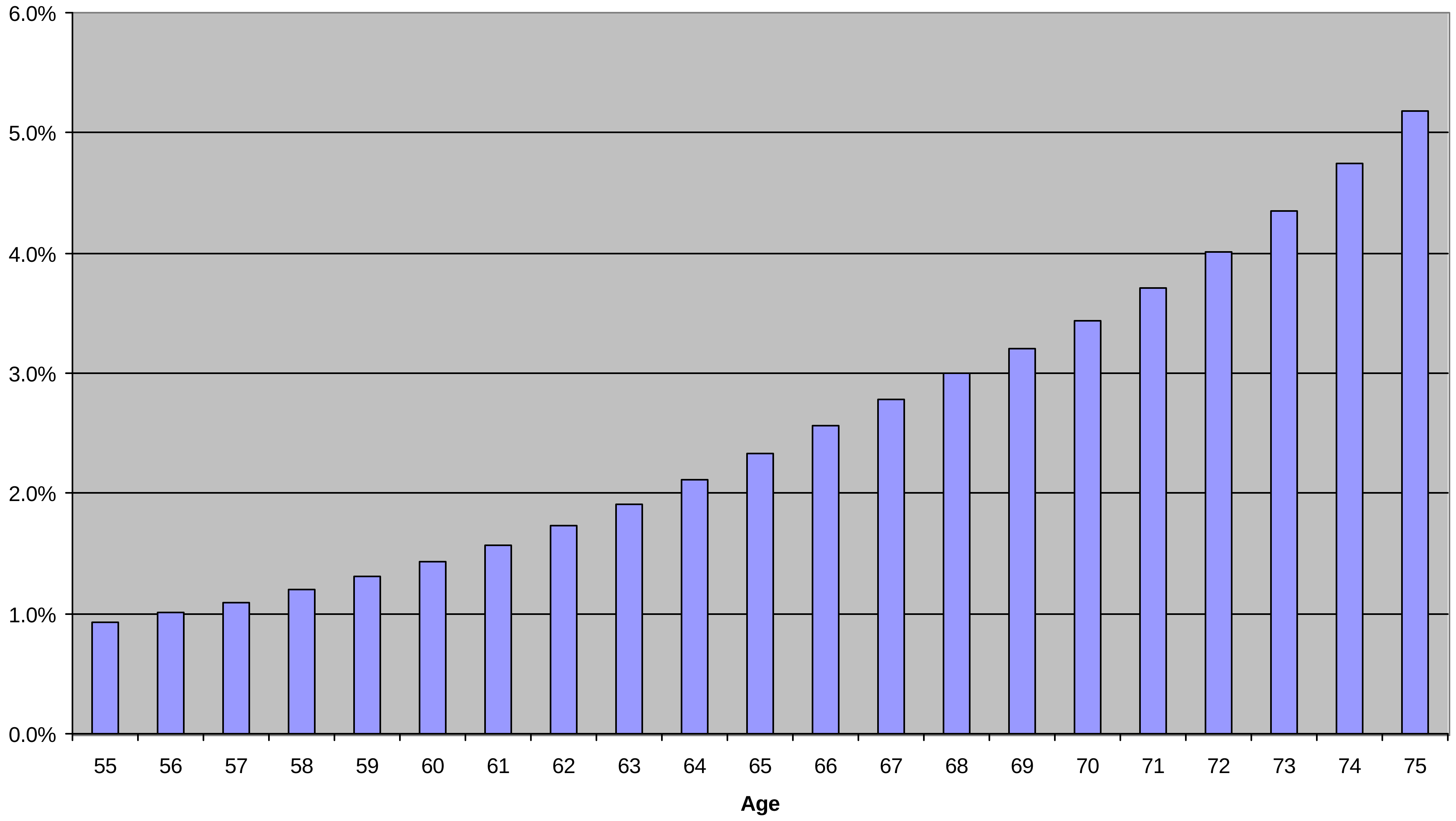
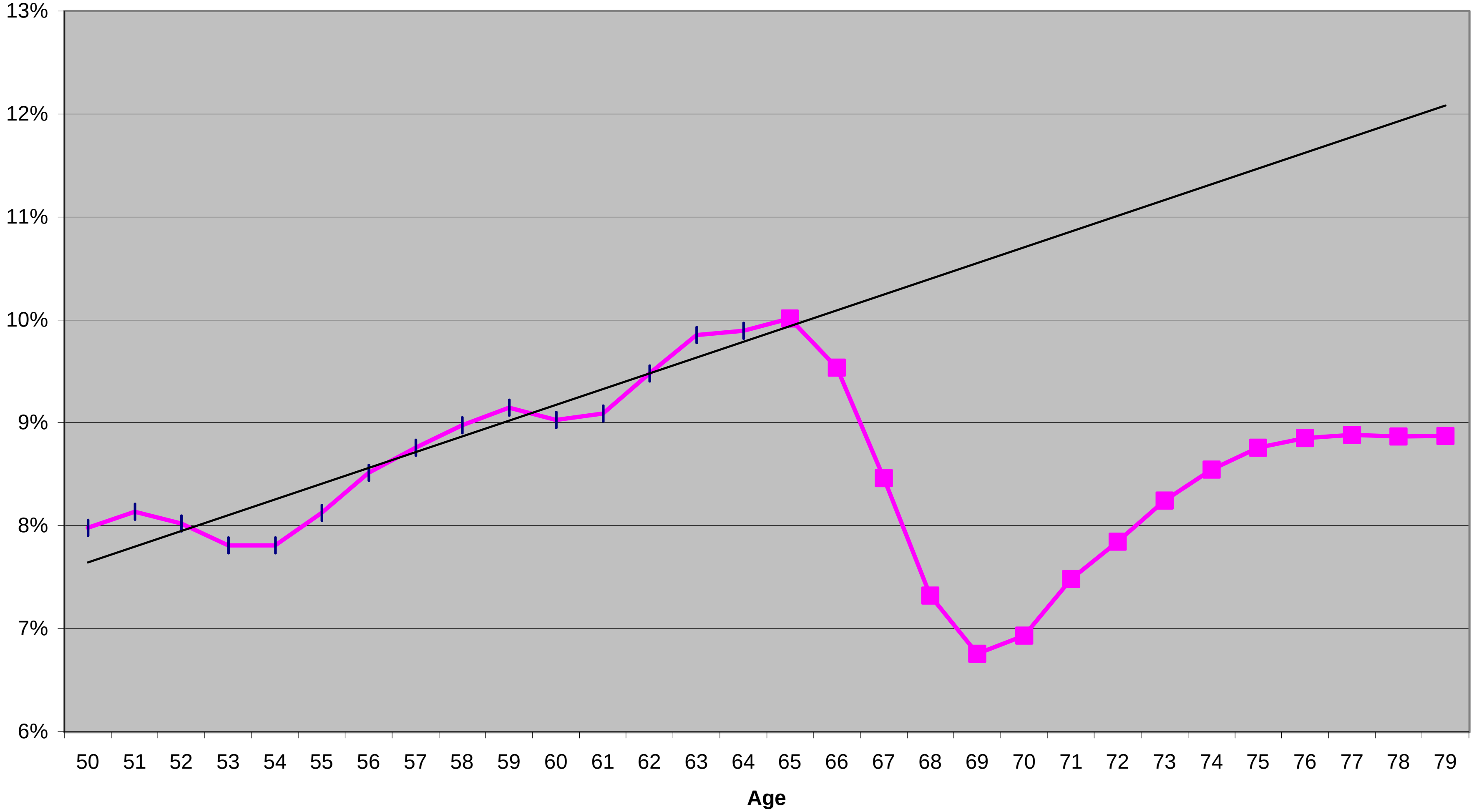
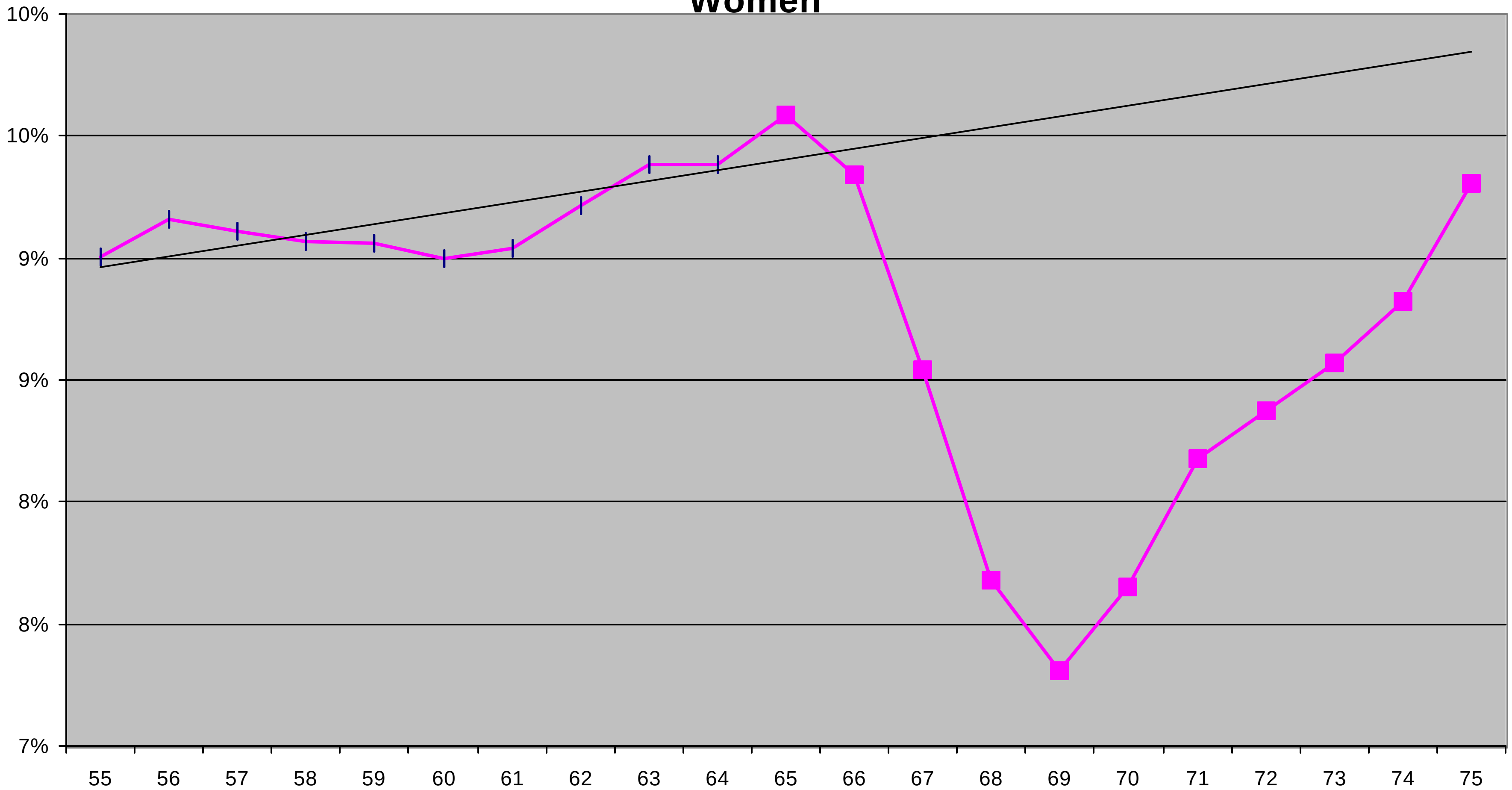


Figure 12
Percentage increase from previous year in probability of death: Men



Source: Author's calculations based on Social Security Administration, 1995 Period life table, http://www.ssa.gov/statistics/Supplement/1998/Tables/PDF/t4c6.pdf

Figure 13
Percentage increase from previous year in probability of death: Women



Source: Author's calculations based on Social Security Administration, 1995 Period life table, http://www.ssa.gov/statistics/Supplement/1998/Tables/PDF/t4c6.pdf

Figure 14
Actual vs. predicted probabilities of survival from age 65 to age t: Males