Health and Health Care of Medicare Beneficiaries in 2030

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Abstract

On Medicare's 50th anniversary, we use the Future Elderly Model (FEM) – a microsimulation model of health and economic outcomes for older Americans – to generate a snapshot of changing Medicare demographics and spending between 2010 and 2030. During this period, the baby boomers, who began turning 65 and aging into Medicare in 2011, will drive Medicare demographic changes, swelling the estimated US population aged 65 or older from 39.7 million to 67.0 million. Among the risks for Medicare sustainability, the size of the elderly population in the future likely will have the highest impact on spending but is easiest to forecast. Population health and the proportion of the future elderly with disabilities are more uncertain, though tools such as the FEM can provide reasonable forecasts to guide policymakers. Finally, medical technology breakthroughs and their effect on longevity are most uncertain and perhaps riskiest. Policymakers will need to keep these risks in mind if Medicare is to be sustained for another 50 years. Policymakers may also want to monitor the equity of Medicare financing amid signs that the program's progressivity is declining, resulting in higher-income people benefiting relatively more from Medicare than lower-income people.

Keywords

aging; health; Medicare; medical innovation; medical spending; microsimulation

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1 Looking Beyond Medicare's First 50 Years

In the summer of 1965, President Lyndon Johnson signed Medicare into law and enrolled Harry Truman as the first Medicare beneficiary. At that time, almost half the nation's seniors lacked hospital insurance and lived in poverty. Rapid medical advances since the turn of the century had firmly entrenched the US health care system as one focused on "cure rather than on care of long-term, continuing sickness" (Stevens 1996). Along with protecting elderly Americans from high hospital costs, Medicare's enactment also ensured a steady and secure revenue stream to the nation's burgeoning hospital enterprise, which by the late-1950s employed more people than the "steel industry, the automobile industry, and the interstate railroads."

The addition of Medicare in 1965 completed a suite of federal programs designed to protect the wealth and health of people reaching older ages in the US, starting with the Committee on Economic Security of 1934 – which recommended the program known today as Social Security. While few would deny Medicare's important role in improving older and disabled Americans' financial security and health, many worry about sustaining and strengthening Medicare to finance high-quality, affordable health care for coming generations.

In 1965, average life expectancy for a 65-year-old man and woman was another 13 years and 16 years, respectively (Congressional Budget Office 2013). Now, life expectancy for 65-year-olds is 18 years for men and 20 years for women – a four- to five-year increase.

In 2011, the first of 75-million-plus baby boomers became eligible for Medicare. And by 2029, when all of the baby boomers will be 65 or older, the US Census Bureau predicts 20 percent of the US population will be older than 65. Just by virtue of the sheer size of the baby-boomer population, Medicare spending growth will accelerate sharply in the coming years.

Understanding how Medicare spending and beneficiary demographics will likely change over the next 15 years can help policymakers explore options to strengthen and sustain Medicare. To assist policymakers, researchers at the USC Leonard D. Schaeffer Center for Health Policy and Economics have used the Future Elderly Model (FEM) – a microsimulation model of health and economic outcomes for older Americans – to generate a snapshot of changing Medicare demographics and spending between 2010 and 2030 under current Medicare program rules (see below for more about the FEM).

Additionally, Schaeffer Center researchers have conducted recent analyses using the FEM to examine Medicare's declining "progressivity" – or the degree to which higher-income people reap greater benefits from the program – and how medical innovation targeting delayed aging rather than specific diseases like cancer and heart disease might affect Medicare spending.

2 The Future Elderly Model

The Future Elderly Model (FEM) is an economic-demographic microsimulation developed over the last decade by researchers with funding from the Centers for Medicare and

Medicaid Services, the National Institute on Aging, the Department of Labor, and the MacArthur Foundation. The University of Southern California Roybal Center for Health Policy Simulation supports continuous development of the FEM, with collaborators from Harvard University, Stanford University, the RAND Corp., University of Michigan and University of Pennsylvania.

The FEM follows Americans aged 51 years and older and projects their health and medical spending over time. Its unique feature is to follow the evolution of individual-level health trajectories and economic outcomes, rather than the average or aggregate characteristics of a cohort.

The FEM has three core modules (see Figure 1). The first is the Initial Cohort module, which predicts economic and health outcomes of new cohorts of 51-year-olds with data from the Health and Retirement Study (HRS) and incorporates trends in disease and other outcomes from external data sources, such as the National Health Interview Survey. This module generates cohorts as the simulation proceeds, so that outcomes for the age 51+ population can be measured in any given year.

The second component is the Transition module, which uses the longitudinal structure of the HRS to calculate transition probabilities across various health states, including chronic conditions, functional status, body-mass index and mortality based on the individual's current characteristics. These transition probabilities depend on a battery of predictors: age, sex, education, race, ethnicity, smoking behavior, marital status, employment and health conditions. Baseline factors are also controlled for using a series of initial health variables. Health conditions are derived from HRS survey questions and include diabetes, high-blood pressure, heart disease, cancer (except skin cancer), stroke or transient ischemic attack, and lung disease (either or both chronic bronchitis and emphysema). Functional status is measured by limitations in instrumental activities of daily living, activities of daily living, and residence in a nursing home.

Finally, the Policy Outcomes module combines individual-level outcomes into aggregate outcomes, such as medical care costs (Medicare, Medicaid and Private); and Social Security expenditures and contributions. The model also accounts for the two key sources of federal revenue – payroll and income taxes – which together amount to over 80% of all federal tax revenue. Individual health spending is predicted with regard to health status (chronic conditions and functional status), demographics (age, sex, race, ethnicity and education), nursing home status and mortality. Estimates are based on spending data from the Medical Expenditure Panel Survey for individuals aged 64 and younger and the Medicare Current Beneficiary Survey for individuals aged 65 and older, who constitute the bulk of the Medicare population. This module has been comprehensively tested against known national aggregates.

An example of how the three modules interact is as follows. For year 2010, the model begins with the population of Americans aged 51 and older based on nationally representative data from the HRS. Individual-level health and economic outcomes for the next 2 years are predicted using transition probabilities. Aggregate outcomes for those years are then

calculated. At that point, a new cohort of 51-year-olds is introduced and joins those who survived from 2010 to 2012. This forms the age 51+ population for 2012. The transition model is then applied to this population. The same process is repeated until reaching the last year of the simulation. A complete technical document detailing the FEM is available online at https://roybalhealthpolicy.usc.edu/fem/.

In the coming pages, FEM projections of Medicare population demographics, risk factors, health and disability are presented. The Transition module played a key role in producing these results, since it forecasts health transitions and mortality for the current population aged 51 to 64 –already observed in HRS – as it ages into Medicare. The Initial Cohort module played a lesser role by introducing the younger cohorts which will be aged over 65 in the latter years of the simulation. Thus, the projection results primarily stem from applying health transitions consistent with longitudinal data to a nationally representative sample.

3 A Typical Elderly Medicare Beneficiary: 2010 and 2030

Comparison of a typical elderly Medicare beneficiary in 2010 and 2030 helps illustrate how changing demographics might affect Medicare (see Table 1).[1] Generally, by 2030, the typical elderly beneficiary will continue to be female but slightly younger, less likely to be white, more educated, more likely to have never smoked but more likely to be obese, and more likely to be disabled and have more chronic conditions.

4 Baby Boomers Drive Medicare Enrollment Growth

The influx of the baby-boom generation, which began turning 65 and aging into Medicare in 2011, will drive Medicare demographic changes between 2010 and 2030. During that time, the total estimated US population aged 65 or older will increase from 39.7 million to 67.0 million (see Figure 2).

The largest growth – 15.4 million people – will occur among the so-called young elderly, those aged 65–74, compared with growth of 11.8 million people in the 75 and older group. While still representing a small share of Medicare beneficiaries, the number of the very oldest Americans – aged 95 and older – will increase significantly, more than doubling from about 400,000 in 2010 to about 850,000 in 2030.

5 More Minority Beneficiaries and Higher Educational Attainment

Similar to changes in the overall US population, the share of minority Medicare beneficiaries will grow significantly between 2010 and 2030 (see Figure 3). The largest increase will occur among Hispanic beneficiaries. By 2030, 10 percent of Medicare beneficiaries will be Hispanic, up from 6 percent in 2010. During the same period, the share of non-Hispanic black beneficiaries will grow from 8 percent to 10 percent, while the share

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[1]While not the focus of this analysis, the growth of nonelderly disabled Medicare beneficiaries has grown steadily in recent years, reaching 17 percent of all beneficiaries in 2011, according to the Centers for Medicare and Medicaid Services, http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/MedicareMedicaidStatSupp/Downloads/2012_Section2.pdf#Table2.4, accessed on May 1,2015.

of non-Hispanic white beneficiaries will decline from 81 percent to 76 percent. The share of other racial and ethnic groups will remain the same at about 4 percent of beneficiaries.

Between 2010 and 2030, the share of Medicare beneficiaries with some college education or higher will grow sharply from 41 percent to 62 percent while the proportion with less than a high school diploma will decline from 21 percent to 9 percent (see Figure 4).

6 Good News, Bad News: Longer Lives but More Disability

The good news – life expectancy for people at age 65 will grow by almost a year from 19.3 years in 2010 to 20.1 years in 2030. The bad news – their expected years of life with a disability at age 65 will increase even more, rising from 7.4 years in 2010 to 8.6 years in 2030.

Both trends are more pronounced for women (see Figures 5 and 6). Women's life expectancy at age 65 will increase by 0.9 years, but their years of life with disability at age 65 will increase even more – 1.4 years – from 8.4 years in 2010 to 9.8 years in 2030. Similar trends are projected for men, with their life expectancy at 65 growing 0.6 years from 17.7 in 2010 to 18.3 in 2030, and their expected years of life with a disability at age 65 increasing 1.1 years from 6.3 in 2010 to 7.4 in 2030.

7 Shifting Risk Factors

By 2030, nearly one in two (47%) elderly Medicare beneficiaries will be obese, up from slightly more than one in four (28%) in 2010 (see Figure 7). In other words, obesity rates will increase about 1 percentage point a year during the 20-year period. Even more alarming, the share of people aged 65 or older with extreme obesity – defined as a body-mass index (BMI) of 40 kg/m^2 or more – is expected to more than double between 2010 and 2030, from 3 percent to 7 percent. Likewise, the share of elderly people with a BMI between 35 and 39.9 kg/m^2 is projected to double from 7 percent to 14 percent during the same period.[2]

On a more positive note, smoking rates are expected to decline between 2010 and 2030, when the share of current smokers aged 65 or older will be 8 percent, down from 11 percent in 2010 (see Figure 8). Similarly, the share of people 65 and older who have never smoked will increase from 43 percent in 2010 to 52 percent in 2030, which means more than half of the elderly population will have never smoked.

8 Chronic Conditions on the Rise

The prevalence of all major chronic conditions – high-blood pressure, heart disease, diabetes, cancer, stroke and lung disease – is expected to rise among elderly Medicare

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[2]This important shift will occur in part because of an important feature found in cross-sectional data: the BMI of individuals who will reach age 65 in the coming decades is significantly higher than that of the current elderly population. Since BMI is observed to be highly persistent in the Health and Retirement Study data used to project health transitions in the FEM, these people are expected to remain obese in large numbers as they grow older and enroll in Medicare. Also, long-lasting population trends indicate that obesity and extreme obesity rates will further increase in years to come. These trends are implemented in the FEM's Initial Cohort module based on National Health Interview Survey data. Obesity projections by the FEM are in line with published forecasts (Wang et al. 2011; Finkelstein et al. 2012).

beneficiaries (see Figure 9).This trend will be driven by a combination of higher rates of obesity and gains in life expectancy, which in turn will be driven by innovations in medical technology that allow people to live longer with chronic conditions. Diabetes is expected to grow the fastest, increasing from about one in four people aged 65 or older in 2010 to nearly four in 10 in 2030. Lung disease will see the slowest increase, from 15 percent in 2010 to 16 percent in 2030, largely because of declining smoking rates.

Additionally, a large increase in the number of elderly beneficiaries with multiple chronic conditions is expected. For example, the share of Medicare beneficiaries with three or more chronic conditions will jump sharply between 2010 and 2030, increasing from 26 percent to 40 percent (see Figure 10). For Non-Hispanic blacks, the increase will be even sharper, rising from one in three people to almost one in two with three or more chronic conditions.

Overall, the greater prevalence of chronic conditions will mean more older Americans with at least one limitation to their activities of daily living (ADL), such as bathing, eating, dressing, walking across a room, or getting in and out of bed (see Figure 11). While the share of people aged 65 or older with at least one ADL limitation will increase from 24 percent to 26 percent, the share living in nursing homes (5%) and with limitations in instrumental ADL (15%), such as taking medication or handling money, will remain constant between 2010 and 2030.

9 Medicare Spending

Shifting health trends and medical inflation will contribute to higher spending per elderly Medicare beneficiary. Spending per beneficiary is expected to grow by a factor of 1.6 for all elderly age groups, reaching $10,800 annually (in 2009 dollars) for the 65–74 age group; $15,900 for the 75–85 group; and $19,800 for beneficiaries older than 85 (see Figure 12). These projections assume Affordable Care Act cost growth targets will be realized.[3]

At age 65, a typical beneficiary in 2010 was estimated to have total lifetime Medicare spending worth $131,000.[4] Because of rising life expectancy, higher prevalence of chronic conditions and medical cost growth, total lifetime Medicare spending for a typical 65-year-old beneficiary will increase 72 percent by 2030, reaching an estimated $223,000 (see Figure 13).

Overall, the combination of 27.2 million more elderly Medicare beneficiaries, higher medical costs and rising rates of chronic conditions will more than double Medicare spending in constant dollars, including disabled beneficiaries aged 64 and younger[5] – from $507 billion in 2010 to more than $1.2 trillion in 2030 (see Figure 14). The divergence in

[3]Similar to the Congressional Budget Office (CBO), Schaeffer Center researchers assume that Affordable Care Act (ACA) provisions "on balance, are reducing federal spending on Medicare" (CBO, 2014). The Future Elderly Model (FEM) constrains cost growth to match ACA spending targets. Specifically, the FEM applies annual cost growth for otherwise identical individuals at a level between the average inflation rate for all goods (measured using the consumer price index) and the average inflation rate for medical services until 2019. And between 2019 and 2030, the FEM assumes that per capita health care spending growth will exceed gross domestic product by 1 percentage point based on ACA spending targets (Eibner et al. 2013).
[4]Because a dollar in the future is less valuable than a dollar in the present, lifetime Medicare spending is expressed in "present value." This means that future spending is adjusted for consistency over time, with a 3 percent annual discount rate applied from age 65 onward. In practice, this discount is somewhat offset by FEM assumptions about the future trajectory of medical spending.

trends between overall Medicare spending and per-beneficiary spending highlights the dramatic fiscal impact of the huge baby-boomer cohort aging into Medicare between 2011 and 2029. The sensitivity of the results to alternative projected growth rates is analyzed in the Appendix. These findings reveal that Medicare spending would still be expected to double by 2030 if costs grew at a slower rate than the ACA targets.

10 Growing Life Expectancy Gap Decreases Medicare Progressivity

A driving force behind Medicare's enactment in 1965 was to provide older Americans of modest means access to expensive hospital care – especially those who had worked all of their lives but who had limited resources in retirement. Historically, all Americans paid the same payroll tax rate to fund Medicare Part A, which covers hospital care. Medicare Part B, which covers physician care, is funded through beneficiary premiums and federal general revenues. Since 1994 there has been no cap on the amount of Medicare earnings taxed, so some would argue that higher-income people have shouldered more of the burden of financing Medicare.

But gaps in life expectancy affect the so-called progressivity of Medicare – or the degree to which lower-income people bear more or less of the burden of financing Medicare compared to the benefits they receive from the program. While all Americans collectively are living longer, life expectancy gains are highest for people at the top of the income distribution. Instead of decreasing over time, the gap in life expectancy between the lowest and highest income Americans is growing. The result is declining Medicare progressivity, raising questions about the equity of Medicare financing.

For example, a study by Schaeffer Center researchers estimated changes in life expectancy by income level in the coming years. They found that males in the lowest income quartile at age 65 could expect to live an additional 13.6 years in 1993; in contrast, 65-year-olds in the highest income quartile could expect to live another 16.7 years (Goldman and Orszag 2014). By 2025, not only will this gap persist, it is expected to grow. Life expectancy at 65 will increase by 4 years for high-income males, compared to less than a two-year gain among the lowest income males. The life expectancy of women will follow a similar progression (see Figure 15).

The study also examined the impact of the life-expectancy gap between high and low earners on lifetime Medicare benefits, valued as costs incurred to the program. For people aged 65 in 1993, the expected cost of lifetime Medicare benefits was about $135,000 (in 2009 dollars) for men and $180,000 for women of all incomes.

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[5]Spending of the Medicare beneficiary population 64 and younger is extrapolated by Schaeffer Center researchers using US Census Bureau population projections (source: http://www.census.gov/population/projections/), Medicare Current Beneficiary Survey data (MCBS; source: https://www.cms.gov/Research-Statistics-Data-and-Systems/Research/MCBS/), National Health Expenditure Accounts (NHEA) projections from the Centers for Medicare & Medicaid Services (source: http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NationalHealthAccountsProjected.html), and Future Elderly Model (FEM) spending projections among the elderly Medicare population. By 5-year age groups aged 64 and under, costs are extrapolated by combining 1) Census projections of population sizes, 2) historical shares of this population enrolled in Medicare, 3) spending per beneficiary as a ratio of that of the population aged 65-74, and 4) FEM per capita spending projections for the population aged 65–74. This exercise assumes that spending per beneficiary will remain constant as a ratio of the spending of 65–74 year-olds in 2010 and that the share of the population of each age group enrolled in Medicare will remain constant to its 2000–2010 average. Aggregate Medicare projections are then adjusted to match NHEA projections in year 2014.

Because of the trends in life expectancy, researchers estimated that Medicare benefits will grow significantly more for high-income people between 1993 and 2025, creating a gap of about $25,000 for men and $20,000 for women (see Figure 16). Researchers concluded that, because the life expectancy and Medicare benefits of high-income Americans are increasing faster than those of low-income Americans, the Medicare program is becoming less progressive over time. Provisions in the 2010 Affordable Care Act requiring higher earners to pay an additional 0.9 percent payroll tax on a portion of their income starting in 2013 may help offset some of Medicare's declining progressivity.[6]

11 Innovation: Double Down on Disease Model or Shift to Delayed-Aging Focus?

As it has historically, medical innovation is likely to have important implications for Medicare spending and the number of beneficiaries, but predicting the course of medical innovation is extremely difficult. Looking at the recent history of innovation and the most promising areas of biomedical research, one can broadly characterize medical innovation of two types: disease specific or delayed aging. For example, a disease-specific innovation would be the development of immuno-oncologic treatments that harness the body's own immune system to fight a tumor. On the other hand, delayed aging could be something akin to weight loss, which reduces the risk of many types of diseases simultaneously – for example, heart disease, diabetes, hypertension, and perhaps even cancer and dementia. Recent scientific advances suggest that slowing the aging process itself – known as senescence – might be possible.

Despite the US population's significant gains in life expectancy amid growing prevalence of chronic conditions and obesity, most medical research, along with the health care delivery system, remains focused on disease-specific, acute, episodic illnesses. And while the disease-specific model has served the nation reasonably well to date, at some point, the law of diminishing returns will come into play with the existing trajectory of medical innovation. Growing evidence suggests that while attacking diseases has extended life for younger and middle-aged people, the same is not true for older people. As noted previously, disability rates are rising faster in some cases than life expectancy, meaning the length of a healthy life span may decrease in the coming years. This raises the possibility that we will be investing research dollars in greater sickness rather than improved health if we continue the disease-specific focus of medical innovation.

Using the Future Elderly Model microsimulation, Schaeffer Center researchers set out to compare two different types of medical breakthrough scenarios. The first represents disease-specific breakthroughs and assumes optimistic developments in medical research and disease treatments of heart disease and cancer. The second is a hypothetical assessment of a successful effort to "delay aging," meaning that scientists could translate research on the biology of aging into therapeutic interventions, coupled with healthier behaviors, that would

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[6]Workers earning more than $200,000 a year ($250,000 for joint filers) started paying higher Medicare hospital insurance (HI) taxes in 2013. The new tax is 2.35% (an increase of 0.9%) of applicable wages above those thresholds. Also starting in 2013, high-income taxpayers became subject to a new Medicare tax on investment income, such as capital gains, dividends, interest and rental income.

reduce and compress both morbidity and mortality into a shorter period of time at the end of life.

Their findings have important implications for major entitlement program outlays, including Medicare and Medicaid (Goldman et al. 2013). The study examined how the different scenarios would affect both life expectancy and disability rates among the elderly between 2010 and 2060, with most of the impact occurring after 2030.

The breakthrough scenarios of delayed cancer and delayed heart disease project a slightly higher number of elderly people in 2060 compared to the status quo – 0.8 percent more for delayed cancer and 2.0 percent for delayed heart disease. In contrast, the delayed-aging scenario would add 6.9 percent more elderly people by 2060.

Researchers also modeled the impact of different medical breakthroughs on disability rates, estimating that the number of elderly people without disabilities under the status quo scenario would grow from 31 million in 2010 to 59 million in 2030 to 75 million in 2060 (see Figure 17). Under the delayed heart disease and cancer scenarios, there would be small increases in the number of nondisabled elderly people compared to the delayed-aging scenario, which estimates an increase of 6.2 million nondisabled elderly by 2030 compared to the status quo scenario. By 2060, this number would increase to 11.7 million additional non-disabled elderly. In turn, there would be 2.9 million fewer elderly Americans living with a disability by 2030, and 4.4 million fewer by 2060. In contrast, breakthroughs in cancer and heart disease prevention would have much smaller implications for both the rate of disability among the elderly and the size of the elderly population.

When examining the effect of the different types of breakthroughs on Medicare and Medicaid spending, researchers found that the impact of the delayed-aging scenario would be relatively modest by 2030, increasing outlays by $28 billion (in 2010 dollars) over the status quo scenario. By 2060, however, the impact would be much higher, adding $295 billion to Medicare and Medicaid spending (see Figure 18). In contrast, the delayed cancer scenario would lead to a modest spending increase, while the delayed heart disease scenario would lead to less spending than the status quo.

Therefore, if medical research remains focused on recent history's disease-specific model, the implications of any particular breakthrough for both population health and Medicare spending would be relatively modest. "Although the disease model has reduced mortality from lethal conditions dramatically in the past century, its influence is now waning because of competing risks. As people live longer, they are more likely to fall victim to multiple diseases," according to the study.

A shift toward delayed-aging breakthroughs would lead to tremendous gains in healthy lifespans but economically challenging circumstances. For Medicare, introducing therapeutic interventions to delay aging would have only modest cost implications by 2030 but would lead to massive additional spending by 2060. Despite the fiscal challenges, the authors conclude that "investing in research to delay aging should become a priority."

12 Implications for Medicare: 2030 and Beyond

Understanding how Medicare spending and beneficiary demographics will likely change over the next 15 years can help policymakers explore options to strengthen and sustain Medicare. By 2030, an estimated 67 million Americans aged 65 or older will be enrolled in Medicare – an increase of more than 27 million elderly beneficiaries from 2010. The largest growth will occur among 65- to 74-year-olds.

While life expectancy will continue to increase, all signs point to growing rates of disability among older Americans. By 2030, almost one in two elderly Medicare beneficiaries will be obese, and the prevalence of all major chronic conditions is expected to rise. In the near term, rates of cognitive impairment and dementia will decline modestly as the baby boomers age into Medicare but are expected to start rising again after 2030. On the brighter side, smoking rates are expected to continue tapering, and elderly beneficiaries will be more educated – both factors that may improve health outcomes.

Overall Medicare spending is projected to more than double between 2010 and 2030 to about $1.2 trillion annually in 2030 (in constant 2009 dollars). Elderly per-beneficiary spending during the same period will grow more slowly, increasing about 50 percent. The faster growth in overall spending reflects the significant fiscal impact of the huge baby-boomer cohort aging into Medicare during this time.

Along with strategies to finance the care of millions of more elderly Medicare beneficiaries, policymakers may want to monitor the equity of Medicare financing amid signs that the program's progressivity is declining, resulting in higher-income people benefiting more from Medicare.

At the same time, policymakers also must consider how medical innovation may shape future Medicare spending and beneficiary demographics. If realized, scientific advances in delayed aging could dramatically extend healthy aging but compound already challenging financing of Medicare.

Acknowledgments

Appendix. Cost Growth Sensitivity Analysis

Under current program rules, Medicare spending is expected to increase because of the growth in the number of Americans aged 65+; the changing health profile of the typical beneficiary; and the changing health care cost associated with treating a given beneficiary. Of these factors, Schaeffer Center researchers recognize that medical cost growth is most uncertain. Medicare spending projections rely on the assumption that Affordable Care Act cost growth targets will be realized, but it is quite unlikely that they will be realized perfectly.

To test the sensitivity of the cost results to that assumption, researchers estimated Medicare outlays for all beneficiaries (shown in Figure 14) under two alternative scenarios. The Below

and Above scenarios assume that annual cost growth will be 0.5% below and above the ACA targets each year from 2015 to 2030, respectively. These divergences with the baseline simulation compound over time and lead to important annual spending variations (Figure A1). Cost growth of half a percentage point above the ACA targets would lead to $200 billion higher Medicare spending by 2030. Given projected demographic trends, cost growth below the ACA targets would somewhat curb Medicare spending growth, but would not prevent it from doubling by 2030.
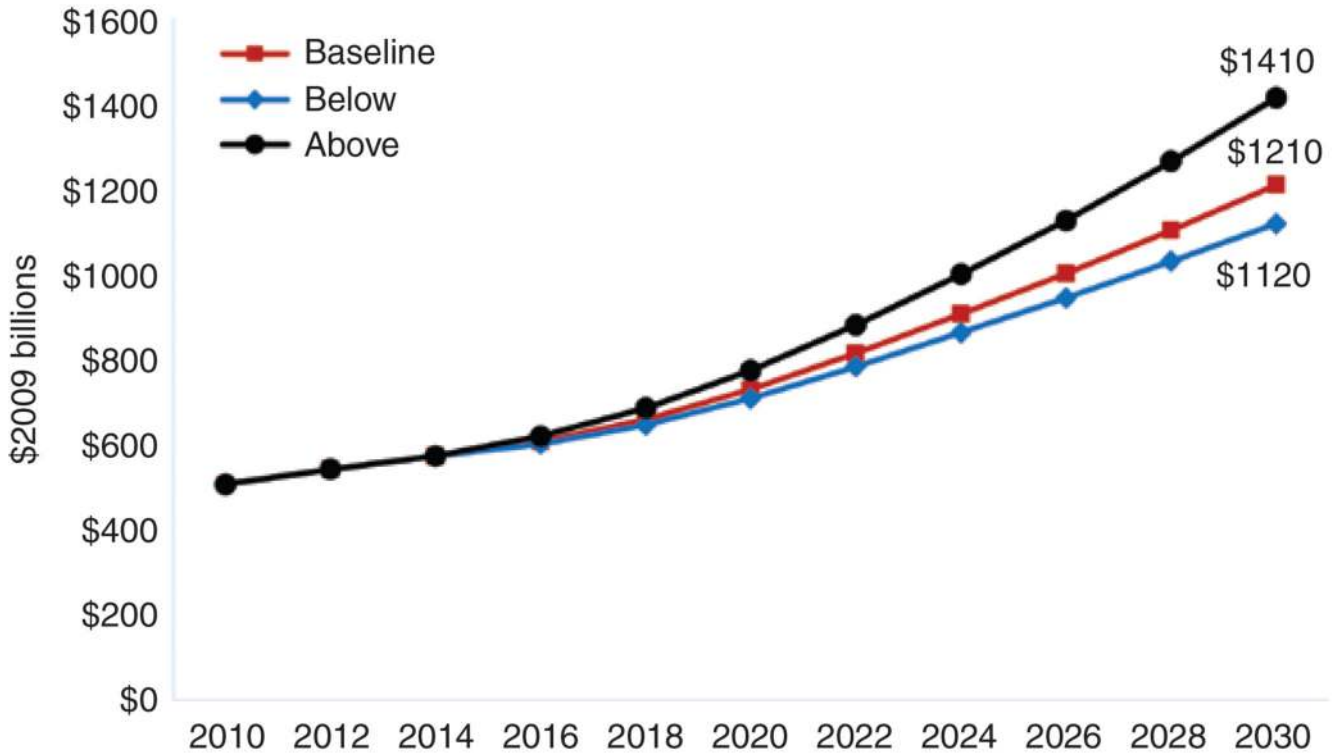
Figure A1.
Estimated Medicare Spending under Alternative Cost Growth Assumptions, 2010–2030
Sources: Future Elderly Model (FEM), University of Southern California Leonard D. Schaeffer Center for Health Policy and Economics, US Census Bureau projections, Medicare Current Beneficiary Survey and Centers for Medicare and Medicaid Services.

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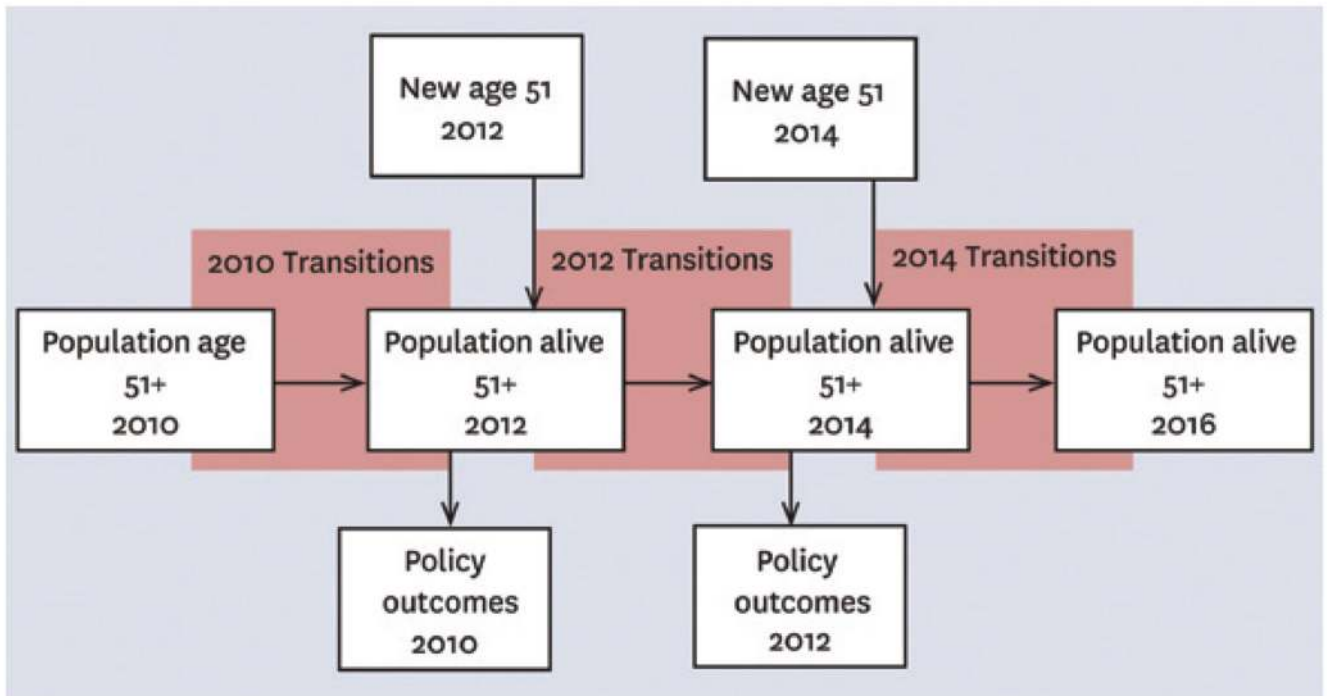
Figure 1.
Structure of the Future Elderly Model.
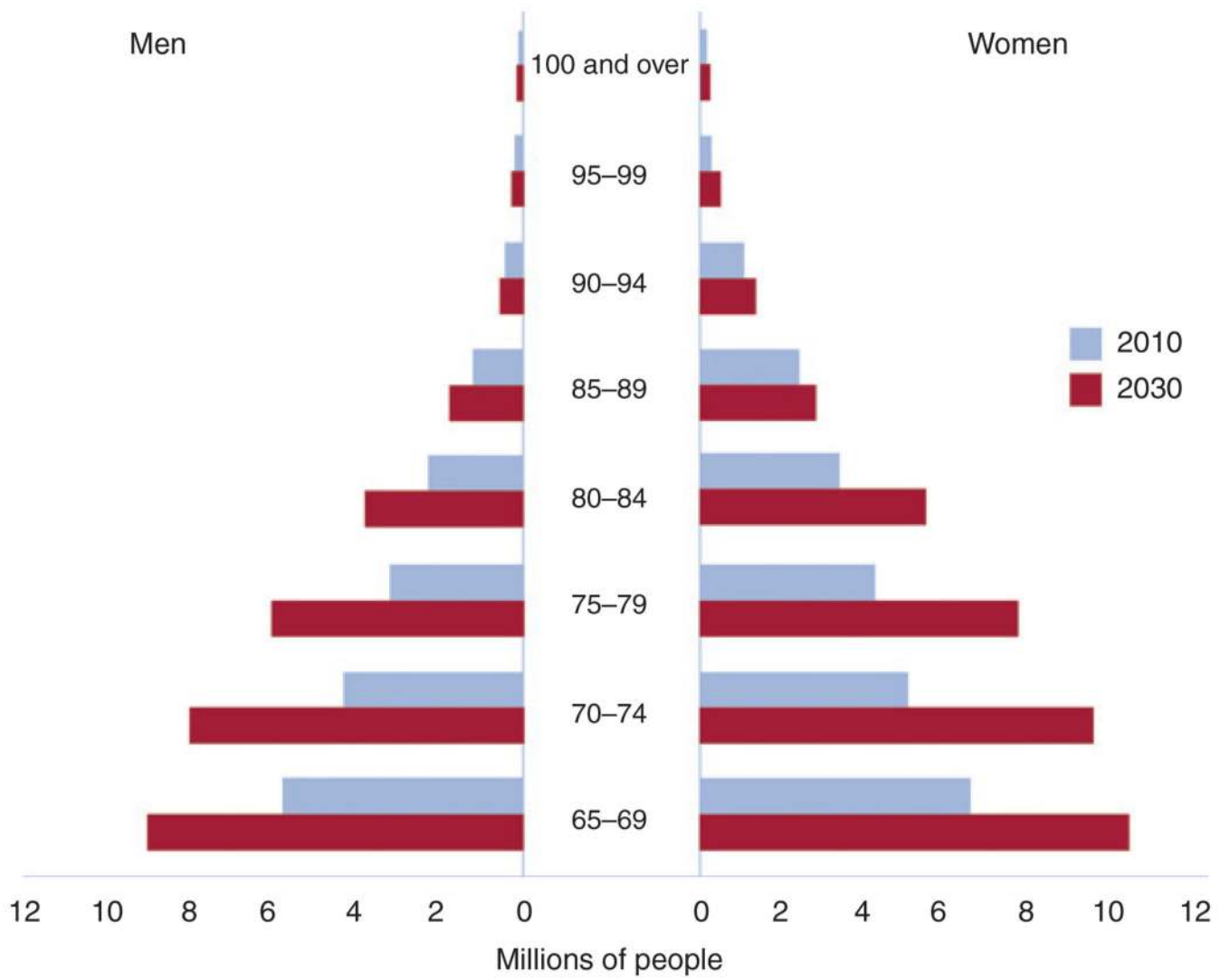
Figure 2.
Elderly Medicare Population, by Sex and Age, 2010 and 2030.
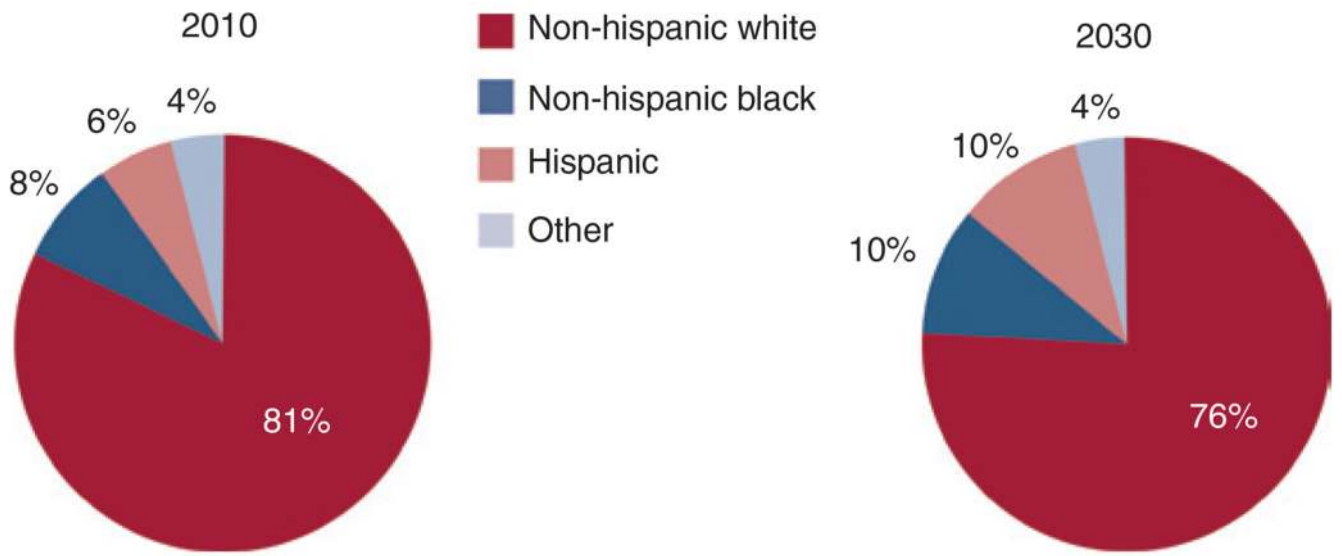
Figure 3.
Elderly Medicare Beneficiaries, by Race and Ethnicity, 2010 and 2030.
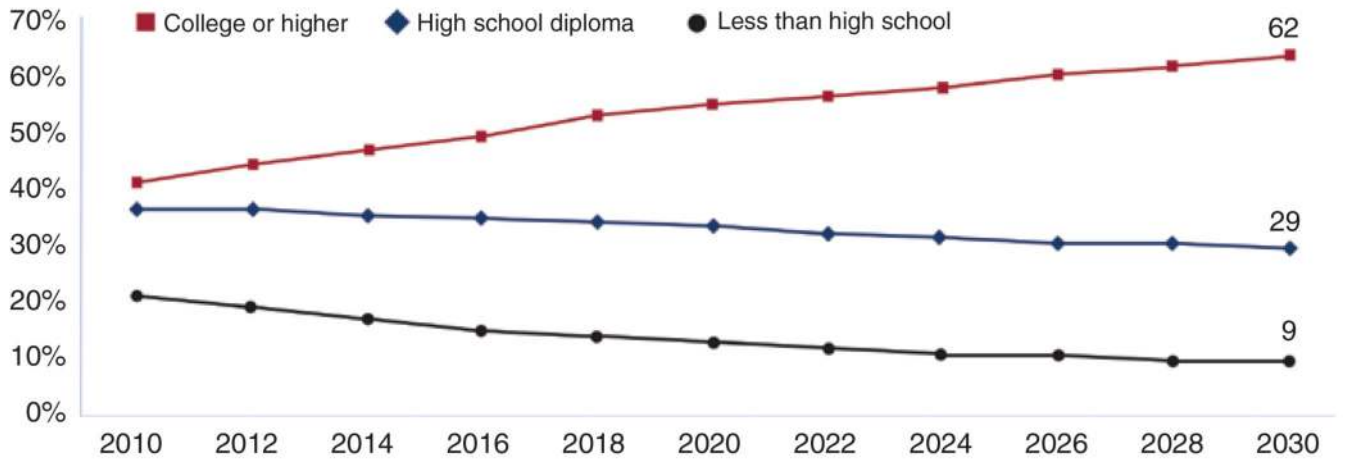
Figure 4.
Elderly Medicare Beneficiaries, by Education Level, 2010-2030.
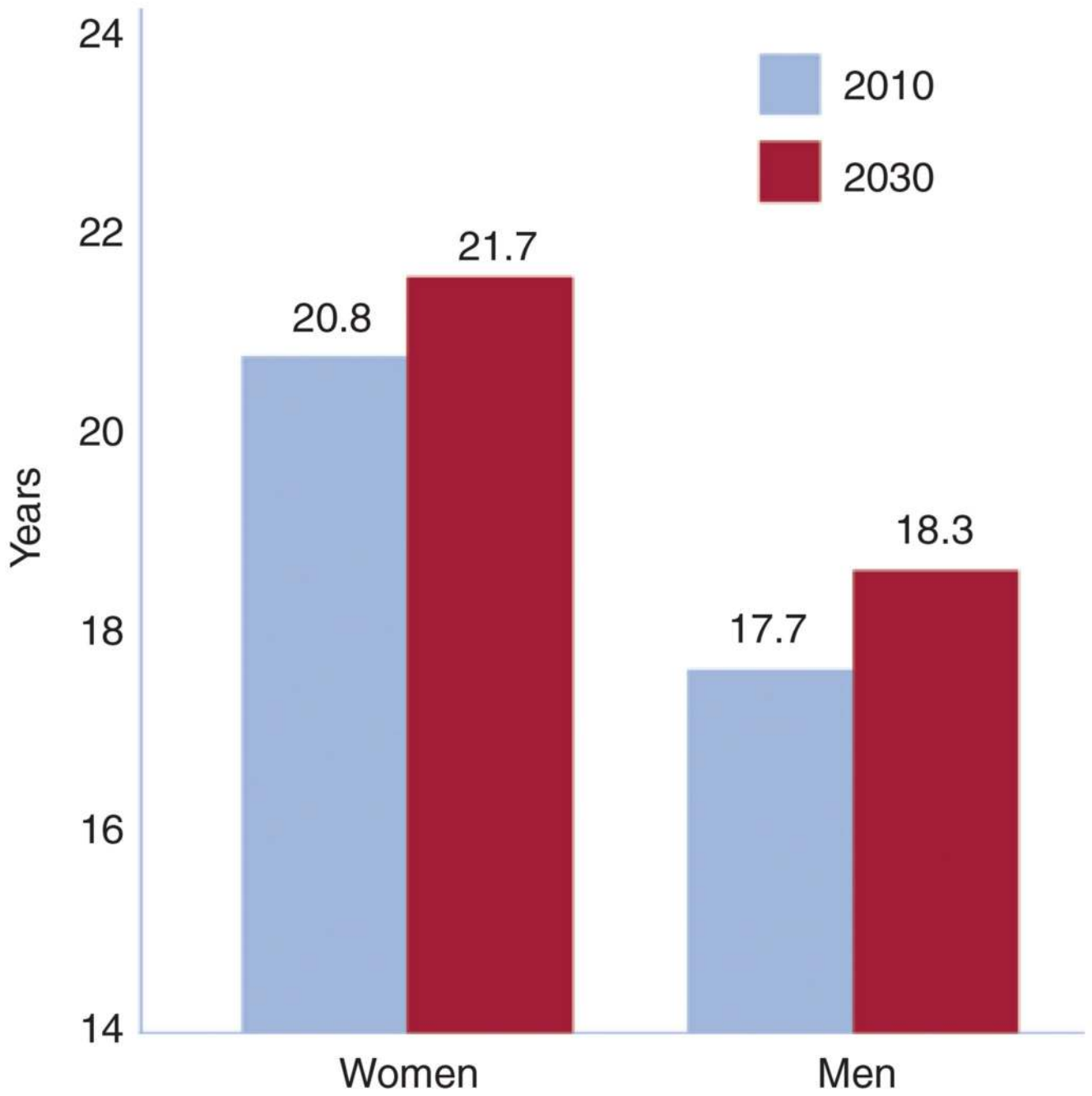
Figure 5.
Medicare Beneficiary Life Expectancy at Age 65, 2010 and 2030.
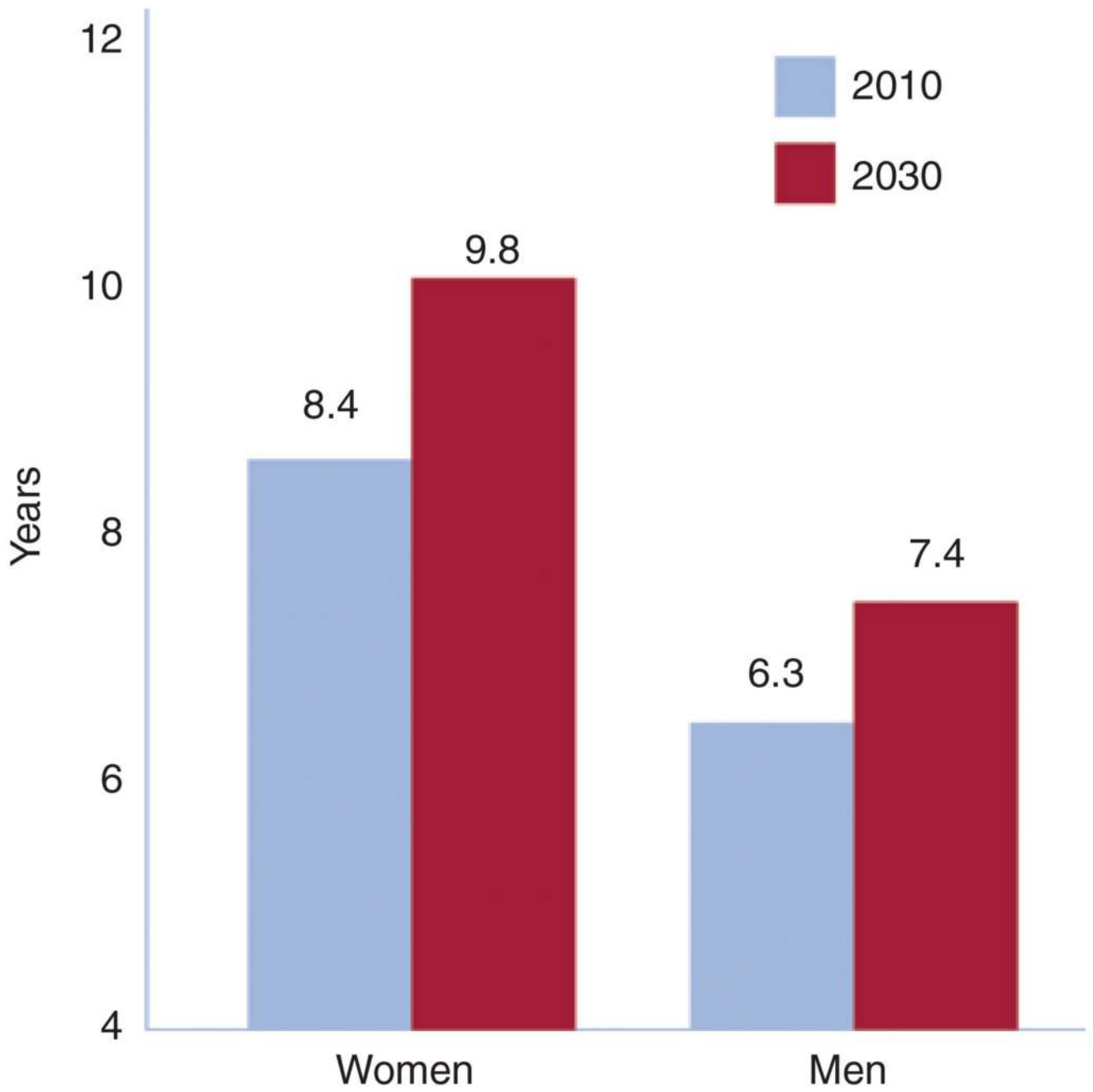
Figure 6.
Medicare Beneficiary Expected Years of Life with a Disability at Age 65, 2010 and 2030.
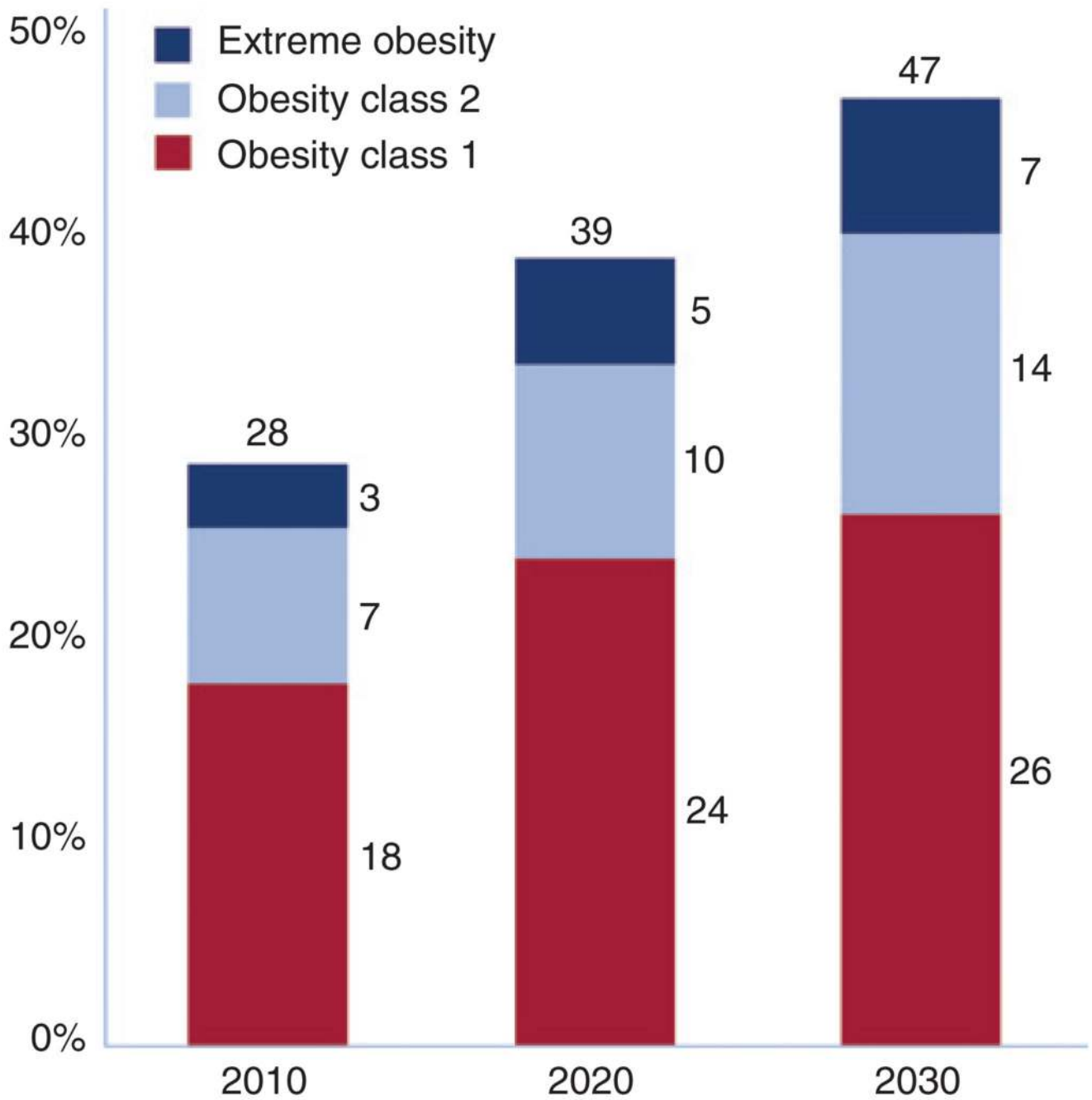
Figure 7.
Obesity among the US Population Aged 65 and Older, 2010–2030.
Note: Obesity Class 1 (body-mass index, or BMI, values between 30 and 34.9 kg/m^2);
Obesity Class 2 (BMI values between 35 and 39.9 kg/m^2); and Extreme Obesity (BMI
values of 40 kg/m^2 or more).
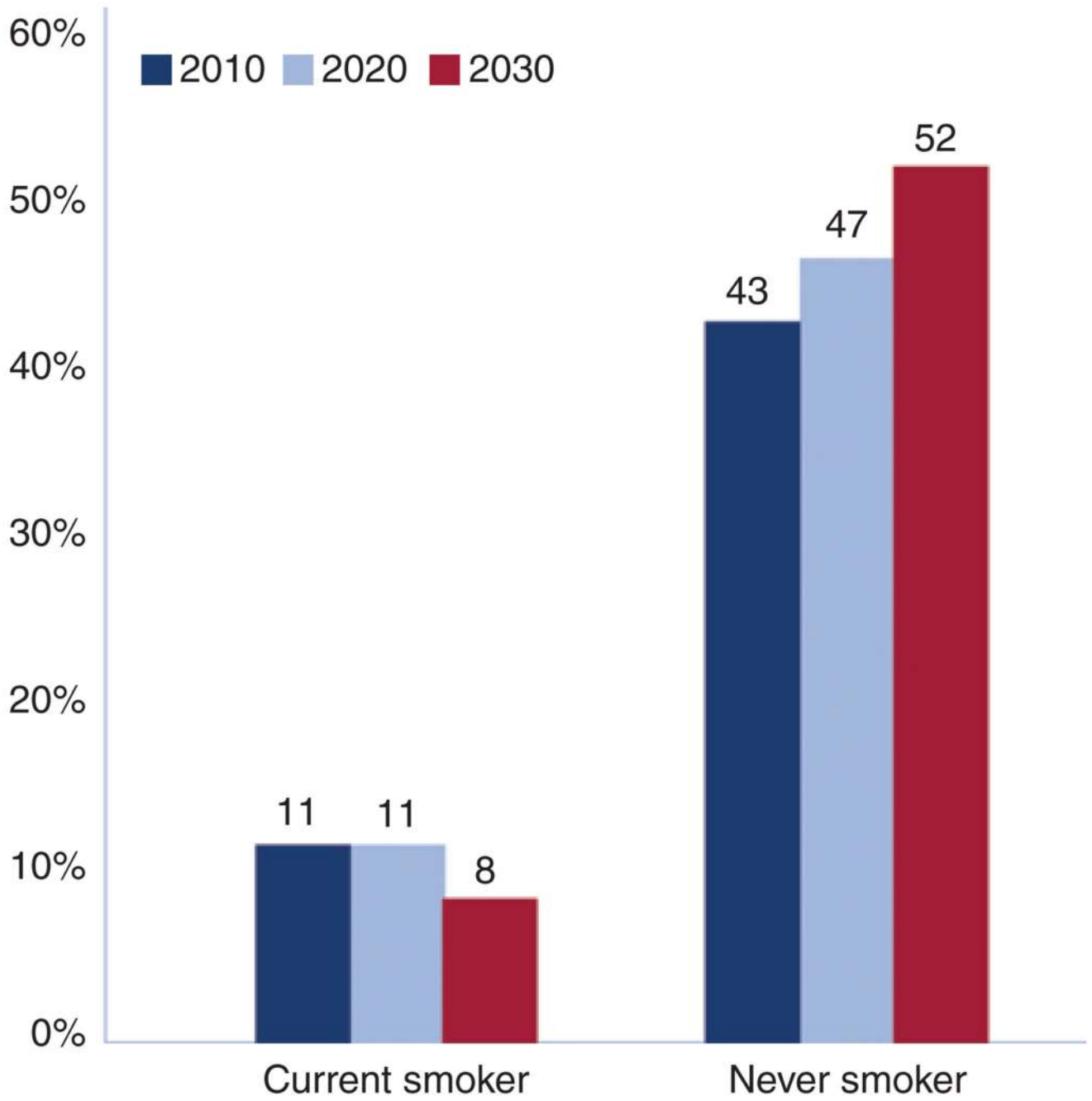
Figure 8.
Smoking Status among the U.S. Population Aged 65 and Older, 2010–2030.
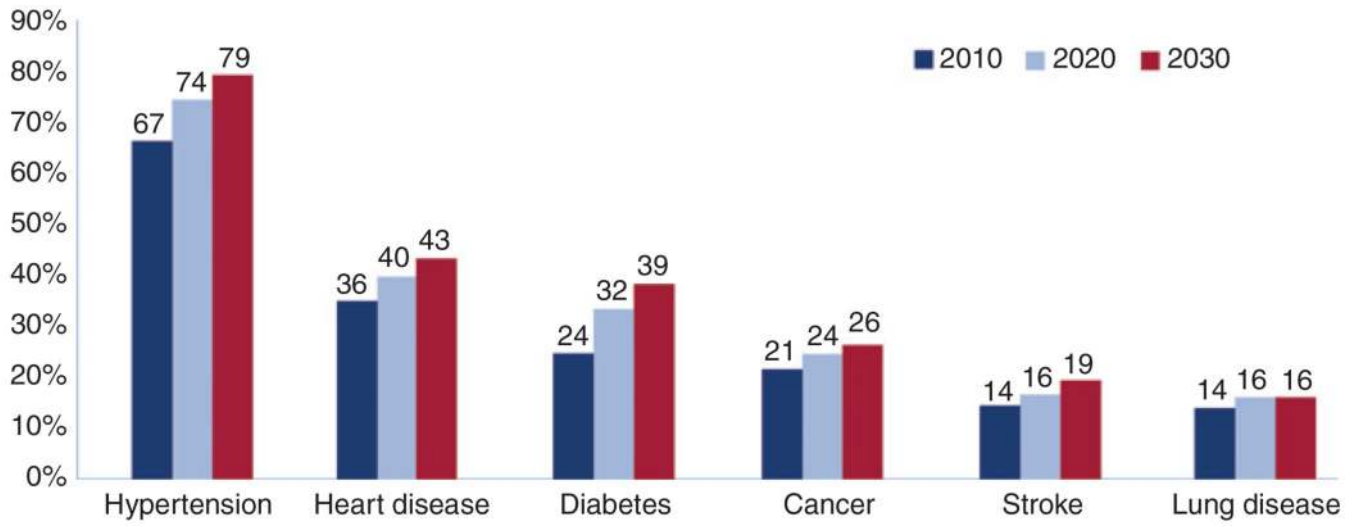
Figure 9.
Chronic Conditions among US Population Aged 65 and Older, 2010–2030.
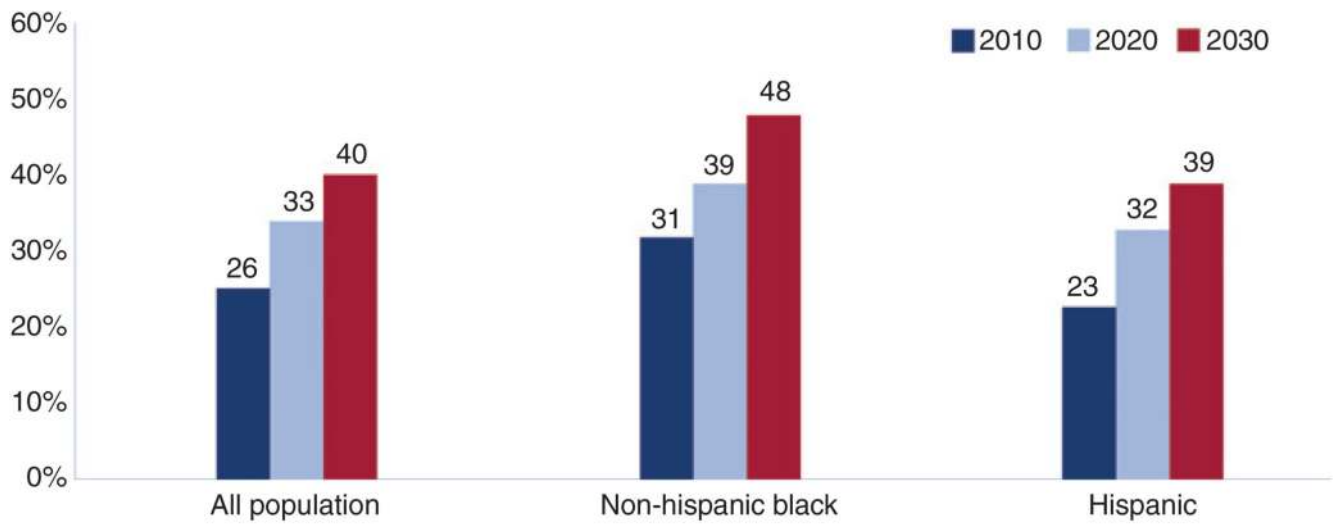
Figure 10.
US Population Aged 65 and Older with Three or More Chronic Conditions, by Race and
Ethnicity, 2010–2030.
Note: Chronic conditions refer to disease categories projected by the FEM and include:
diabetes, high-blood pressure, heart disease, cancer (except skin cancer), stroke or transient
ischemic attack, and lung disease (either or both chronic bronchitis and emphysema).
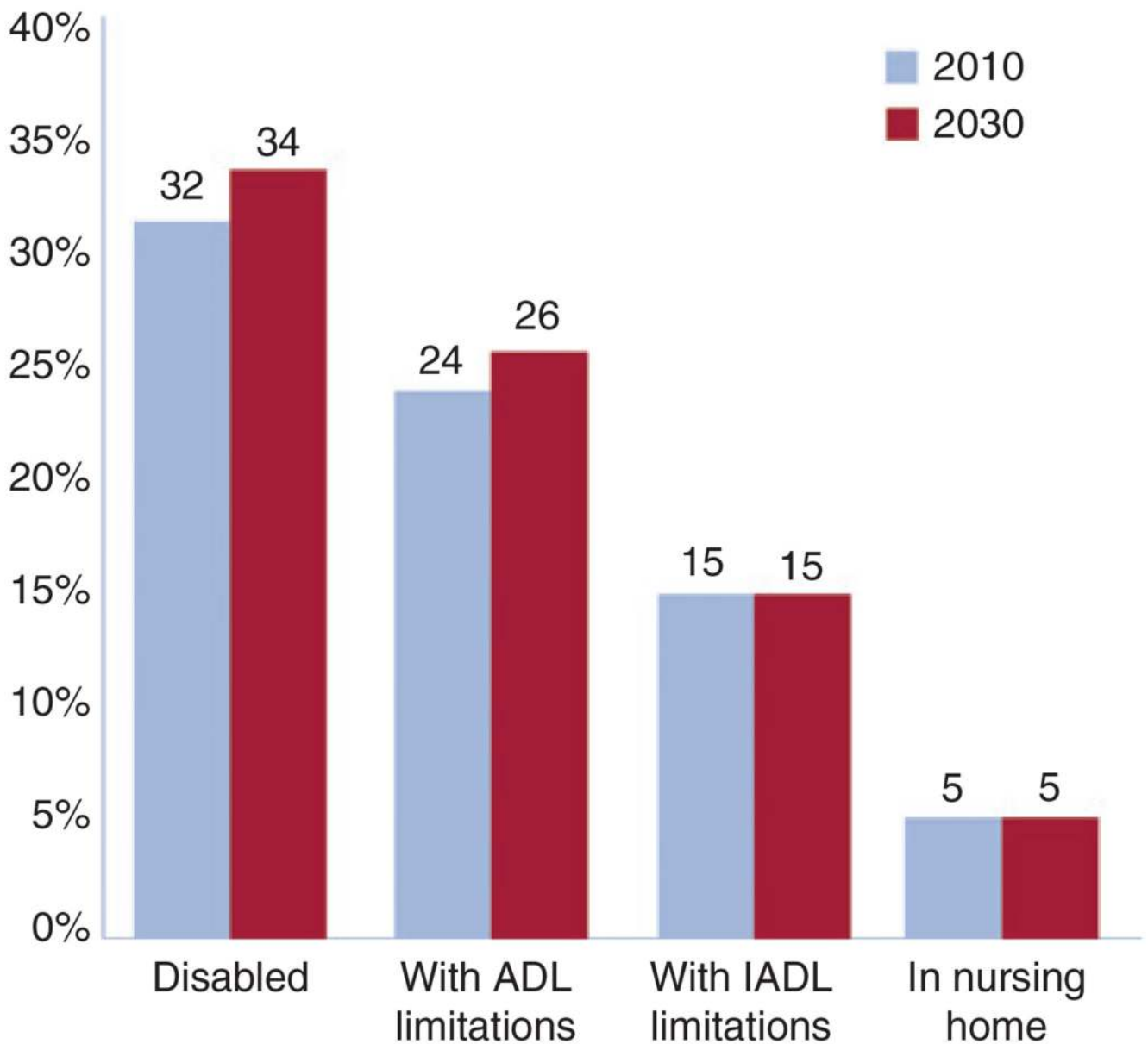
Figure 11.
Functional Status of U.S. Population Aged 65 and Older, 2010 and 2030.
Notes: Disabled is defined as having one or more ADL (activities of daily living) limitations, having one or more IADL (instrumental activities of daily living) limitations, living in a nursing home, or a combination of the three. ADL include bathing, eating, dressing, walking across a room and getting in or out of bed. IADL include using a telephone, taking medication and handling money.
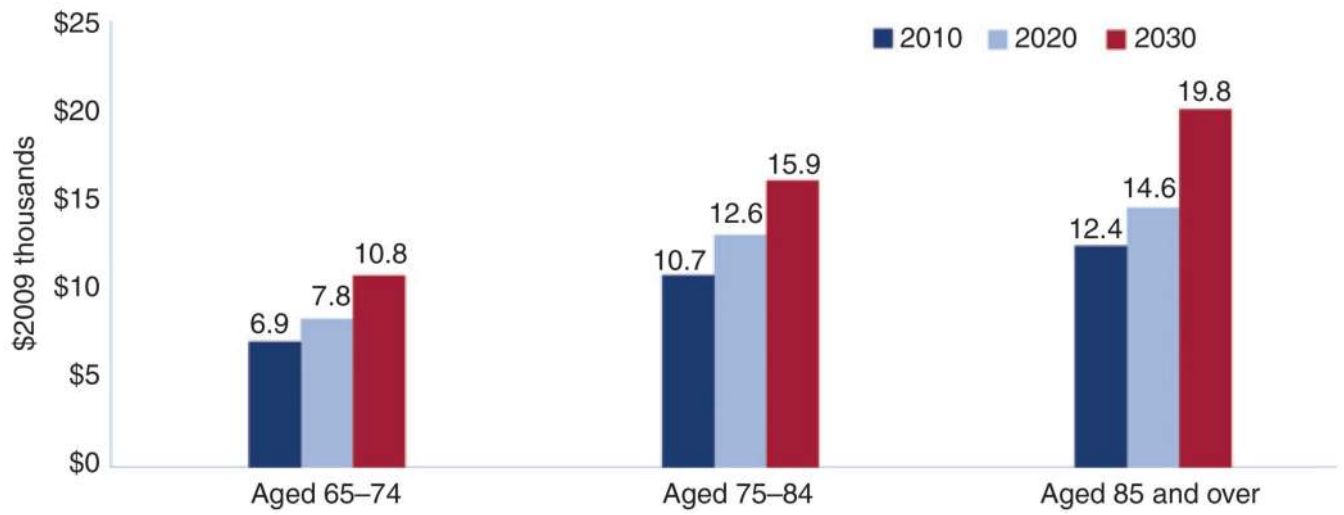
Figure 12.
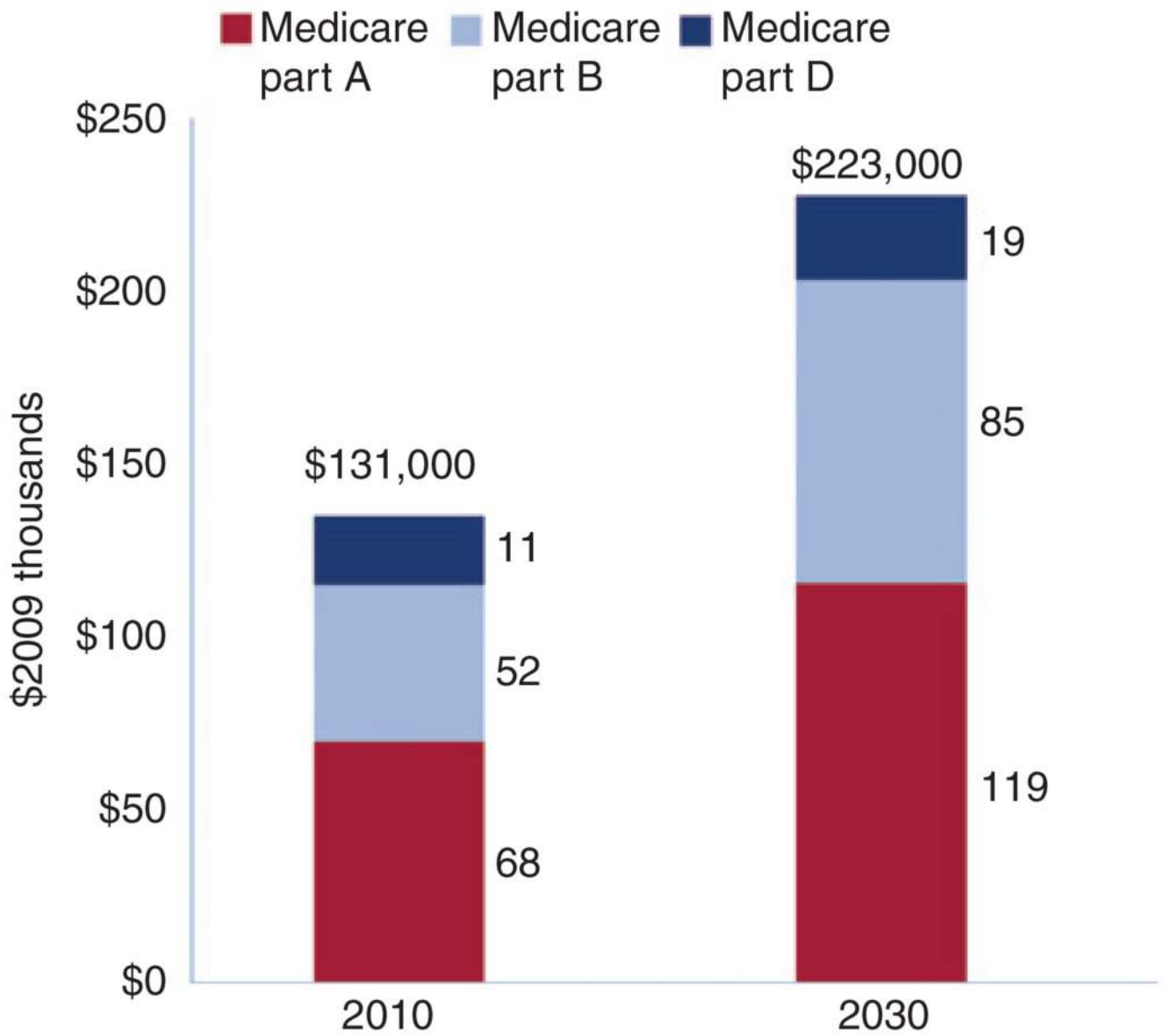Estimated Medicare Spending Per Elderly Beneficiary, by Age Group, 2010–2030.

Figure 13.
Estimated Total Lifetime Medicare Spending for a Typical Medicare Beneficiary Aged 65, 2010 and 2030.
Note: Amounts are in present value, computed with a 3 percent discount rate adjustment applied from age 65 onward.
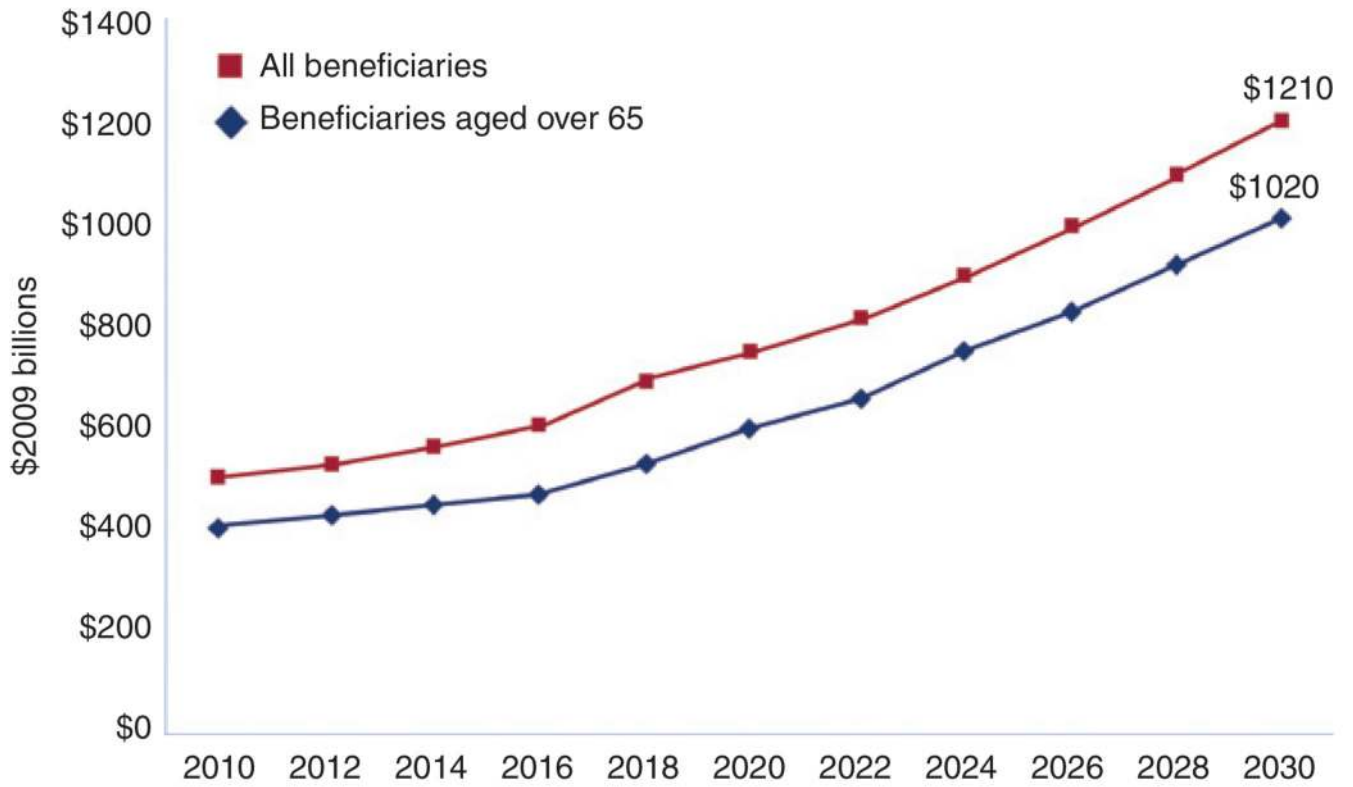
Figure 14.
Estimated Medicare Spending, 2010–2030.
Sources: Future Elderly Model (FEM), University of Southern California Leonard D.
Schaeffer Center for Health Policy and Economics, US Census Bureau projections,
Medicare Current Beneficiary Survey and Centers for Medicare and Medicaid Services.
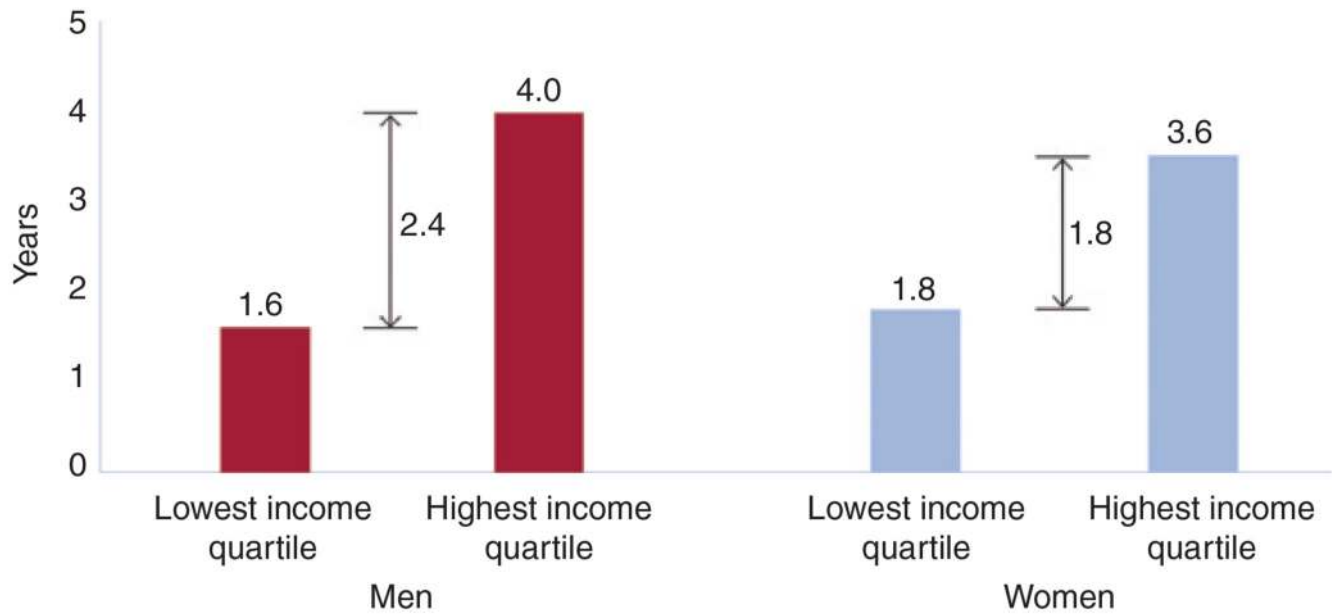
Figure 15.
Projected Increase in US Life Expectancy at Age 65, 1993–2025.
Source: Table 1 of Goldman, Dana P., and Peter Orszag, "The Growing Gap in Life Expectancy: Using the Future Elderly Model to Estimate Implications for Social Security and Medicare," American Economic Review: Papers and Proceedings, 2014, Vol. 105, No. 5 (May 2014).
Note: This figure shows the difference in life expectancy at age 65 between the cohorts born in 1928 and 1960, as projected by the Future Elderly Model (FEM), University of Southern California Leonard D. Schaeffer Center for Health Policy and Economics.
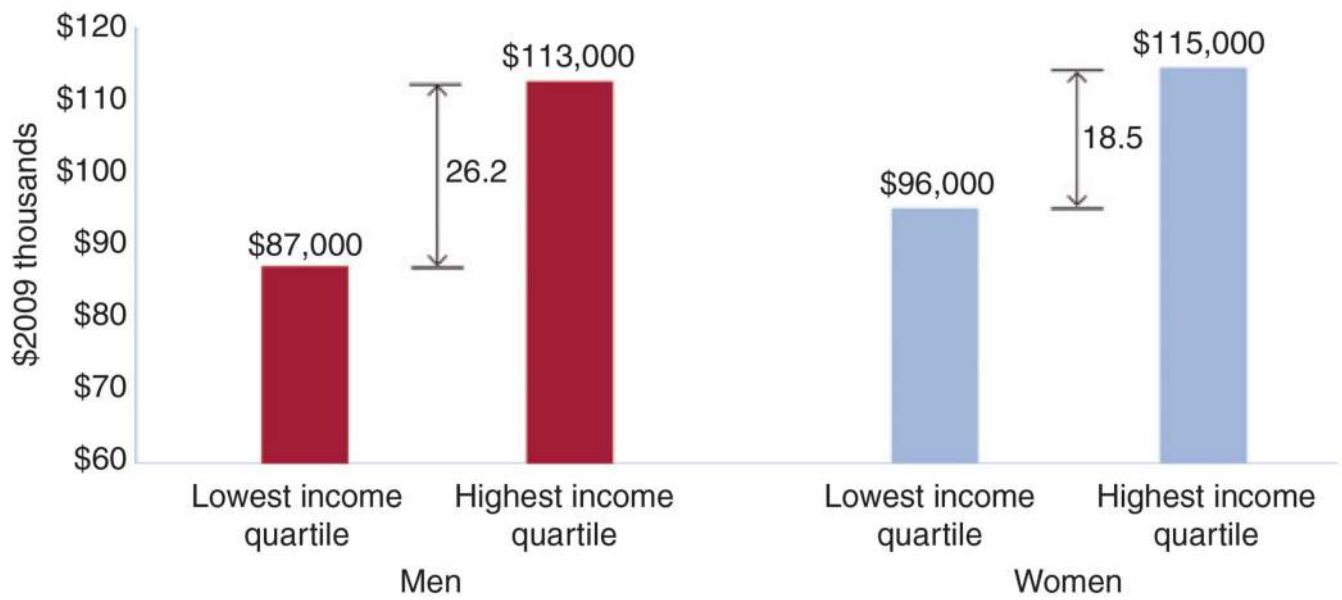
Figure 16.
Projected Increase in Lifetime Medicare Benefits Between Cohorts Aged 65 in 1993 and 2025.

Source: Table 3 of Goldman, Dana P., and Peter Orszag, "The Growing Gap in Life Expectancy: Using the Future Elderly Model to Estimate Implications for Social Security and Medicare," American Economic Review: Papers and Proceedings, 2014, Vol. 105, No. 5 (May 2014).
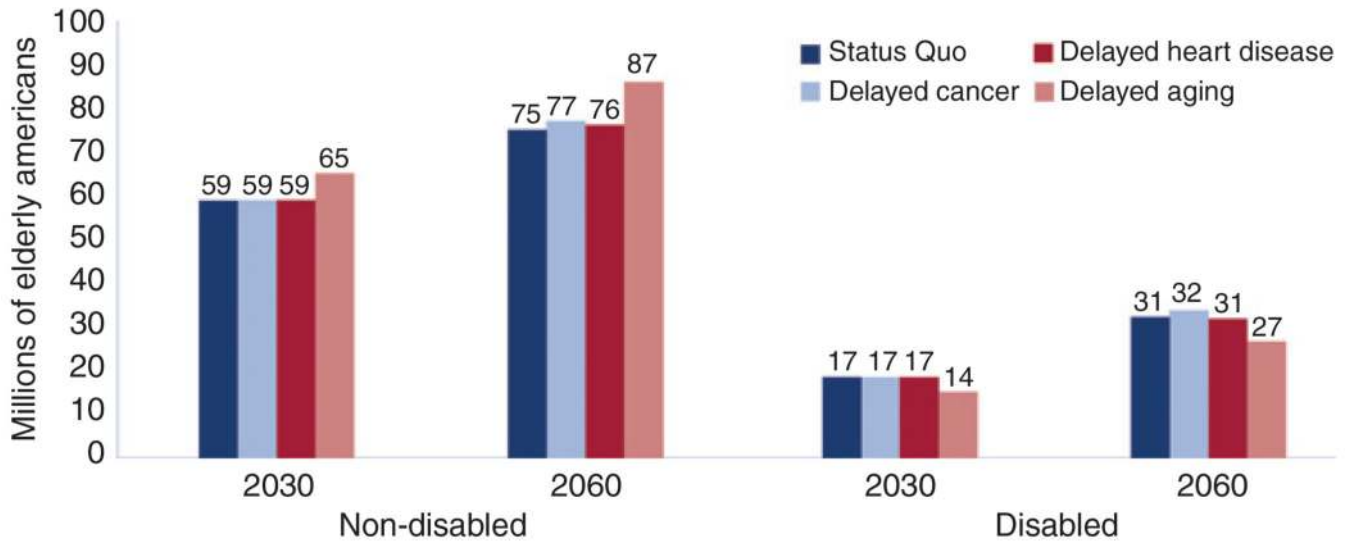
Figure 17.
Nondisabled and Disabled Elderly Americans Under Various Medical Innovation Scenarios, compared to the Status Quo, 2030 and 2060.

Source: Future Elderly Model (FEM), University of Southern California Leonard D. Schaeffer Center for Health Policy and Economics; and Exhibit 1 of Goldman, Dana P., et al., "Substantial Health and Economic Returns from Delayed Aging May Warrant a New Focus for Medical Research," Health Affairs, Vol. 32, No. 10 (October 2013).

Notes: The figure shows the number of elderly Americans (65 or older) projected to be either nondisabled or disabled according to the different medical innovation scenarios. Disabled is defined as having one or more limitations in instrumental activities of daily living, having one or more limitations in activities of daily living, living in a nursing home, or a combination of the three. The delayed-aging scenario resulted in a substantially higher percentage and number of nondisabled people than the delayed heart disease or delayed cancer scenarios.
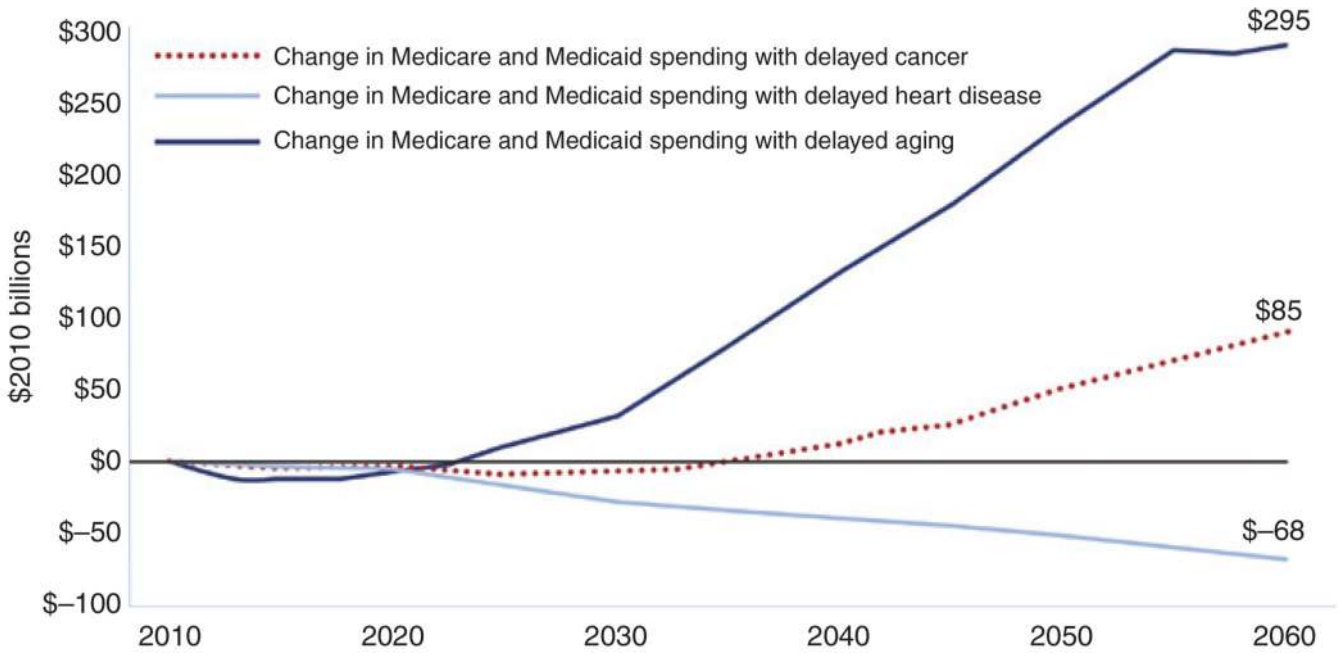
Figure 18.
Change in Medicare and Medicaid Spending Under Various Medical Innovation Scenarios Compared to Status Quo, 2010–2060.
Source: Future Elderly Model (FEM), University of Southern California Leonard D. Schaeffer Center for Health Policy and Economics; and Exhibit 1 of Goldman, Dana P., et al., "Substantial Health and Economic Returns from Delayed Aging May Warrant a New Focus for Medical Research," Health Affairs, Vol. 32, No. 10 (October 2013).
Notes: All spending is in 2010 dollars. The figure shows per period (nondiscounted) projected spending on Medicare and Medicaid under various medical innovation scenarios, relative to the status quo scenario for Americans aged 51 or older. Spending is much higher in the delayed-aging scenario because of the larger increase in the total population, even though per period costs for Medicare are lower.

Table 1

Characteristics of a Typical Elderly Medicare Beneficiary, 2010 and 2030.

	2010	2030
Age	76.1	75.8
Sex	Female (57%)	Female (56%)
Race	Non-Hispanic white (81%)	Non-Hispanic white (76%)
Highest educational attainment	High school diploma	College
Smoking status	Former smoker	Never smoked
Body mass index (BMI)	27.2 (Overweight)	30.2 (Obese)
Proportion disabled	32%	34%
Chronic conditions	1.8	2.2

Source: Future Elderly Model (FEM), University of Southern California Leonard D. Schaeffer Center for Health Policy and Economics.

Disabled is defined as having one or more limitations in instrumental activities of daily living, which include using a telephone, taking medication and handling money; having one or more limitations in activities of daily living, which include bathing, eating, dressing, walking across a room and getting in or out of bed; living in a nursing home; or a combination of the three. Chronic conditions refer to disease categories projected by the FEM and include: diabetes, high-blood pressure, heart disease, cancer (except skin cancer), stroke or transient ischemic attack, and lung disease (either or both chronic bronchitis and emphysema). Medians are shown for categorical variables (sex, race, educational attainment and smoking status); averages are shown for numerical variables (age, BMI and number of chronic conditions).