

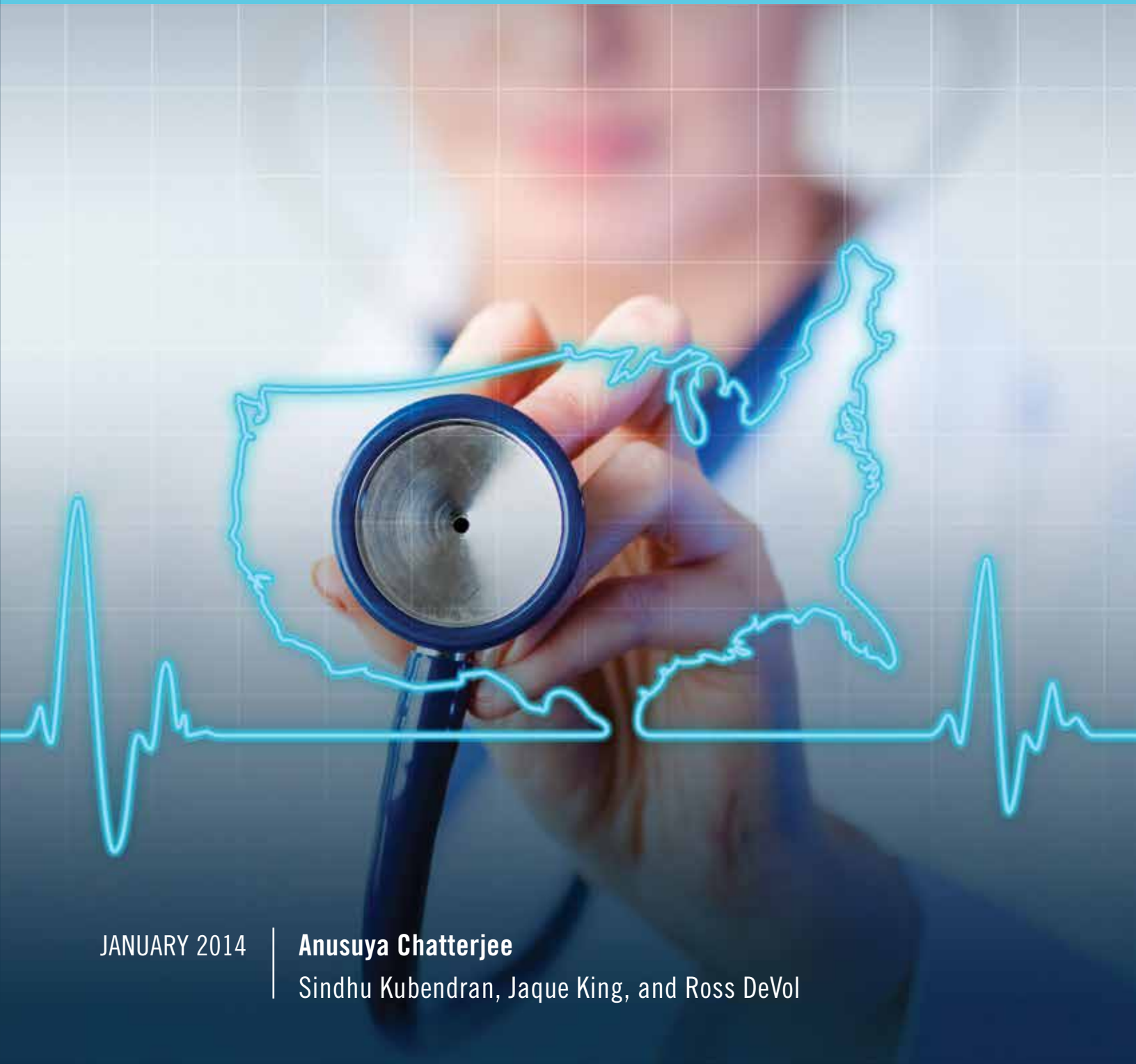


MILKEN INSTITUTE

CHECKUP TIME

Chronic Disease and Wellness in America

Measuring the Economic Burden in a Changing Nation



JANUARY 2014

Anusuya Chatterjee

Sindhu Kubendran, Jaque King, and Ross DeVol



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ACKNOWLEDGMENTS

The authors would like to thank our editor, Edward Silver, for helping to make our report as clear and focused as possible on a challenging deadline.

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ON THE WEB

Access this report and much more information on chronic disease and risk factors at chronicdiseaseimpact.com

Introduction

In the realm of health, there are no more deadly and costly threats to patients, their families, and the economy than chronic disease. Despite medical inflation falling to a four-decade low, health-care spending reached 17.9 percent of U.S. GDP in 2012. If current trends continue, it will hit 20 percent in 2022, according to the Centers for Medicare and Medicaid Services (CMS).

Behavioral changes such as eating better, exercising more, and smoking less, along with other public health interventions, are the most cost-effective strategies to contain the growth of chronic disease. We must continue to invest in research and development to find vaccines and therapeutic cures, but prevention is the largest piece of the puzzle. In the United States, public sources provide the greatest share of total funding for the prevention of chronic disease. Nevertheless, according to the CMS, public health spending represented only about 3 percent of health-care spending in 2009, while expenditures on chronic disease accounted for 75 percent of health-care costs.

In 2007, the Milken Institute published the study “An Unhealthy America: The Economic Burden of Chronic Disease,” which analyzed how much seven major chronic diseases (cancer, heart disease, hypertension, stroke, diabetes, and pulmonary and mental conditions) were costing America in human capital, medical expenditures, and economic productivity. Even more importantly, it projected those costs into the future under several sets of conditions. What would they look like if we didn’t alter course? How much could be saved through modest personal behavior adjustments and advances in treatment?

Major findings from that study included:

What does chronic disease cost us?

For each disease, we calculated the number of people with a reported case, the treatment costs, and lost productivity and workdays. About 109 million Americans reported having at least one chronic disease in 2003 (the latest data available at the time) and a total of 162 million cases were reported. Treatment costs and lost productivity amounted to \$1.3 trillion.

Where is this taking us economically?

We projected rates of disease, treatment costs, and lost economic output over a 20-year period, assuming that those trends continued, resulting in a 42 percent increase in cases to 230 million in 2023, with \$4.2 trillion in treatment costs and lost economic output.

What costs would be avoidable if we improved prevention and treatment?

We projected rates of disease and associated costs under an optimistic scenario, assuming modest improvements in preventing and treating disease relative to a set of baseline or most likely assumptions. By 2023, we found, the United States could avoid 40 million cases, cut treatment costs \$220 billion, and increase GDP \$900 billion.

What is the long-term impact of reducing the disease burden?

Building on our 20-year projections, we assessed the importance of health investment to human capital and national economic performance over a longer horizon. Inflation-adjusted GDP could be \$6 trillion, or 18 percent, higher by 2050.

What are the implications of our findings?

We concluded that investment in good health is an investment in economic growth and made two primary recommendations:

- » The health-care system should create incentives for prevention.
- » The nation should renew its commitment to healthy body weight.

It has been nearly seven years since we released “An Unhealthy America.” In preparation for the Summit on Public Health and Prosperity, co-hosted by the CDC Foundation and the Milken Institute, we decided to examine whether progress has been made and calculate performance relative to our projections based on the behavioral assumptions. Using a similar methodology to that of the original study, we updated the actual economic burden associated with five high-mortality diseases for 2008 through 2010. The resulting paper, “Checkup Time: Chronic Disease and Wellness in America/Measuring the Economic Burden in a Changing Nation,” follows this Introduction. It was authored by Anusuya Chatterjee, along with Sindhu Kubendran, Jaque King, and myself.

The good news in the update is that treatment expenditures per patient and heart disease prevalence are lower than our baseline projections. And the bad news: In all other diseases, the population of patients reporting a condition rose beyond our baseline projections, and actual treatment costs and productivity losses exceeded estimates.

The composite economic burden associated with the examined diseases was \$28 billion and \$135 billion more, respectively, than projected in the baseline and optimistic scenarios, primarily due to the higher numbers of patients reporting a condition. Regarding treatment expenditures, the actual value was only \$12 billion more than the baseline scenario, and the corresponding excess loss to the economy was \$16 billion. Although the actual numbers are above baseline values, they are very close in percentage terms.

In regard to causal factors, the effort against heart disease seems to have been aided by falling smoking rates. As the Centers for Disease Control and Prevention has reported, smoking prevalence was 19.3 percent of American adults in 2010, versus “An Unhealthy America’s” assumptions of 19.95 percent in the baseline scenario and 19.35 percent under optimistic conditions. Additionally, many statin drugs became available as generics in recent years, and they’ve reduced the rate of progression to heart disease. Obesity, as reported by CDC’s Behavioral Risk Factor Surveillance System, was 27.8 percent in 2010 as opposed to 26.7 percent in our baseline scenario. Obesity is a significant factor in many cancers, hypertension, and especially type 2 diabetes. Its higher prevalence contributed to the number of cases of most diseases exceeding our projections for 2010. In diabetes, improved and earlier detection played a role in boosting reported cases.

For almost all these diseases, our findings show that it is the growing volume of cases that is expanding the nation’s economic burden. Indeed, as the population grays, we face a rising risk of widespread age-dependent chronic afflictions.

Yet we can learn from what works. Strategies to battle cardiac disease have had the most success, in both

reducing prevalence and easing the economic burden. Much of the credit goes to public anti-smoking initiatives. Drawing upon that, we can expect that aggressive campaigns to prevent obesity, improve nutrition, and motivate physical movement will curtail the growth of heart disease and, ultimately, set it on a downward trajectory. Simple physical activity not only helps control weight but can bring down cholesterol levels, and such healthy habits can put distance between us and the menaces of stroke and hypertension.

We know the interventions that will make the most impact. The time to prevent the preventable is now.

Ross DeVol

Chief Research Officer

Milken Institute

Illness Out of the Blue

Alex was an athlete, in perfect shape, and rarely ate junk food. His 30-year-old life was good, and he knew that nothing could stop him from achieving his dreams. He had only one vice—smoking.

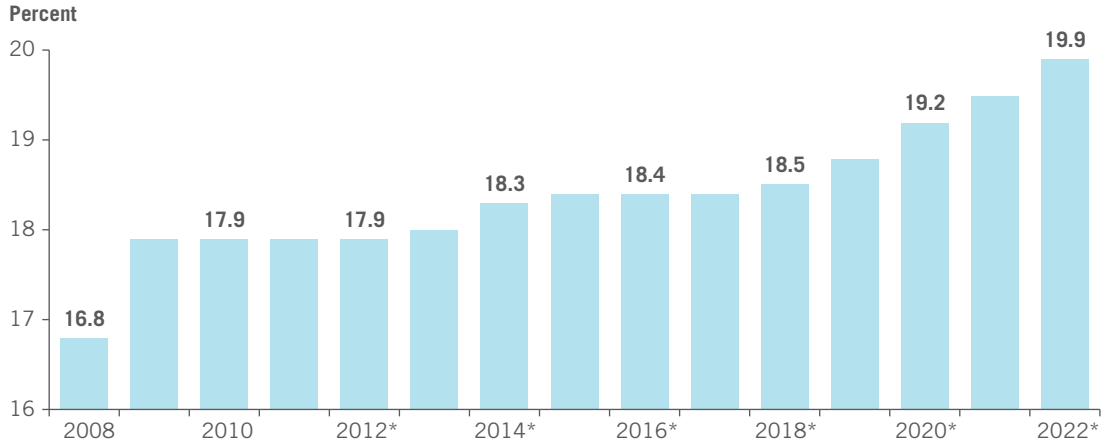
He was on a business trip from Boston to New York when suddenly he lost the grip on his carry-on. Alex hardly paid attention when his bag fell to the ground. He picked it up and was on his way. During a meeting the next day, however, he felt an unbearable shooting pain on the left side of his chest, shoulder, and down the left arm. Alex was rushed to the hospital and diagnosed with heart disease. Shortly thereafter, he had to endure bypass surgery.

Julia was also in seemingly great health at 72 years old, still played tennis, and never smoked. She was having her afternoon tea one day when she suddenly felt uneasy and had difficulty in breathing. She woke up in a hospital three days later, realizing that she would never be able to walk again or perform the daily activities of life on her own. Julia had suffered a stroke. Now, she is entirely dependent on a caregiver.

Life will never be the same for Alex and Julia. On top of their concerns about comfort and quality of life, the costs of their care weigh painfully on them. In this country, millions of Alexes and Julias suffer from chronic conditions, and they can tell similar stories.

According to the Centers for Disease Control and Prevention (CDC), chronic illness affects one of every two adults in the U.S., and they are responsible for 75 percent of health-care costs. Needless to say, the rising expense is a burden for the country. In 2008, those costs were 16.8 percent of GDP, and by 2022 they are projected to be just shy of 20 percent. That's far too fast an increase in only 14 years.

Rising health-care costs (as % of GDP)

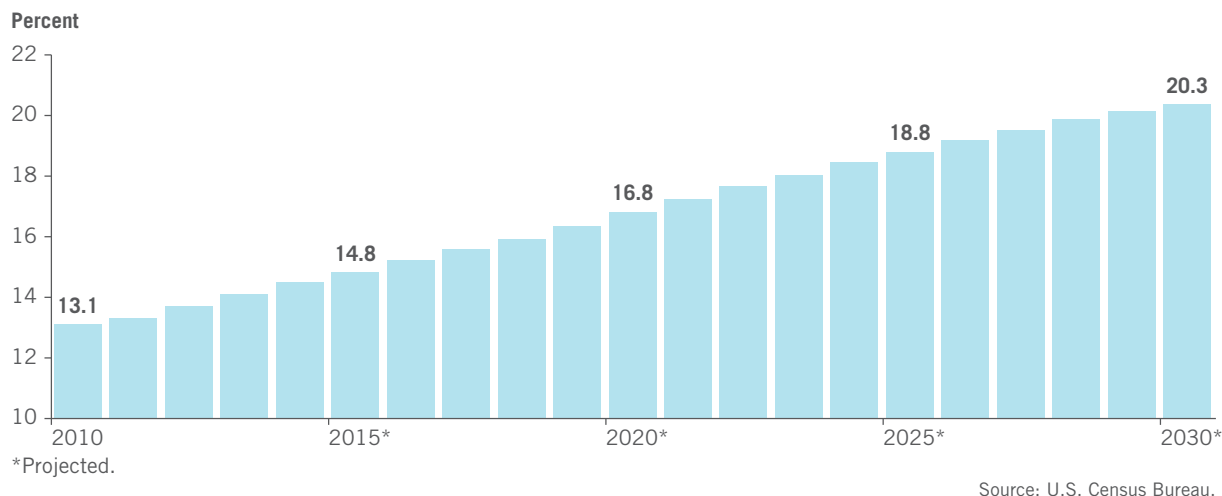


*Projected.

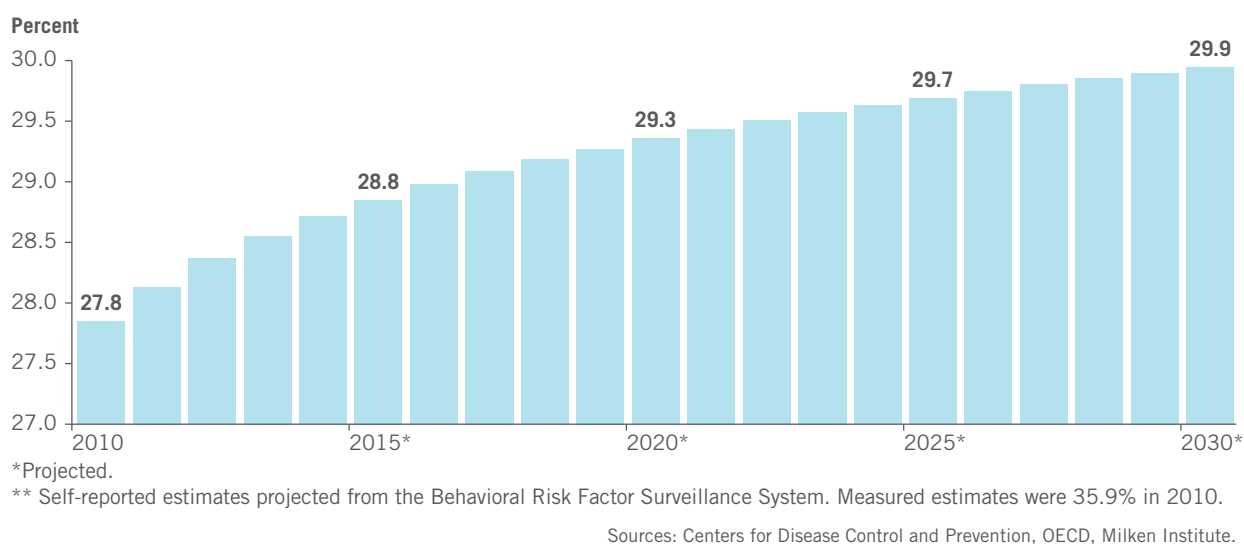
Source: Centers for Medicare and Medicaid Services.

If this trend persists, the burden to society will be enormous. Policymakers, corporations, and other stakeholders, aware of the challenge, are exploring innovative approaches to mitigate it. As many seek fixes in reducing coverage for treatment and reimbursement fees, taxing medical devices, or reforming malpractice law, it is important to understand the factors driving costs upward.

Percent of population age 65+



Adult obesity rates**



As Americans become habituated to sedentary lifestyles and unhealthy diets, obesity, together with an aging population, are bound to increase the prevalence of chronic disease. And higher prevalence will continue to ramp up health-care costs.

‘An Unhealthy America’: By the Numbers

Behavioral changes and treatment innovations can diminish some of the risk factors that are largely responsible for chronic diseases in this country. Let’s consider two scenarios for the future:

1. The baseline scenario: This assumes that risk and other factors follow historical growth rates. In other words, demographic trends, improvement in early detection and medical innovation, behavioral factors and other demographic influences, and the pattern in health-care costs follow historical trends.
2. The optimistic scenario: In contrast, this view assumes that risk and other factors will improve upon historical rates, thanks in large part to behavior modifications such as smoking cessation, healthful eating, and regular exercise, which lowers obesity and checks cholesterol levels, together with innovations in medical technology and drug discovery. All these can reduce the prevalence and severity of disease as well as improve its management. Those positive effects would also constrain the costs of care.

But how would these scenarios affect the overall economic burden?

In 2007, a Milken Institute study titled “An Unhealthy America”¹ projected² that aggregate treatment expenditures for the five most common chronic diseases³ in 2008-2010⁴ would be \$263.8 billion in the baseline scenario. Obesity, a leading risk factor for these diseases, was projected to show a moderate increase to about 26.7 percent of the adult population in 2010. Similarly, high cholesterol levels, also a key risk factor for many diseases, was assumed to be 39.8 percent among adults in 2010.

As noted earlier, policies and programs to reduce many of these risk factors can translate into lower treatment expenditures for these diseases. This optimistic scenario assumed that increased awareness of diet and nutrition would bring high cholesterol levels down to 37.9 percent in 2010, and anti-obesity initiatives would help cut obesity rates back to 25.9 percent in 2010. Further, the smoking population would contract. Positive behavior change, together with innovations in treatment and technology, would help to decrease the prevalence of these chronic diseases and lower expenditures to \$248.2 billion in 2008-2010. So, the projections estimated a \$15.6 billion savings to the health-care system just from these five diseases if the country followed the optimistic scenario.

But savings for the health-care system is not the only economic benefit of having the optimistic scenario come to pass. A healthy workforce is a more productive workforce, which is essential to growth. Chronic diseases can impose profound effects on the job market in terms of lower workforce participation and drained productivity.

A sick employee typically misses work more frequently and contributes less to the organization and the overall economy. This is commonly known as “absenteeism” in labor economics parlance. Further, “presenteeism,” or the productivity loss associated with a sick, underperforming employee, can have substantial adverse effects on GDP. The same labor market effects apply, moreover, to informal caregivers who tend to the affected people,

1. Ross DeVol et al., “An Unhealthy America: The Economic Burden of Chronic Disease,” Milken Institute, October 2007.

2. Based on 2003 values.

3. Cancer, diabetes, heart disease, hypertension, and stroke.

4. Average value for the period.

though on a more limited scale. To estimate the economic burden associated with a disease, one must account for the “indirect impact” of lost GDP incurred by ill employees and their caregivers.

“An Unhealthy America” projected an aggregate GDP loss from the five diseases of \$1.2 trillion in the baseline scenario because of the condition of sick workers and the efforts of their caregivers. The optimistic scenario would imply a somewhat lower \$1.1 trillion in lost GDP. Combining treatment expenditures with GDP loss due to fewer workdays and lower productivity for these five diseases, the economic burden for 2008-2010 was \$1.47 trillion in the baseline and \$1.37 trillion in the optimistic scenario. Hence, the aggregate savings to the health-care system and contribution to GDP will be \$106.9 billion more in the latter scenario.

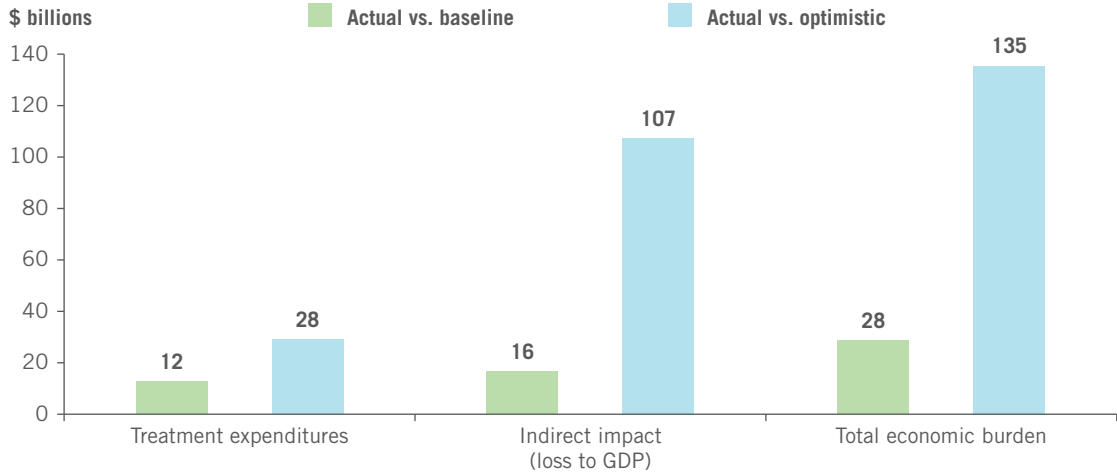
Weighing the Economic Burden

When the “An Unhealthy America” study was released, our projections were widely cited and they are still being used by many organizations. With data for subsequent years now available, it is time for a “reality check.” Using methodology from the study, this paper has updated the actual economic burden associated with these diseases for 2008-2010.

What do these numbers imply?

- » If the actual economic burden is greater than that projected in the baseline scenario, it implies that the adverse effect of these diseases is growing more quickly than the historical trend.
- » If the actual economic burden falls between the baseline and optimistic projections, then initiatives to blunt risk factors are working, though they can be improved.
- » If the actual economic burden is lighter than optimistic estimates, then initiatives to control risk factors may be considered effective.

Difference between actual and projected economic burden of five chronic diseases (\$ billions)



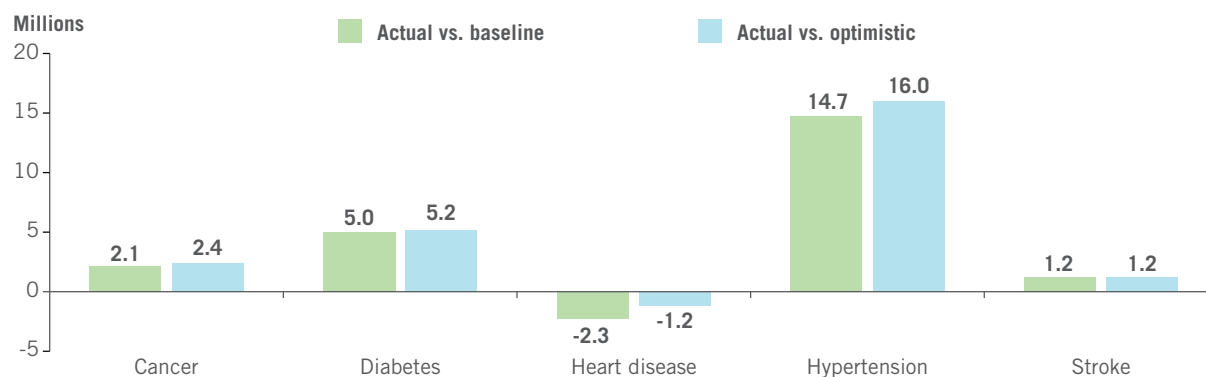
Sources: Medical Expenditure Panel Survey, National Health Interview Survey, Milken Institute.

The actual (2008-2010) economic burden associated with the five diseases was \$28 billion and \$135 billion more, respectively, than calculated in the baseline and optimistic scenarios. Regarding treatment expenditures, the actual value was only \$12 billion more than the baseline scenario, and the corresponding excess loss to the economy, or the indirect impact, was \$16 billion. Although the actual numbers are above baseline values, they are very close.

Mathematically speaking, treatment expenditures can increase because of either or both of the following reasons: a) the population reporting a condition (PRC) is rising, and b) higher average treatment expenditures per PRC. When comparing the PRC data to the projections from “An Unhealthy America,” we see that in all cases but heart disease, the PRC was higher than projected. This could be due to both increases in the severity of risk factors and better disease identification mechanisms, leading to a reduction in undiagnosed and untreated disease. For example, the self-reported adult obesity rate in 2010 was 27.8 percent, 1 percentage point higher than baseline projections and 1.9 percentage points higher than the optimistic scenario.

In contrast to the changes in PRC itself, expenditures per PRC were lower than projected for all conditions except heart disease. So, expanding PRCs are responsible for driving up expenditures for these ailments.

Differences between actual and projected population reporting a condition (PRC) 2008-2010 (millions)



Sources: Medical Expenditure Panel Survey, Milken Institute.

A larger PRC would also imply greater numbers of sick people and caregivers in the workforce. It is not surprising then that the composite indirect impact (or loss to GDP) was also higher than the baseline scenario (by \$16 billion) and the optimistic scenario (\$107 billion).

From the above, we conclude that the economic burden (aggregate of treatment expenditures and indirect impact) for these five diseases was \$28 billion and \$135 billion in excess of the baseline and optimistic scenarios, respectively.

Economic burden 2008-2010 (\$ billions)

Disease	Actual	Baseline	Optimistic	Difference actual-baseline	Difference actual-optimistic
Cancer	504.0	502.2	448.8	1.8	55.2
Diabetes	228.0	204.8	195.8	23.2	32.1
Heart disease	210.1	248.7	226.1	-38.6	-15.9
Hypertension	497.1	469.2	449.8	27.9	47.3
Stroke	63.1	49.0	46.6	14.1	16.6
Total	1,502.3	1,473.9	1,367.0	28.4	135.2

Sources: Medical Expenditure Panel Survey, National Health Interview Survey, Milken Institute.

A more detailed investigation shows that heart disease imposed a lighter economic burden than expected. Why? The smoking cessation movement likely played a role. The CDC reports smoking prevalence of 19.3 percent in 2010. However, “An Unhealthy America” assumed a reduction in the smoking rate to 19.95 percent by 2010 in the baseline scenario and 19.35 percent under optimistic conditions; therefore, the rate has declined much faster than projected by the baseline and slightly faster than in the optimistic scenario.⁵ Although aggregate treatment expenditures were lower than in the baseline scenario, they surpassed optimistic scenario numbers. Hence, initiatives to lower expenditures show promise—they are below the historical trend but have room to improve.

For heart disease, the lower expenditure resulted from fewer people reporting the condition than in either scenario (2.3 million fewer than baseline and 1.2 million fewer than the optimistic projection). This could be credited to improved prevention, either through lifestyle changes or more effective treatment. However, it was not the result of more heart disease deaths, as that rate has been declining over the past decade. In 2000, it was 257.6 per 100,000 Americans; by 2010, it had dropped to 179.1.⁶

Our estimates show that actual average expenditures per PRC were higher than in both these hypothetical scenarios, which could be accounted for by expensive diagnostics, surgery, and the use of costly sites of services, such as emergency rooms and inpatient care. However, because there were fewer heart disease cases than projected, there were also fewer employed heart disease patients and associated caregivers, which lowered the amount of GDP lost to absenteeism and low productivity.

The economic burden associated with hypertension was much larger than projected estimates, and the gap was larger than that associated with either diabetes or stroke. Hypertension’s burden amounted to \$497.1 billion in 2008-2010, \$27.9 billion and \$47.3 billion more than the baseline and optimistic scenarios, respectively. However, most of the excess stems from the economic contribution side of the equation, since actual treatment expenditures for hypertension were \$800 million less than in the baseline scenario. Treatment expenditures per PRC were much lower than in both scenarios, implying that better treatment and health education might have started working effectively.

However, hypertension remains one of the gravest threats to the population. Actual hypertension PRC outstripped the baseline and optimistic scenarios by 14.7 million and 16 million, respectively. While much of this increase in PRC may be due to the widening prevalence of risk factors such as obesity and high cholesterol, part may be credited to better diagnostic tools and techniques. In this sense, an expanding PRC is ultimately a positive thing because it indicates that more people with hypertension are being properly treated. But because many remain employed, that inflicts a sizable loss on GDP—\$28.7 billion more than in the baseline scenario and \$45.4 billion more than the optimistic calculation.

Because hypertension and stroke have a strong causal link, it is reasonable to expect them to follow a similar trend. Indeed, in both the baseline and optimistic scenarios, the actual economic burden of stroke is greater than the projected burden. While smoking rates have been sliding in recent years, they are doing so too slowly to keep pace with the rising treatment expenditures and indirect impact of stroke. This is a key factor behind the larger-than-expected burden on the GDP.

5. Centers for Disease Control and Prevention, Current Cigarette Smoking Among Adults – United States, 2011. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6144a2.htm?s_cid=%20mm6144a2.htm_w (accessed Jan. 12, 2014).

6. Centers for Disease Control and Prevention, Health, United States, 2012. <http://www.cdc.gov/nchs/data/has/has12.pdf#026> (accessed Jan. 12, 2014).

At \$63.1 billion, the burden of stroke was the smallest among the studied diseases. However, it was larger than projections under both scenarios: \$14.1 billion more than baseline and \$16.6 billion more than the optimistic estimate. Actually, treatment expenditures per PRC were much lower than in both scenarios, implying that better treatment options might be effective. The PRC for stroke saw the largest percentage increase from the baseline and optimistic scenarios (46 and 50 percentage points, respectively), which suggests that the condition can be reduced with more preventive effort.

Improved survival from stroke contributed to the increase. The mortality rate has dropped significantly in the past decade. In 2000, the CDC reported an age-adjusted death rate of 60.9 per 100,000, which by 2010 had declined to 39.1.⁷

The economic burden associated with diabetes was \$228 billion, representing \$23.2 billion more than the baseline scenario and \$32.1 billion more than the optimistic projection. The actual expenditures per PRC were relatively close but lower than the projected estimates, so the increase in aggregate economic burden was driven by an approximately 5 million expansion of PRC beyond projections. Part of the increase in PRC was due to improved diagnosis. With diabetes becoming more prevalent in the U.S., more clinicians are checking patients regularly for potential signs. Early control of the disease can prevent the onset of more severe complications in the long run.

Reduced average treatment costs may be related to a larger proportion of diabetics having a milder form of the disease or managing it better through oral medications and/or insulin pump use. Non-insulin dependent diabetics can take less expensive oral medications, require fewer office visits, and are less likely to suffer expensive complications. Since many patients with diabetes remain employed, most of the \$228 billion economic burden is based on indirect impact. About \$45.7 billion was spent on treatment and \$182.3 billion was lost to the GDP.

The economic burden associated with cancer was \$504 billion, \$1.8 billion more than projected in the baseline scenario and \$55.2 billion more than in the optimistic calculation. This is the heaviest burden associated with the diseases examined. Compared to the baseline scenario, treatment expenditures were \$8.7 billion more than expected, but the indirect impact was \$6.9 billion less.

The actual treatment expenditures and indirect impact were higher than optimistic projections. With actual per-PRC expenditures close to projections, the increase was tied to the rise in the overall cancer population. The actual PRC was slightly over 2 million more than projections for both the baseline and optimistic scenarios. Happily, survival may be a primary cause of this rise, as the cancer death rate diminished from 190.89 per 100,000 in 2003 to 171.76 per 100,000 in 2010.⁸ The lower indirect impact relative to the baseline scenario could be explained by earlier diagnosis due to increased screening. That leads to reduced side effects from treatment, lower absenteeism, and higher productivity.

7. Centers for Disease Control and Prevention. "Health, United States, 2012." www.cdc.gov/nchs/data/hus/12.pdf#026 (accessed Jan. 12, 2014).

8. National Cancer Institute.

Treatment expenditures and indirect impact 2008-2010 (\$ billions)

Disease	Actual		Baseline projection*		Optimistic projection*		Absolute difference: actual-baseline		Absolute difference: actual-optimistic	
	Treatment expenditures	Indirect impact	Treatment expenditures	Indirect impact	Treatment expenditures	Indirect impact	Treatment expenditures	Indirect impact	Treatment expenditures	Indirect impact
Cancer	78.0	425.9	69.3	432.9	66.0	382.8	8.7	-6.9	12.0	43.1
Diabetes	45.7	182.3	39.1	165.7	37.6	158.3	6.6	16.6	8.1	24.0
Heart disease	87.4	122.7	91.6	157.1	84.6	141.5	-4.2	-34.3	2.8	-18.8
Hypertension	44.9	452.2	45.7	423.5	43.0	406.8	-0.8	28.7	1.9	45.4
Stroke	20.3	42.9	18.1	30.9	17.1	29.5	2.2	11.9	3.2	13.4
Total	276.2	1,226.0	263.8	1,210.1	248.2	1,118.8	12.5	15.9	28.0	107.2

* "An Unhealthy America" estimates.

Sources: Medical Expenditure Panel Survey, National Health Interview Survey, Milken Institute.

Population reporting a condition (PRC) 2008-2010 (millions)

Disease	Actual	Baseline projection	Optimistic projection	Absolute difference: actual-baseline	Absolute difference: actual-optimistic
Cancer	14.8	12.7	12.5	2.14	2.37
Diabetes	21.2	16.2	16.0	5.04	5.20
Heart disease	19.4	21.7	20.6	-2.29	-1.22
Hypertension	56.8	42.1	40.8	14.72	16.00
Stroke	3.7	2.6	2.5	1.18	1.25

Sources: Medical Expenditure Panel Survey, National Health Interview Survey, Milken Institute.

Expenditures per PRC 2008-2010 (\$)

Disease	Actual	Baseline projection	Optimistic projection	Absolute difference: actual-baseline	Absolute difference: actual-optimistic
Cancer	5,279.1	5,464.9	5,299.6	-185.8	-20.5
Diabetes	2,147.7	2,414.1	2,344.7	-266.4	-197.0
Heart disease	4,506.3	4,216.5	4,095.6	289.9	410.8
Hypertension	791.3	1,079.9	1,048.8	-288.5	-257.5
Stroke	5,400.8	7,018.0	6,817.0	-1,617.3	-1,416.2

Sources: Medical Expenditure Panel Survey, National Health Interview Survey, Milken Institute.

What We've Learned and What We Can Do

What are the takeaways of our findings? Can they offer guidance for policy and influence behavior in the health-care arena? For almost all these diseases, it is the growing volume of cases that is expanding the nation's economic burden. We know that the U.S. population is aging. But can we build programs that support and sustain a healthy and active life in retirement? We know that our ways of life and work generate sedentary routines, job stress, and unhealthy diets. But can we act today to reverse those trends?

We believe our report can stir hope. Interventions to reduce health risk or improve treatments and delivery systems are restraining the prevalence and overall economic burden associated with these diseases. However, the effects, and effectiveness, of these interventions vary from disease to disease. Can we take the clues about what works, and why, for one ailment and draw lessons for another?

Strategies to battle heart disease have had the most success in lowering prevalence and easing the economic burden. Much of the credit goes to public anti-smoking initiatives. (Indeed, if Alex, whose story began this paper, had kicked the habit, he may have avoided his health crisis.) Learning from that, we can be optimistic that aggressive campaigns to address obesity, improve nutrition, and motivate physical activity will bear fruit in the future. Simple physical movement not only helps to control weight but has been effective in cutting cholesterol levels. Keeping bad cholesterol in check through exercise and nutrition can restrain the menaces of stroke and hypertension.

Actually, the average treatment costs for most of these conditions have been falling, possibly the result of behavioral changes. It can also be due to innovations in technology and treatments. (Our friend Julia might have seen the warning signs before her stroke if she had a device to monitor her vitals.) Generic drugs can greatly reduce health-care costs and widen access to medications. More personalized treatment before disease onset can reduce incidence, and better disease management can curtail the need for sudden visits to expensive sites of services, such as emergency rooms and hospital admissions.

The American College of Cardiology and American Heart Association now recommend statins for people at risk of heart disease. If diabetes patients and their doctors manage the disease well, they can avoid potentially grave glycemic events that send costs climbing. If the delivery process quickens development of drugs that save the lives of cancer patients, that achievement would pay dividends in many forms.

One size does not fit all, of course, and we need initiatives and programs tailored to the crucial requirements of specific diseases. However, many illnesses have common risk factors. If we focus on making progress in controlling them, the prevalence of these diseases will wane.

We believe the following strategies should be pursued:

- 1. Behavioral changes:** Smoking cessation, physical activity, and better eating habits are basic yet powerful ways to improve health and prevent chronic disease.
- 2. Innovations in technology and drug development:** Improved therapeutic devices can help with early detection and management of disease. Similarly, a drug that controls cholesterol and hypertension also reduces the risk of comorbid diseases. Better monitoring and medicines can reduce visits to expensive sites of services. Regulatory approval of generic drugs can also significantly cut prices, making treatments affordable to more patients.
- 3. Improved delivery of services and communication:** If providers were to routinely inform patients about their risks and how to better manage their health, it would pay off in better outcomes and lower expenditures. An emphasis on increasing the patient-centeredness of care delivery and financial incentives for providers to manage disease effectively can have a significant impact on both quality of care and quality of life.
- 4. Health education:** Education is among the most important factors in a successful intervention. Aggressive health information campaigns through the media, schools, and other community awareness programs can work wonders.
- 5. Wellness programs:** Outside of the medical complex, there is much room for improvement in wellness and illness prevention initiatives. A range of organizations, such as employers, local government agencies, and nonprofits, can promote healthy living through wellness programs. Integrating exercise, nutrition awareness, and other good-for-you practices is the cornerstone of preventing chronic disease and reducing health-care costs.

These broad measures can't achieve their goals unless all sectors of society work together. Government agencies, nonprofit organizations and foundations, businesses and employers, community groups, and above all, citizens should see themselves as health activists. Public-private partnerships, community programs, workplace wellness programs, and health education could accelerate the gains the nation has already made.

Let's invest in wellness strategies that produce the biggest bang for not a whole lot of bucks. We need to prioritize the targets of our interventions: Should the focus be on children, seniors, working people? Organizations and businesses should partner with health-care providers to emphasize living healthfully, not just treating illness.

Many projects are underway and showing results as we speak. Here is a sampling from across the country:

NUTRITION

Veggie Mobile, New York

Sponsored by the nonprofit Capital District Community Gardens, the Veggie Mobile program acts as a “produce aisle on wheels” that brings fresh produce to senior centers, public housing projects, and inner-city neighborhoods in several New York state counties. The Veggie Mobile also offers a Taste and Take recipe each week, providing meal plans that include nutrition facts. Diabetic and hypertensive patients may even receive Veggie RX from their doctors, coupons redeemable for fresh produce on the Veggie Mobile.

www.cdcg.org/programs/veggie/veggie/

National Salt Reduction Initiative

The National Salt Reduction Initiative is a public-private partnership that seeks to prevent cardiovascular disease through reducing salt in food. Companies and restaurants can voluntarily join the initiative, pledging to reduce the amount of salt in a category of their offerings. The NSRI monitors foods’ sodium content as well as sodium levels in the population through urinalysis. Companies that have signed up include Starbucks, Unilever, Heinz, and Campbell Soup.

www.nyc.gov/html/doh/html/diseases/salt.shtml

FITNESS

Hoonah Fun and Fit Partnership, Alaska

Rural Alaskans are much more likely to be obese than people living elsewhere in the state. Hoonah, a rural community, created the Hoonah Fit and Fun Partnership to enhance physical activity and improve social support for health, which involved the school district, government agencies, health clinics, and various community organizations. They used the CDC’s Community Preventive Services Task Force’s “Guide to Community Preventive Services” to steer them to their goals. Among their contributions, the Partnership increased locally produced food on school lunch menus, extended school gym hours, created free and fun community exercise programs, and reopened the local community pool.

www.thecommunityguide.org/CG-in-Action/FunandFit-AK.pdf

Walk with a Doc

Walk with a Doc was started in 2005 by Ohio physician David Sabgir and has spread to communities throughout the United States. Walking is a low-impact activity that lowers the risk of chronic disease and offers other health benefits. This program encourages the activity by creating a community for people to be physically active, meet others, and walk in the company of physicians.

www.walkwithadoc.org

Complete Streets

It’s the automobile’s world; pedestrians and cyclists just live in it. In an effort to change that situation, the National Complete Streets Coalition—in partnership with AARP, America Bikes, the National Association of City Transportation Officials, and others—presses for measures to make walking and biking safer, more convenient, and more appealing. Among its goals are less obesity and fewer fatalities. Overrepresented in traffic deaths, older people face challenges as drivers and walkers. Signs are often inadequate; walk signals are too short and traffic too fast for them to cross wide streets safely; and bus stops often lack seating. Unfriendly streets can also discourage seniors from leaving their homes, adding to their isolation. To date, more than half of the nation’s states have adopted or otherwise committed to Complete Streets policies.

<http://www.smartgrowthamerica.org/complete-streets>

SMOKING

NYC Coalition for a Smoke-Free City

New York has been a staunch advocate for curbing tobacco use, having created one of the nation's most comprehensive set of smoking policies. Most recently, then-Mayor Michael Bloomberg signed a law that raised the legal age for tobacco sales (including e-cigarettes) to 21. Another law curbs cigarette tax evasion and bans the use of coupons for cigarettes so that prices may not be discounted. In 2002, the Smoke Free Air Act prohibited smoking in workplaces and indoor recreational venues. Last year, the law was extended to include e-cigarettes.

<http://nycsmokefree.org/existing-legislation>

www1.nyc.gov/office-of-the-mayor/news/373-13/mayor-bloomberg-signs-legislation-raising-legal-age-sell-tobacco-products-curb-cigarette-tax/

CORPORATE WELLNESS

Google, Safeway, and PepsiCo

Employee wellness programs often provide fitness infrastructure, offer incentives for reaching health goals, and make coaching services available. Google, Safeway, and PepsiCo are leaders in this field. For example, employees who take part in Safeway's Healthy Measures program typically lower their blood pressure and cholesterol levels, and a good portion improve their body mass index. Google makes strides toward healthy living by promoting fitness, making full-service gyms, swimming pools, and classes available to employees. In addition, the Web giant has a cafeteria with free, nutritious choices and provides medical professionals, physical therapy, and chiropractic services on site. PepsiCo's Healthy Living program focuses on health coaching, along with fitness and nutrition programs and stress management support. Both PepsiCo and Safeway offer employees financial incentives for participation in wellness programs.

HEALTH EDUCATION

Diabetes Self-Management Education

The American Diabetes Association recognizes Diabetes Self-Management Education as an integral tool in daily living for people with the disease. Diabetes is a management-intensive condition, requiring daily pricks of the finger to check glucose levels, calculations of the amount of insulin necessary, and injection of the hormone. Health education classes are designed to enable diabetic patients to understand their condition and manage it effectively in a variety of settings. Though classes often take place in doctors' offices or clinics, they also provide a community support system for diabetic patients.

http://care.diabetesjournals.org/content/36/Supplement_1/S100.extract

DRUG AND DEVICE INNOVATION

Expanded research and development in the drug and medical device fields has reduced risk, increased survival rates, and raised quality of life for those who suffer with disease. Recent research has aimed to develop drugs to prevent the onset of a number of chronic diseases. For example, combination antiplatelet therapy with medication to treat risk factors has been proven effective in preventing recurrent stroke and reducing mortality. Intensive research is also being applied to medical devices, with new types frequently entering the market. From the da Vinci robot performing prostatectomies to ever-less-invasive insulin pumps, medical devices are changing the health care industry and the experience of patients.

Methodology

This paper followed the methodology defined in “An Unhealthy America” and used updated data from the following sources. For more details, please visit www.chronicdiseaseimpact.com. A brief summary of the primary data sets used in this study follows.

Treatment expenditures

The Medical Expenditure Panel Survey (MEPS) was used to estimate both actual and projected treatment expenditures. Disease-specific expenditures were aggregated from sites of service.⁹ MEPS is a nationally representative sample of the United States’ civilian, noninstitutionalized population that collects data on specific health services provided, their frequency, and associated payment.

We deployed a cost-of-illness approach to estimate the economic burden associated with treatments of the studied diseases. This approach represents the actual expenditures and reflects asymmetry in treatment options and costs to patients. The framework for the above approach requires linking disease-specific quantities (population reporting a condition) and site-specific treatment expenditures that include historical disease prevalence/incidence information. Outliers were smoothed as necessary.

Indirect impact

Indirect impact, as measured in terms of lost economic output (foregone GDP), was derived from the National Health Interview Survey (NHIS). The NHIS is a nationally representative survey of health conditions and employment. Indirect impact is the aggregate of absenteeism and presenteeism for both individuals and caregivers. Here, absenteeism is defined as the number of workdays missed due to illness, and presenteeism is defined as diminished productivity that occurs as a result of employees coming to work ill.

Once we estimated the indirect impact of individual lost workdays, we followed a 2004 study by Goetzel et al.¹⁰ to estimate individual presenteeism. To estimate the impact of lost workdays for caregivers, we first used estimates from two studies. In 2004, the National Alliance for Caregiving and AARP¹¹ reported that there were about 21.5 million full-time employed caregivers, and in 2009, they updated this number, showing an increase of 200,000 employed caregivers per year.¹² The second study,¹³ conducted by Metlife, estimates the number of workdays caregivers lost per year. Using these studies, caregivers’ absenteeism for each disease was calculated in a similar manner to individual absenteeism.

9. Sites of services include office based visits, inpatient, outpatient, emergency room, prescribed medicine, and home health.

10. Goetzel et al., “Health, Absence, Disability, and Presenteeism Cost Estimates of Certain Physical and Mental Health Conditions Affecting U.S. Employers,” *Journal of Occupational and Environmental Medicine* 46 (2004).

11. National Alliance for Caregiving and AARP: “Caregiving in the U.S.” (2004).

12. “Caregiving in the U.S. Executive Summary,” National Alliance for Caregiving, AARP (2009).

13. Metlife Mature Market Institute, National Alliance for Caregiving (2006), “The Metlife Caregiving Cost Study: Productivity Losses to U.S. Business,” <http://www.caregiving.org/data/Caregiver%20Cost%20Study.pdf>.

About the Authors

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