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## An Apple a Day:

The Impact of Health Conditions on  
the Required Savings for Healthcare

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### ABSTRACT

Healthcare is one of the most significant and worrisome categories of expenses in retirement. These expenses are primarily in the form of premiums for Medicare parts B and D and supplemental insurance, as well as out-of-pocket expenses for copays and cost sharing related to medical treatments and medications. We show that for a healthy 65-year-old male retiree, cumulative savings of approximately \$144,000 would be required to fund these expenses for the projected retirement period at a 90% confidence level. For a female, the amount would be \$156,000. However, for different health and disease states, the interactions of projected health costs and associated mortality projections often have interesting and counterintuitive effects on retirement planning. For example, the higher retiree healthcare costs of conditions such as diabetes and tobacco use are offset by reduced life expectancies. The net effect is that, in certain health states, less savings are required for healthcare.

## 1. Introduction

No issue in American life generates more anxiety than rising healthcare costs. Anyone looking at the data knows that Medicare and Medicaid are the prime cost drivers of another national concern — soaring federal deficits. American employers, for their part, not only worry about how health policy will impact their businesses but also about whether some of their workers may be clinging to their jobs for fear of losing health coverage. In addition, nearly everyone who is anywhere near retirement age worries about whether he or she has saved enough to cover healthcare costs once he or she retires. Unfortunately, these worries are well-grounded.

For years now, expert analysts for the Employee Benefits Research Institute (EBRI) and other retirement research centers have been sounding the alarm about retiree health costs. EBRI's estimates of lifetime medical expenses for a healthy couple, now age 65, run to multiple hundreds of thousands of dollars.<sup>1</sup> Some workplace savings providers have responded to these concerns by including generalized information on retiree health costs in their offerings. But this information typically takes the form of an unnervingly large number — a quarter-million dollars or more — that many workplace savers find paralyzing rather than motivating.

That paralysis may be one reason why so few people have failed to address their own healthcare future. A recent survey conducted by Empower Institute and Brightwork Partners found that only 12% of working Americans have taken any account of health costs in their retirement planning.<sup>2</sup> This detailed survey of more than 4,000 respondents estimates the percentage of working income that American households are on track to replace in retirement. Eight out of 10 are flying blind when it comes to understanding — or dealing with — what will be, for many, their largest cost in retirement. Four out of 5 baby boomers in the survey cite uncovered health expenses

and the risk of becoming ill as the two top financial concerns in retirement. More than half admit to knowing virtually nothing about the costs of participating in the Medicare program. Americans' anxiety and inaction is further compounded by lack of knowledge about potential health costs in retirement. Even though health costs poll as one of the greatest concerns among Americans in or close to retirement, the retirement services industry has made minimal progress toward addressing these concerns.

In this study, we take a fresh look at the interaction between healthcare and retirement. There are many excellent analyses of general retirement healthcare costs that have already been published (e.g., EBRI's healthcare series). What is new and different about this study is that we explicitly integrate costs specific to certain health states with the mortality data associated with these states. This allows us to estimate the savings needed to fund healthcare that are mortality-adjusted based on health state.

The main findings of this study show that there are considerable variations in the financial implications across individuals with different health and retirement circumstances. Medical conditions such as cancer, diabetes, cardiovascular disease and high cholesterol require markedly different medical costs per year under Medicare. Yet in terms of savings, these higher costs are offset by shorter life expectancies. Ironically, individuals in excellent health may face the highest overall medical expenses because they are projected to live the longest. For example, the savings required for a 65-year-old female to confidently fund healthcare expenses range from a low of \$111,000 (Type 2 diabetes) to a high of \$156,000 (in good health) — even though having diabetes will cause higher annual costs.

<sup>1</sup> Source: *Amount of Savings Needed for Health Expenses for People Eligible for Medicare: Unlike the Last Few Years, the News is Not Good*, Employee Benefit Research Institute, 2015, 36, No. 10

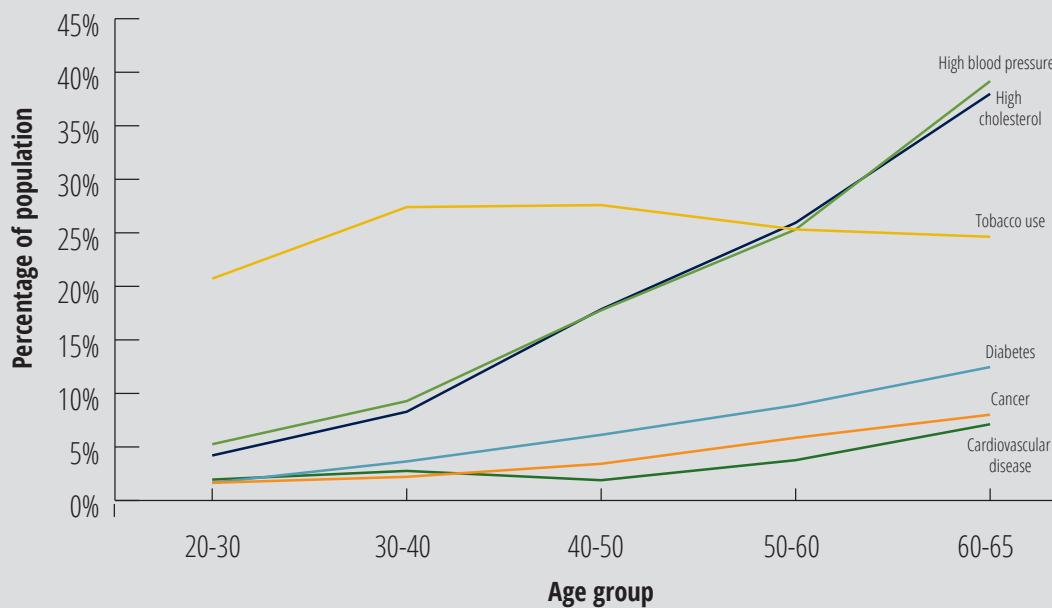
<sup>2</sup> Lifetime Income Score V: Optimism and Opportunity, Empower Institute, 2015.

## 2. The Health of Retirees

As part of the Lifetime Income Score V survey, conducted by Empower Institute in January 2015, we assessed the health state of members of each responding household. Specifically, survey questions asked if one or both members of the household were healthy or if one or both members had one or more of six health conditions — diabetes, cancer, high blood pressure, high cholesterol, cardiovascular disease and tobacco use. Exhibit 1 depicts the incidence rates for these health states by age group.

What is immediately obvious from this graph is the increasing unhealthiness as Americans age. Roughly 40% of individuals have high blood pressure and/or high cholesterol by the time they are in the preretirement group — ages 60 to 65. Diabetes, cancer and cardiovascular disease occur in this age group at a rate of 12.5%, 8.0% and 7.1%, respectively. Interestingly, tobacco use is relatively consistent across all age groups, with the preretirement age group at an alarmingly high 25%.

**Exhibit 1. Incidence Rates for Health States by Age Group**



Source: Empower Institute and Brightwork Partners, 2015 retirement survey

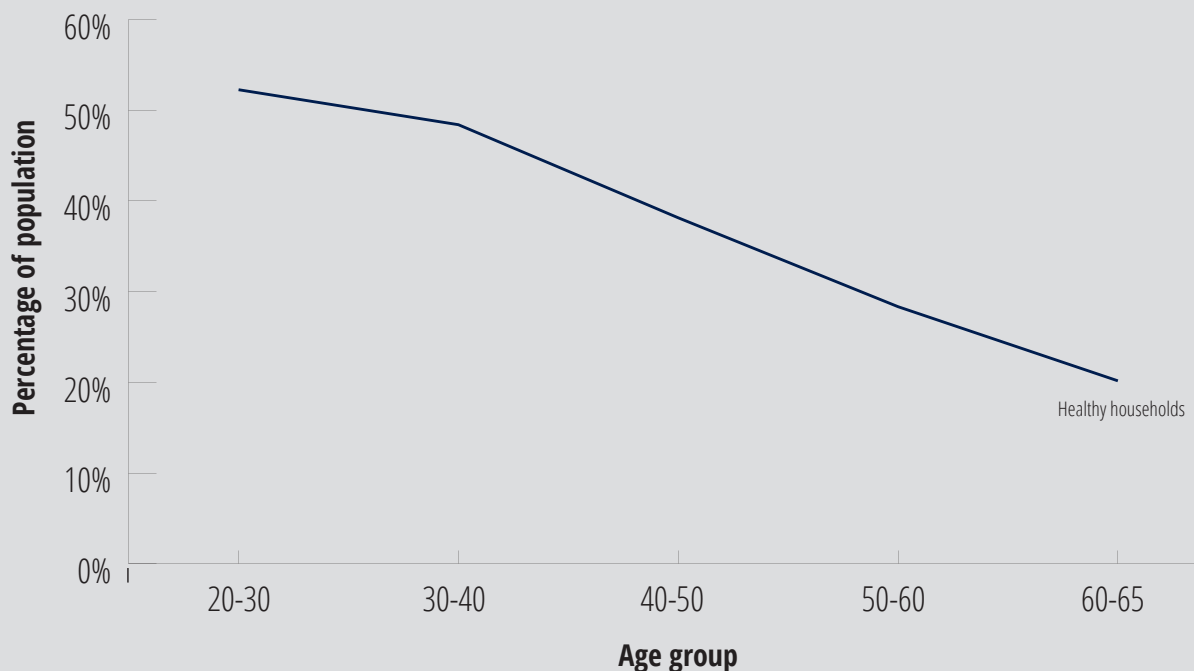
With the changing health fortunes by age, it's natural to question just how many households are actually healthy as they enter retirement. Exhibit 2 organizes the data from the retirement survey by identifying those households in which the respondent and spouse have none of the six adverse health states. While more than 50% of households are found to be healthy in the 20-30 age group, only 20% of them are healthy in the 60-65 preretirement age group. Understanding the interaction of health state and healthcare expenses in retirement is extremely relevant for the vast majority of working Americans.

### 3. Healthcare Costs

One survey found that 56% of middle-income baby boomers know little or nothing about Medicare. Even more surprising, it noted that 13% of Americans think that Medicare is free.<sup>3</sup> This lack of knowledge of the healthcare system is only one of many aspects of retirement planning that has to be addressed if any progress is to be made toward achieving a full and successful retirement.

As a starting point for understanding these costs, it seems useful to begin with a very broad overview of some

**Exhibit 2. Percentage of Healthy Households by Age Group**



Source: Empower Institute and Brightwork Partners, 2015 retirement survey

of the cost components of Medicare. More importantly, it is worth exploring how these costs might vary based on the particular health state of the individual. With this in mind, let's review Medicare's most salient aspects and costs.

The core feature of Medicare, as defined in the 1965 Medicare Amendment to the Social Security Act signed by President Lyndon Johnson, is referred to as Part A. This insurance covers stays in nursing facilities and hospitals beginning at age 65. The coverage is free provided that

the individual paid the FICA tax for 40 quarters during his or her working career. (The 2015 premium for Part A is currently \$407 per month if the individual never worked or paid the FICA tax.)

Medicare Part A covers a hospital stay of 100 days. The first 60 days are fully covered. The next 30 days require a copayment of \$315 per day and \$630 per "lifetime reserve day" after day 90. The coverage also includes a 100-day stay in a nursing facility. The first 20 days are fully covered. The next 80 days require a copayment of \$157.50 per day.

<sup>3</sup> Source: <http://www.centerforsecureretirement.com/media/166389/retirement-healthcare-report.pdf>

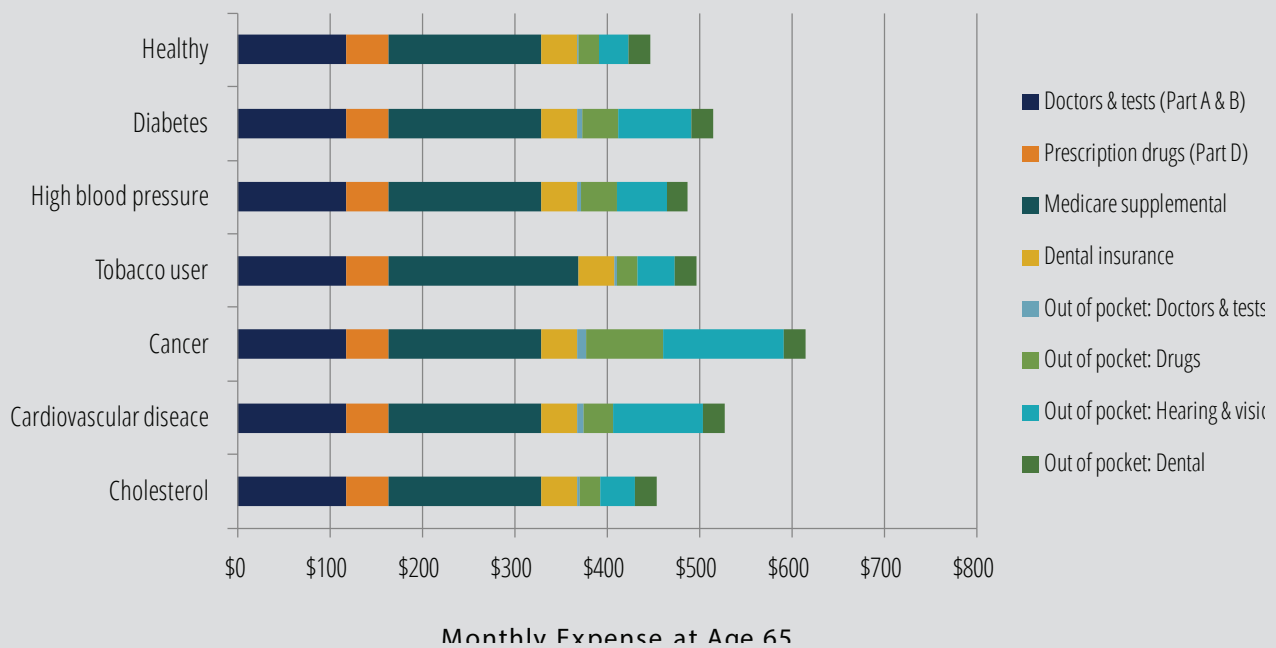
Another component of Medicare is Part B. Part B is general medical insurance that covers outpatient care, such as doctor visits and diagnostic tests. It covers 80% of the costs, while the individual bears the remaining 20%. There is also a \$147 per-year deductible. Currently, the base premium for Part B is \$104.90 for individuals making \$85,000 per year or less. For incomes above this level, there is a premium surcharge. The maximum premium for Part B is \$335.70 for incomes in excess of \$214,000 per year.

Part D of Medicare covers prescription drugs. This insurance can be obtained by adding a Medicare prescription drug plan or by getting a Medicare Advantage plan through an HMO or a PPO that offers Medicare prescription drug coverage. For individuals making \$85,000 or less, there is no income surcharge. The maximum premium is an individual's plan premium plus a \$70.80 income surcharge for incomes in excess of \$214,000.

Supplemental (Medigap) policies are sold by private companies to help pay for expenses not covered by Medicare, such as copayments, coinsurance and deductibles. An individual must have both Part A and Part B to purchase a Medigap policy. Expenses such as vision, hearing aids and dental care are not covered by Medigap.

In order to get a sense of the overall healthcare costs for a retiree, Exhibit 3 compiles the costs for Medicare premiums and out-of-pocket costs, such as copays and deductibles. These aggregate costs are also differentiated by health condition. Exhibit 3, which is based on a 65-year-old female, represents the monthly costs in the first year of retirement for an income of \$85,000 or less (i.e., there are no income surcharges). Notice that the monthly costs are significant — the totals range from approximately \$450 to \$600. The highest healthcare costs are associated with conditions such as diabetes, cancer and cardiovascular disease due to the higher out-of-pocket expenses.

**Exhibit 3. Monthly Healthcare Costs for a 65-Year-Old Female — Income of \$85,000 or Less**

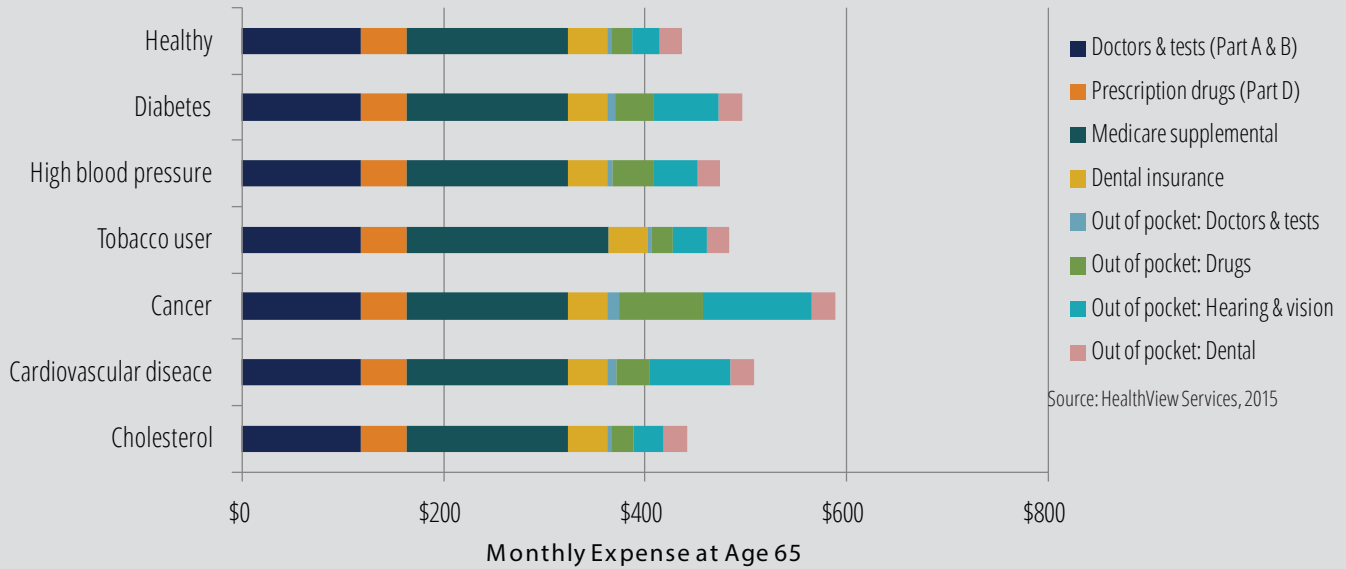


Source: HealthView Services, 2015

Exhibit 4 provides a similar view of healthcare costs for a 65-year-old male with an income of \$85,000 or less. The amounts are slightly smaller than the costs for a female,

with monthly differences in the range of only \$9 to \$25 depending on health state.

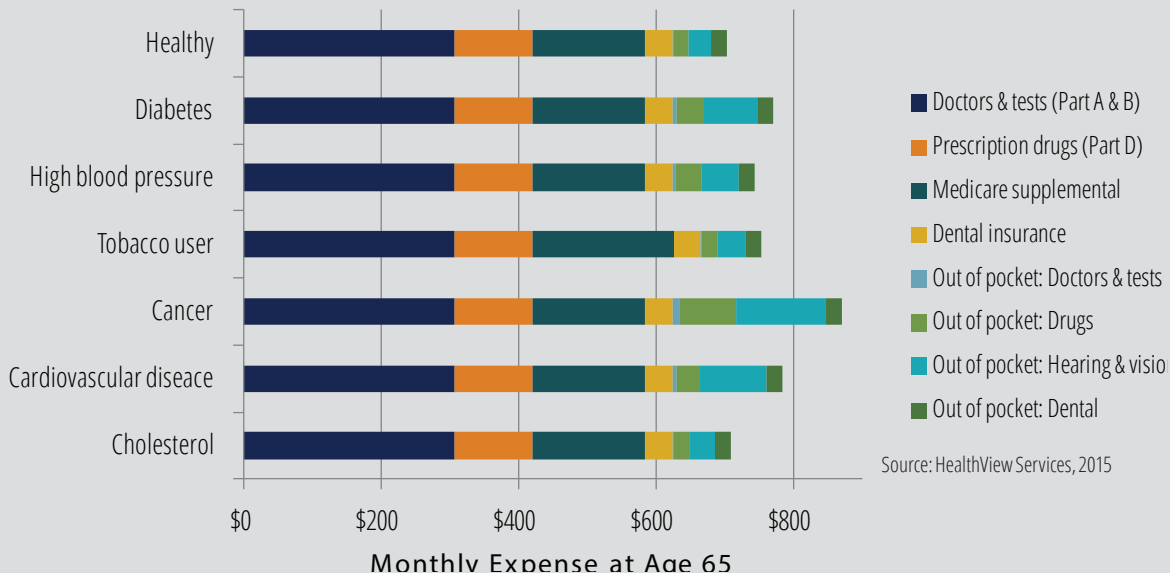
**Exhibit 4. Monthly Healthcare Costs for a 65-Year-Old Male — Income of \$85,000 or Less**



As a final note on first-year healthcare costs, Exhibit 5 shows the impact of the maximum income surcharge on Medicare Part B and Part D premiums. These surcharges hit their top tier at retirement incomes in excess of \$214,000. For these individuals, total costs range from

about \$700 to \$870 per month. Keep in mind, of course, that these are only first-year costs. Healthcare inflation, which historically has outpaced general inflation, could quickly make these costs an ever-increasing burden on retirement savings.

**Exhibit 5. Monthly Healthcare Costs for a 65-Year-Old Female — Income of More Than \$214,000**



#### 4. Solving for Required Healthcare Savings

Now that we have explored some of the links between health conditions and healthcare costs, it is worthwhile to consider the savings required to fund these costs throughout retirement. To do so, we need two more types of data. First, we need to incorporate the appropriate healthcare inflation rate in projections of future healthcare costs. Second, we need to know how long we might have to fund these costs; hence, we need to know the life expectancy for each of the health states we are considering.

On the inflation front, HealthView Services actually provides projections of future healthcare costs in nominal

dollars. Each component cost, including Medicare premiums and out-of-pocket costs, has its own inflation rate. Using historical data and its own view of the healthcare system, HealthView makes a determination of future levels of inflation-adjusted costs. These values are utilized in the savings analysis below.

For life expectancy, Exhibit 6 provides the health-specific ages for males and females who have an attained age of 65. Health conditions such as cancer and diabetes and health states such as cardiovascular disease, high blood pressure and high cholesterol have less of an impact because there are medications that can effectively manage these conditions.

#### Exhibit 6. Life Expectancy by Health State for a 65-Year-Old

	Healthy	Cancer	Cardiovascular disease	Diabetes	High blood pressure	High cholesterol	Tobacco use
Male	87	81	85	78	86	85	81
Female	89	81	88	81	88	87	83

Source: HealthView Services, 2015

To determine the amount of savings required to fund healthcare costs, it is important to capture the uncertainty around investment returns experienced by a portfolio funding healthcare. A simple way to evaluate the overall health of a healthcare savings plan is through the use of a net present value (NPV) analysis. It captures both the mortality risk and the uncertainty around investment returns by discounting the cash inflows and outflows of the healthcare savings plan in the appropriate manner. Mathematically, the equation for the mortality-adjusted, discounted cash flows is:

$$NPV = \sum_{t=0}^{LE} \frac{CF_t}{(1+R)^t} \quad (1)$$

where:

t = years into the future

LE = life expectancy

CF<sub>t</sub> = cash flow at time t

R<sub>t</sub> = the risk-adjusted discount rate

The cash flows of the healthcare savings plan,  $CF_t$  in equation (1), represent savings inflows into the portfolio prior to retirement age and the outflows from healthcare expenses deducted after retirement.  $CF_0$  in the NPV analysis represents the individual's current savings at any desired time  $t=0$ . Life expectancy for a particular health state,  $LE$ , is obtained from the table in Exhibit 6.

In order to determine the discount rate applicable at each time  $t$ ,  $R_t$ , we use the returns on the healthcare savings fund available in each year. These returns, denoted  $r_t$ , can be obtained from historical time series or through Monte Carlo simulation. Assuming for convenience (but without loss of generality) that the asset classes included in the investment portfolio are stocks, bonds and cash equivalents, the discount rate can be expressed by:

$$(1+R_t)^t = (1+r_1)(1+r_2)(1+r_3) \dots (1+r_t) \quad (2)$$

where:

$$r_t = (w_S \times r_{St}) + (w_B \times r_{Bt}) + (w_C \times r_{Ct}). \quad (3)$$

In equations (2) and (3), we have the following definitions:  $w_S$ ,  $w_B$  and  $w_C$  are the portfolio weights in stocks, bonds and cash, respectively;  $r_{St}$ ,  $r_{Bt}$  and  $r_{Ct}$  are the returns on stocks, bonds and cash at time  $t$ , respectively.

In this study, we only consider healthcare expenses, and we fix the values of  $w_S$ ,  $w_B$  and  $w_C$  at 0.40, 0.60 and 0, respectively. This allows us to focus exclusively on the interaction of health state and healthcare savings.

We represent healthcare savings risk as the probability of ruin. It is represented as a zero-order, lower-partial moment of the distribution of NPV outcomes about a target value of zero. It is expressed as:

$$\text{Probability of ruin: } LPM_0 = \sum_{NPV_j < \tau} (\tau - NPV_j)^0 / (n-1) \quad (4)$$

where  $NPV_j$  = the  $j^{\text{th}}$  NPV outcome from the set of  $n$  observations from equations (1), (2) and (3), as generated

from return simulations and  $\tau$  = target value of zero. We optimize the savings amount in equation (1) such that the probability of ruin is 0.10.

## 5. Saving for Healthcare Expenses

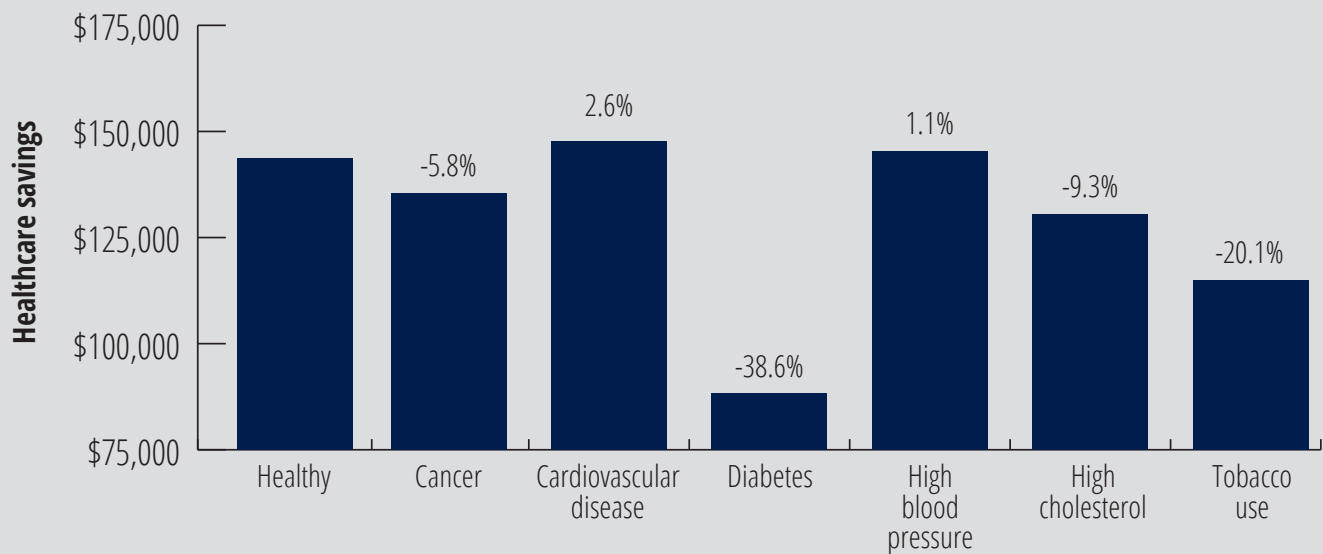
Using our NPV approach, with projected annual healthcare costs and health-specific life expectancy, we are able to determine the amount of savings required to fund healthcare at a 90% confidence rate at age 65. Exhibit 7 compares the savings amount for a healthy 65-year-old male (\$143,800) with the amount required for alternative health conditions. All of these amounts are based on healthcare expenses reflecting no income surcharges, (i.e., retirement income less than or equal to \$85,000 per year).

While all adverse health conditions have higher annual expenses than good health (see Exhibits 3 and 4), some have required savings amounts less than those for good health. The shorter life expectancies for conditions such as cancer, diabetes, high cholesterol and tobacco use more than offset the higher annual costs. In other words, while individuals with these conditions have higher annual healthcare expenses, they don't have to pay them as long. Health states such as cardiovascular disease and high blood pressure, while carrying higher annual costs, don't have as significant a mortality offset. The required savings for individuals with one of these conditions are, in fact, slightly higher than the required savings for healthy individuals.

Exhibit 8 provides the required healthcare savings for a 65-year-old female across the various health states. Notice, in this case, that the savings amounts are quite a bit higher due to both the higher annual costs for a female and the longer life expectancies within each health condition. Both exhibits 7 and 8 highlight the significant impact that certain health states have on the amount of healthcare expenses individuals have to pay during retirement. The impact from diabetes and tobacco use is especially high as shortened mortality effects dramatically reduce the required savings.

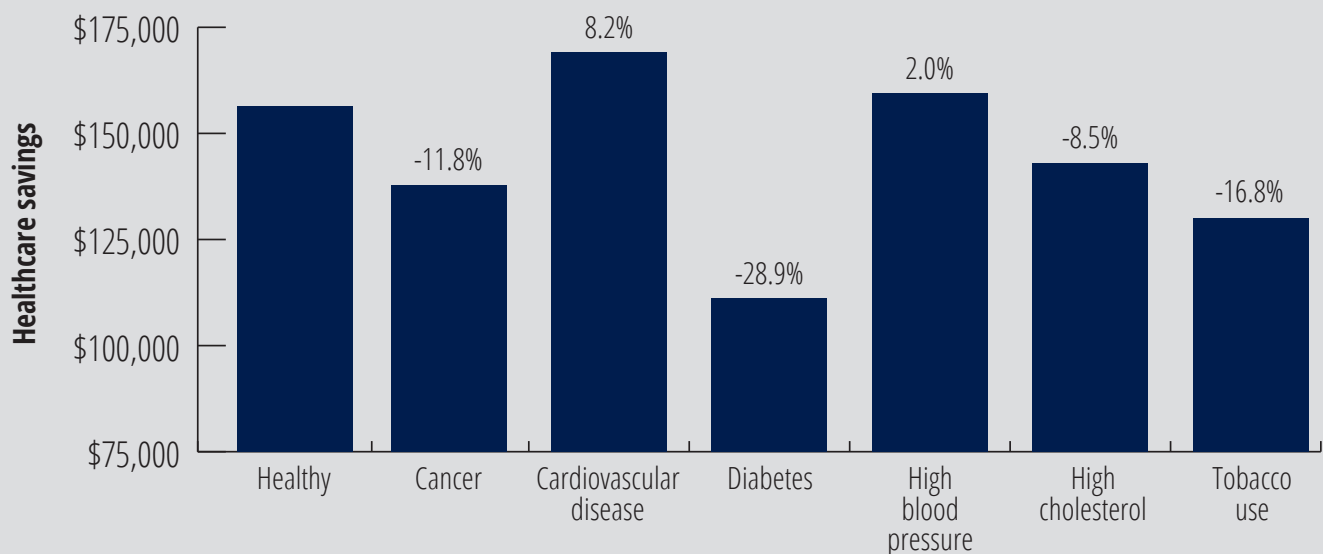


**Exhibit 7. Savings Required for a 65-Year-Old Male to Fund Medicare Expenses  
(40/60 Allocation — 90% Confidence)**



Source: HealthView Services, 2015

**Exhibit 8. Savings Required for a 65-Year-Old Female to Fund Medicare Expenses  
(40/60 Allocation — 90% Confidence)**



Source: HealthView Services, 2015



## 6. Conclusions

To be sure, there is not — and actually cannot be — any one-size-fits-all solution to retiree health costs. Health states are individual by definition. For example, a person may or may not use tobacco or have diabetes, cardiovascular disease or cancer. Excellent health, ironically, can actually raise an individual's lifetime health spending needs because of the likelihood that healthy 65-year-olds will live much longer. By contrast, the initially higher costs for a retiree who is dealing with a health issue such as cancer or diabetes are statistically likely to be offset by earlier mortality.

These variations can be dramatic. We estimate that a healthy 65-year-old male, for example, will need approximately \$144,000 in savings to be confident to fund out-of-pocket healthcare expenses in retirement; on the other hand, a similar male who suffers from diabetes will likely need about \$88,000. Individual experience, of course, will vary from these general statistics, making it

nearly impossible to precisely predict a specific individual's healthcare costs across what may be decades of retirement. But the impossibility of precision is no excuse for inertia. Doing nothing to address retiree health costs is not an option.

The challenge is to offer individuals at least a first approximation of potential health expenses in retirement — a way to act on meeting them either by raising their savings rate or by changing their lifestyle. More specifically, the need is for a user-friendly basic health cost assessment built right into individuals' workplace savings experience. The key drivers of such an assessment process should include well-established actuarial data associated with a few most dominant health variables, including state of residence; publicly available estimates on Medicare costs and how they break down; and, finally, real assurances to participants that any data they enter will be strictly confidential.

The charts, graphs and screen prints in this presentation are for ILLUSTRATIVE PURPOSES ONLY.

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