



The Value of Investment in Health Care

Better Care, Better Lives

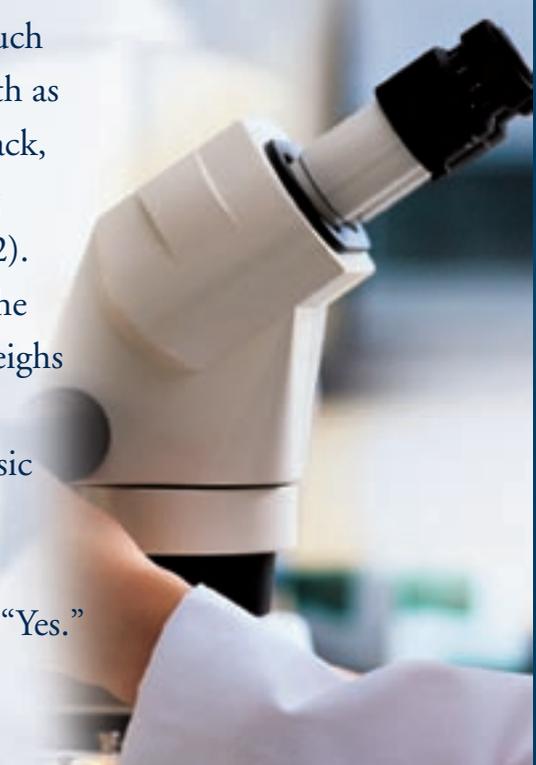
Executive Summary

Over the past few decades, significant advances in the U.S. health care system have helped people live longer and better lives. In fact, both mortality and disability rates have fallen consistently since the 1970s. This period has also seen substantial increases in health spending. All too often, health care discussions seem to center on the substantial increase in per person spending on health care during this period (Figure 1), rather than the benefits of improved health care that the spending brought.

Executive Summary

A focus on costs merely as a problem overlooks the value that patients and society in general derive from improved health. While costs are undoubtedly an important part of the health care debate, they should be considered in the context of the benefits achieved.

The Value of Investment in Health Care attempts to spur such a discussion by focusing on overall improvements in health as well as taking a specific look at four conditions (heart attack, type 2 diabetes, stroke, and breast cancer) that are among the most common causes of death and disability (Figure 2). The study suggests that the value of improved health in the U.S. population over the past 20 years significantly outweighs the additional health care expenditures that accompanied the improvements. In this report, we seek to answer a basic question that frequently goes unaddressed in the current debate: Is our increased health care spending worth it? The findings of this study show that the answer clearly is “Yes.”



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Figure 1 ■ U.S. Health Care Expenditures per Person (2000 U.S. \$)

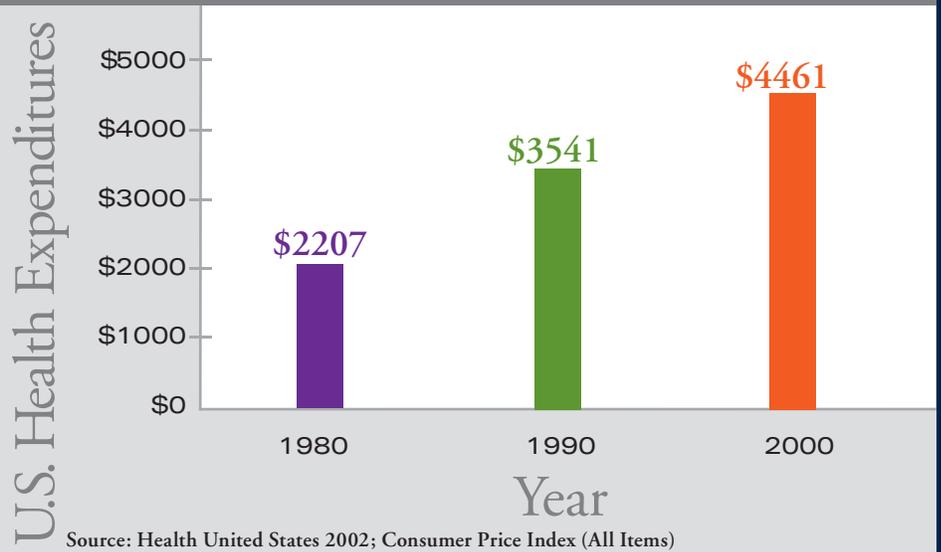
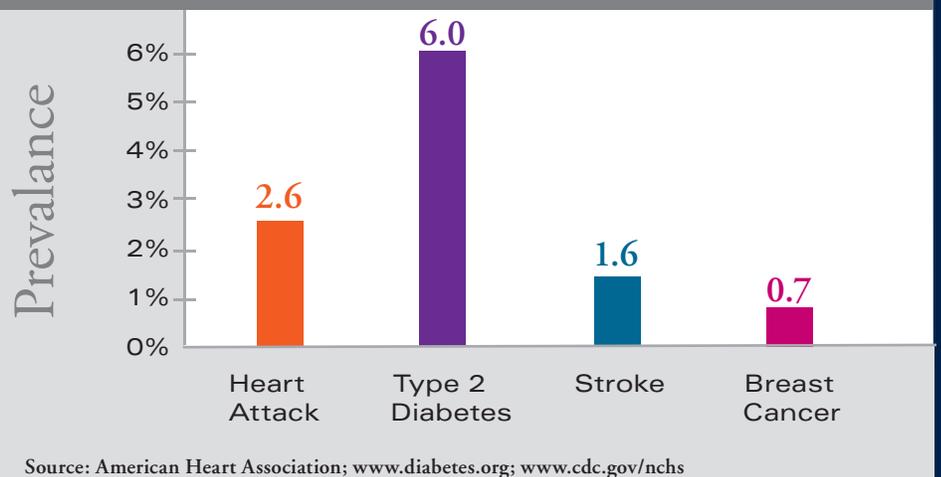


Figure 2 ■ Percent (%) of U.S. Population in 2003 Affected by Conditions Studied



Summary of Findings

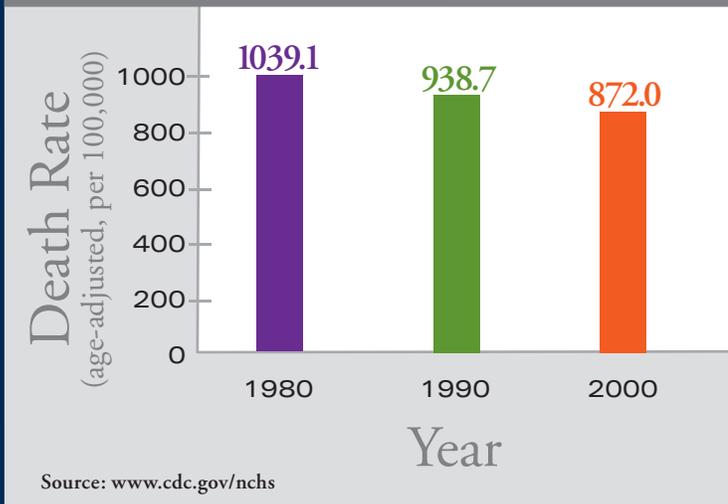
Overall Health

Our analysis suggests that, in the past 20 years, each additional dollar spent on health care services has produced health gains valued at \$2.40 to \$3.00.

Annual age-adjusted per person health care costs between 1980 and 2000 increased by \$2,254 (102%), but this was accompanied by significant health gains, including:

- Annual death rates declined from 1,039.1 to 872 per 100,000 persons (16%), as shown in Figure 3.
- Life expectancy from birth increased by 3.2 years (4%), as shown in Figure 4.
- Disability rates for people over 65 years declined from 26.2 to 19.7 per 100 persons (25%), as shown in Figure 5.
- Number of days in the hospital, a measure of population health, fell from 129.7 to 56.6 per 100 persons (56%).
- Death rates in three of the diseases discussed in this report have fallen in the past 20 years. Death rates for type 2 diabetes have risen throughout the 1990s, coupled with an increase in the incidence of obesity.

Figure 3 ■ Decline in Death Rates, 1980-2000



Simply put, without the above improvements in health and the associated investment, the U.S. would have spent \$634 billion less on health care in 2000, but we would have experienced:

- 470,000 more deaths,
- 2.3 million more people with disabilities, and
- 206 million more days spent in the hospital.

Figure 4 ■ Increase in Life Expectancy from Birth, 1980-2000

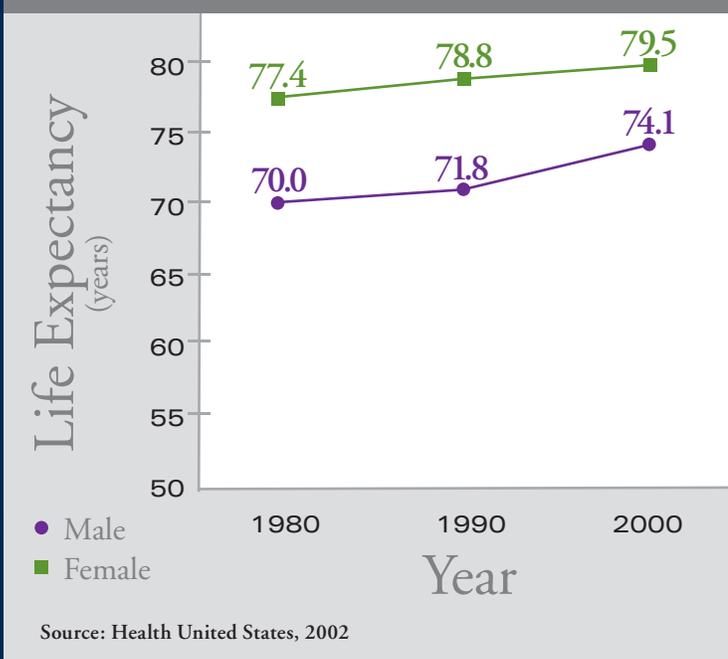
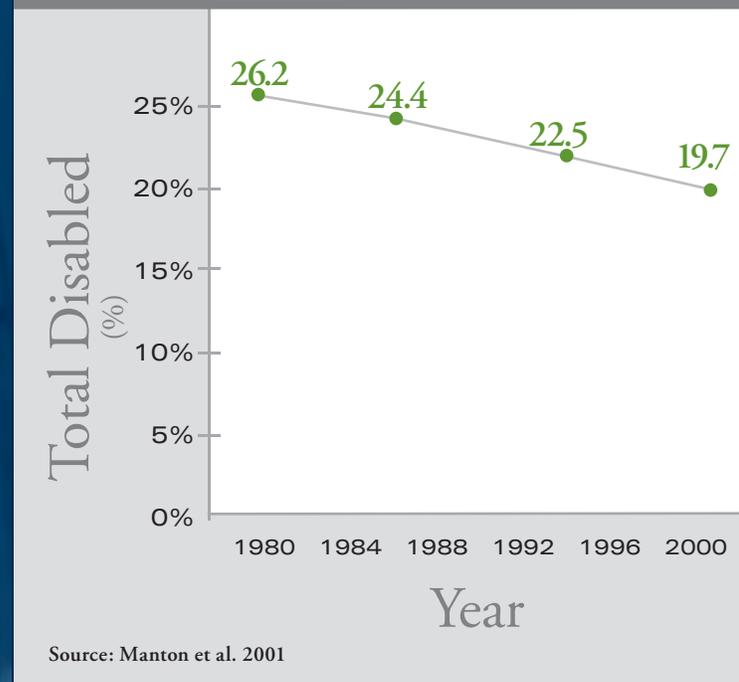


Figure 5 ■ Decline in Disability Rates for People Aged Over 65 Years, 1982-2000



Heart Attack

Cardiovascular disease, of which heart attacks are a primary component, continues to be the leading cause of death and disability in the U.S. Each year in the U.S., about 1.5 million people suffer a heart attack, with 2.6% of all people having suffered a heart attack at some point in their lives. Improvements in medical technology, including minimally invasive procedures, and noteworthy progress in thrombolytic therapy immediately following an acute heart attack, have improved survival rates significantly. In addition, breakthrough medicines used to lower blood pressure and reduce cholesterol levels can actually prevent heart attacks.

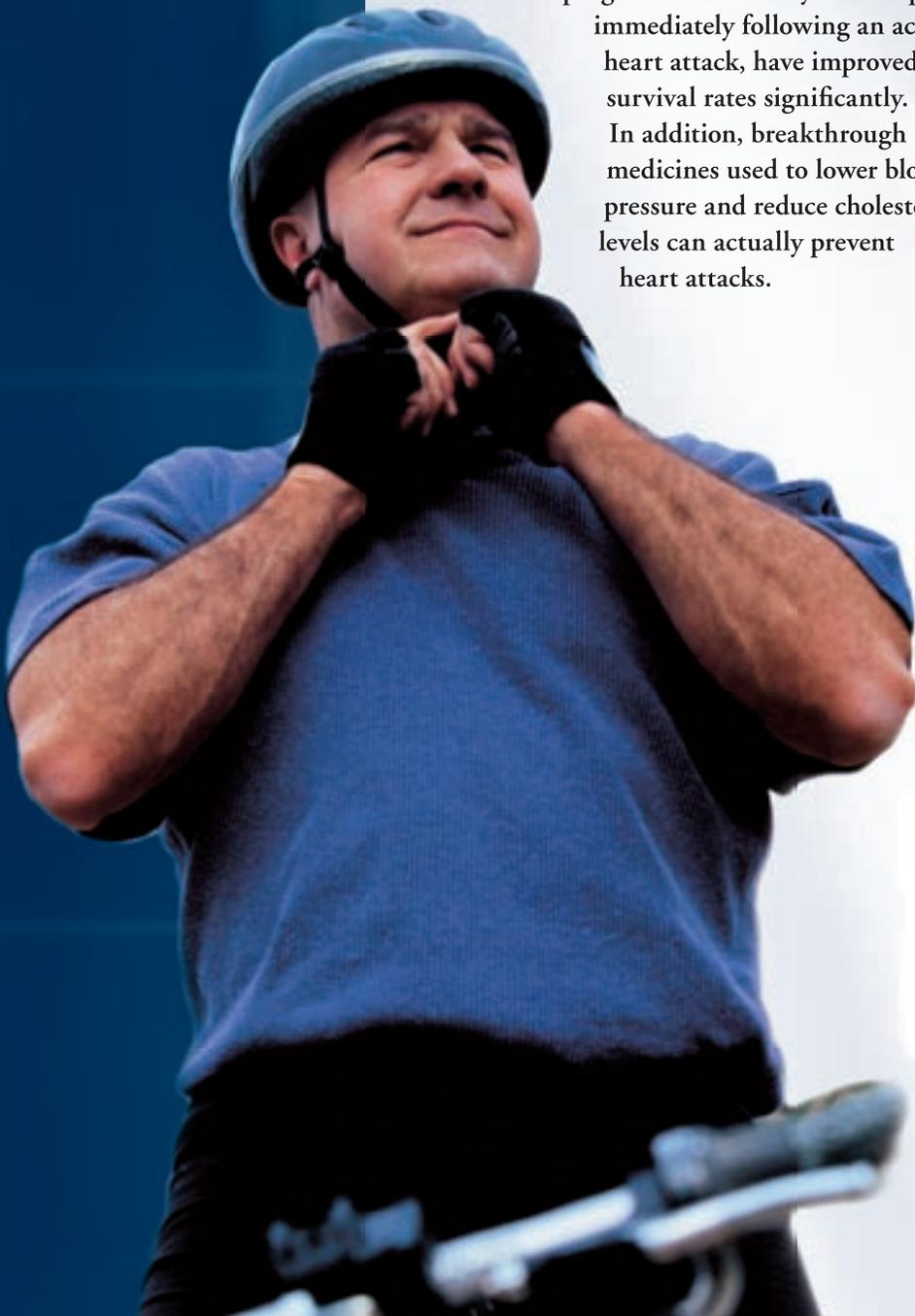
Based on a study of claims data for Medicare patients who suffered a heart attack, *every additional dollar spent on the overall treatment of heart attack has produced health gains valued at \$1.10.*

Evidence of the value of health gains associated with specific investments in the management of heart attack includes:

- Every additional dollar spent on statin therapy in heart attack survivors (vs. survivors treated with usual care) has produced health gains valued as high as \$9.44.
- Every additional dollar spent on the routine use of beta-blockers (vs. under-use) in patients suffering acute heart attacks has produced health gains valued as high as \$38.44.

Some of the key innovations in the treatment of heart attacks include:

- Therapy for patients with heart attacks has improved dramatically with the introduction of newer, safer “clot-busting” agents.
- Diagnostic imaging technologies and procedures (e.g., ultrasound and cardiac catheterization) provide critical information on heart functioning and performance, which aids in treatment.
- Percutaneous coronary interventions (PCIs), such as primary and conventional angioplasty with and without stents, improve survival in heart attack patients and provide an alternative to open-heart procedures (e.g., coronary artery bypass graft).

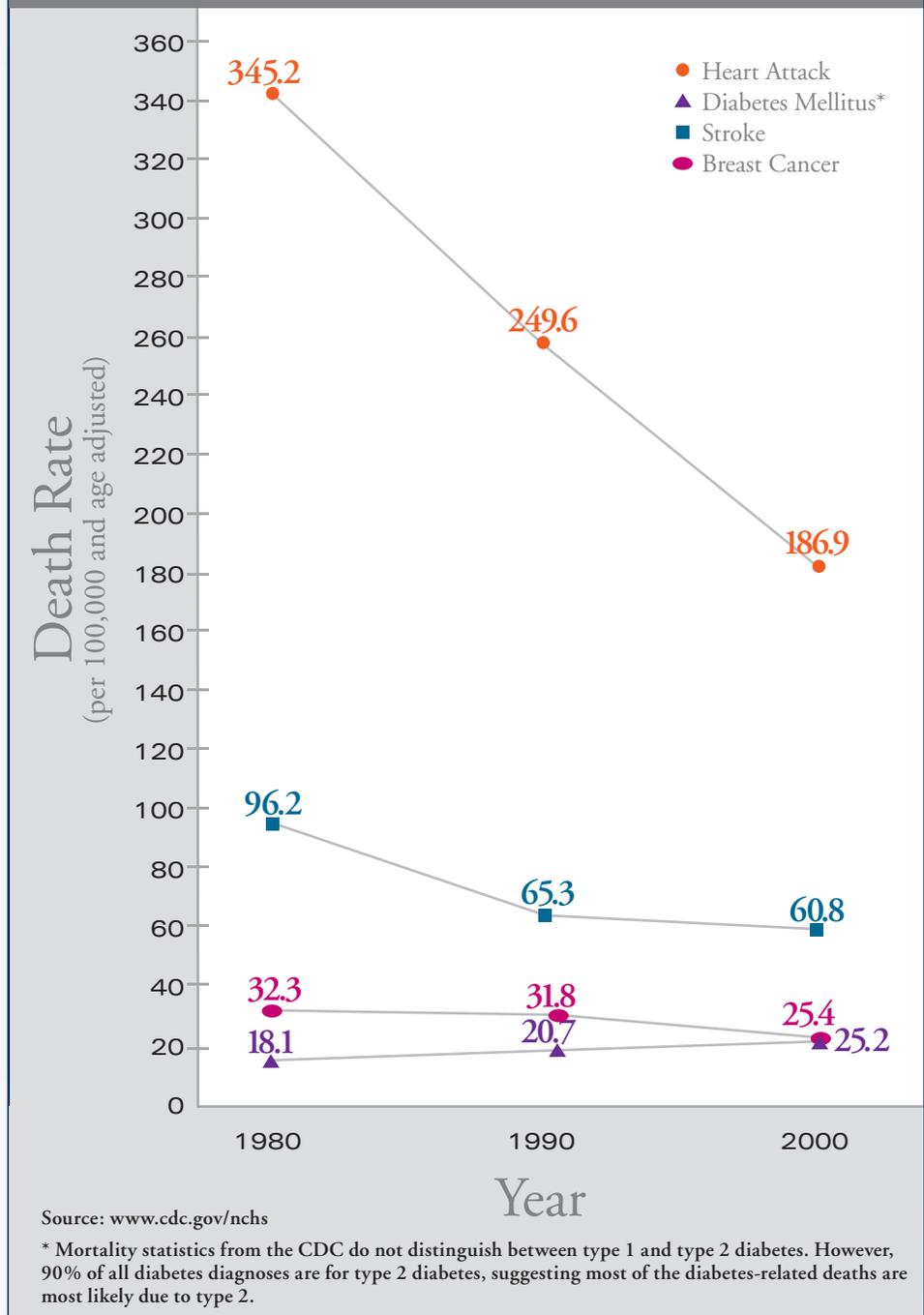


- Intravenous glycoprotein inhibitors are used during PCIs as prevention against clotting of blood.
- Several different therapies are routinely used as maintenance therapy to prevent recurrent heart attacks:
 - Short-term therapy with antiplatelets to prevent blood clots;
 - Antihypertensive agents (e.g., ACE inhibitors, angiotensin receptor blockers, beta-blockers) to control blood pressure; and
 - Statin therapy to lower lipid levels.

Advances in treatment have improved health outcomes for heart attack patients.

- Mortality due to heart attacks has been cut by more than half over the past 20 years, with rates falling from 345.2 to 186.9 per 100,000 persons (Figure 6).
- Early initiation of treatment with statins following an acute heart attack reduces the risk of fatal heart disease or a recurrent heart attack by 24%.
- Implantable cardiac defibrillators, which now can be implanted without open heart surgery, treat life-threatening irregular heart rhythms and reduce the risk of sudden cardiac death.
- Maintenance therapy with beta-blockers in patients who have suffered a heart attack leads to a reduction of 22% in one-year mortality rates.

Figure 6 ■ Death Rates for Conditions Studied, 1980-2000



- The use of glycoprotein inhibitors has been shown to reduce the risk of death, a second heart attack, or need for revascularization by 48% in patients who have suffered a first heart attack.

Type 2 Diabetes

Type 2 diabetes (also known as non-insulin-dependent diabetes mellitus), is the most common form of diabetes, affecting 17 million people in the U.S., or roughly 6% of the population. Unfortunately, poorly managed diabetes can result in long-term complications such as diseases of the eye, kidney, and nervous system, as well as cardiovascular disease. These complications can lead to blindness, nerve damage, kidney failure, heart attack, stroke, and death. In the past few years, substantial progress has been made in understanding the risk factors for diabetes.

Based on a study of claims data for Medicare patients with type 2 diabetes, *every additional dollar spent on the overall treatment of type 2 diabetes has produced health gains valued at \$1.49.*

Evidence of the value of health gains associated with specific investments in management of type 2 diabetes includes:

- Every additional dollar spent on intensive blood glucose control in newly diagnosed type 2 diabetic patients has produced health gains valued at \$3.77.
- Every additional dollar spent on statin therapy in type 2 diabetics who also suffer from high cholesterol has produced health gains valued at \$3.00.
- Every additional dollar spent on the screening and treatment of diabetic eye disease in type 2 diabetes patients on insulin has produced health gains valued at \$36.00.

The management of type 2 diabetes has evolved significantly over the past few decades, due most recently to an increased understanding of risk factors:

- Advances in self-monitoring blood glucose kits, more accurate hemoglobin A1c tests, and more effective insulin and oral drug therapies have made tight blood glucose control possible.
- Tight control of blood pressure has been identified as an integral part of type 2 diabetes management.
- Statin therapy is routinely used in patients with type 2 diabetes to reduce elevated cholesterol levels.

Overall mortality rates for diabetes mellitus have steadily increased over the past 20 years from 18.1 to 25.2 per 100,000 persons, given the increase in the incidence of type 2 diabetes.* However, interventions in type 2 diabetes are expected to improve outcomes by diminishing the risks and occurrence of long-term complications, as shown in several recent studies:

- Stringent control of blood glucose levels leads to reductions in risks for any diabetes-related complication (12%), any diabetes-related death (10%), death due to any reason (6%), and all microvascular complications, including eye, nerve, and kidney disease (25%).
- Tight blood pressure control in type 2 diabetes patients with high blood pressure leads to reductions in all diabetes complications (24%), deaths due to diabetes (32%), strokes (44%), heart failure (56%), and all microvascular complications, including eye, nerve and kidney disease (37%).
- When cholesterol is lowered with statin therapy, the risk of coronary events is reduced by 25% in type 2 diabetes patients.

* Mortality statistics from the CDC do not distinguish between type 1 and type 2 diabetes. However, 90% of all diabetes diagnoses are for type 2 diabetes, suggesting most of the diabetes-related deaths are most likely due to type 2.

Stroke

Stroke is the third leading cause of death in the U.S. and the leading cause of adult disability; roughly 1.6% of the U.S. population have suffered a stroke. Two-thirds of stroke survivors suffer from significant long-term physical and emotional disabilities. Given the impact of stroke on victims and their families, progress in prevention, diagnosis, and treatment is critical. To this end, significant advances in diagnosis and therapy have improved patient care and reduced the mortality rate from stroke.

Based on a study of claims data for Medicare patients who suffered from stroke, *every additional dollar spent on the overall treatment of stroke has produced health gains valued at \$1.55.*

Evidence of the value of health gains associated with specific investments in management of stroke suggests that every additional dollar spent on antiplatelet therapy vs. aspirin for the prevention of stroke in high-risk patients has produced health gains valued at \$2.00 to \$6.00.

Some of the noteworthy progress in the management of stroke includes:

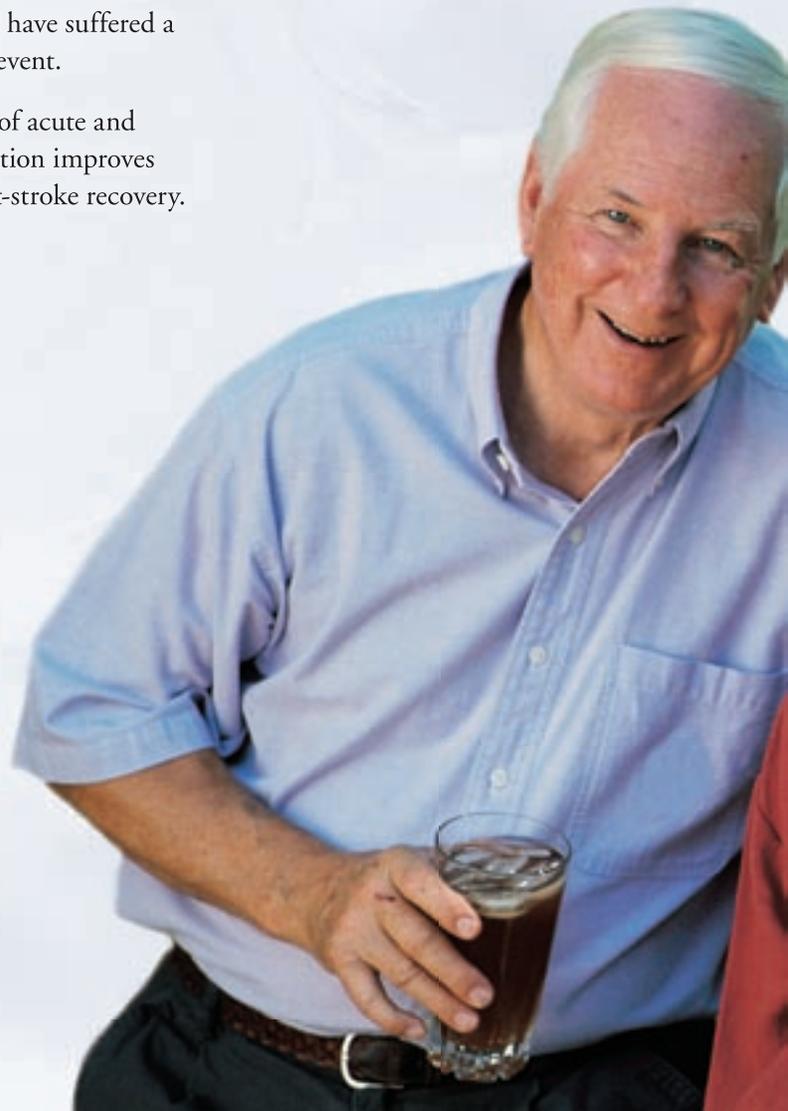
- Advances in surgical techniques (e.g., carotid endarterectomy, early aneurysm surgery, minimally invasive microcoil devices used to treat brain aneurysms) and better drug therapy (e.g., combination therapy with dipyridamole and aspirin, anticoagulants, and antithrombotics) are expected to reduce the incidence of stroke, both

primary stroke in high-risk patients and recurrent stroke in patients previously suffering a stroke.

- “Clot-busting” therapy is routinely used immediately following acute stroke.
- Advances in brain and vascular imaging—such as computed tomography (CT) and magnetic resonance imaging (MRI) scans of the brain and ultrasound images of the vessels—enable more rapid diagnosis and treatment of stroke.
- Glycoprotein inhibitors are often used to reduce the risk of recurrent coronary events (such as stroke) in individuals who have suffered a primary coronary event.
- The increased use of acute and subacute rehabilitation improves and speeds up post-stroke recovery.

This progress has led to improved outcomes for stroke survivors.

- Stroke mortality rates have significantly declined in the past 20 years, falling from 96.2 to 60.8 per 100,000 persons, as shown in Figure 6.
- Due to the reduced mortality rates, the estimated number of non-institutionalized stroke survivors increased by 400,000 (from 2.0 to 2.4 million) between 1980 and 1991.



Breast Cancer

Breast cancer is one of the most commonly diagnosed cancers among women in the U.S., affecting 2.2 million women out of a total of 143.4 million women (1.5% among all women in the U.S.; 0.7% of the entire U.S. population) in 2000. About 40% of these women lived with breast cancer for 10 or more years. In 2001 alone, an estimated 192,000 new cases of invasive breast cancer were diagnosed. While substantial progress has been made in diagnosing and treating breast cancer, researchers continue their efforts to improve the outcomes for women affected by this disease.

Based on a study of claims data for Medicare patients with breast cancer, *every additional dollar spent on overall breast cancer treatment has produced health gains valued at \$4.80.*

Evidence of the value of health gains associated with specific investments in breast cancer management includes:

- Every additional dollar spent on stereotactic core needle biopsy (vs. surgical biopsy) has produced health gains valued at \$3.70 to \$4.83.
- Every additional dollar spent on newer, less toxic hormonal therapy has produced health gains valued at \$27.03 to \$36.81.

The period since the 1970s has seen the following noteworthy advances in the diagnosis and treatment of breast cancer:

- The increased emphasis on mammograms at an earlier age allows for earlier diagnosis and initiation of treatment.
- Recent years have seen a shift towards less invasive diagnostic procedures. For example, stereotactic core needle biopsy allows removal of only a microscopic sample.

- Breast-conserving surgery offers a greatly improved cosmetic and psychological outcome over the traditional, more invasive mastectomy.
- New and better-tolerated hormonal treatments (used to block the effects of estrogen on the growth of cancer cells) improve rates of cancer-free survival without major side effects.

As the health interventions for breast cancer have advanced, health outcomes have improved.

- Overall mortality from breast cancer has declined from 32.3 in 1980 to 25.4 deaths in 2000 per 100,000 persons, as shown in Figure 6.
- Five-year survival rates have increased from 76.9% in 1980 to 86.6% in 1995.
- For a 54-year-old woman diagnosed with lymph node-positive breast cancer, the risk of developing metastatic disease has declined from 40% to 15%.



Conclusion

Expressed in dollar terms, the value of improved health in the U.S. population over the past 20 years significantly outweighs the additional health care expenditures during this period. *The Value of Investment in Health Care* adds further significant evidence showing that our increased spending on health care is well worth the cost. This evidence is consistent with economic theory: continued investment in health care reveals society's preference and implicit belief that the expected benefits are worth the costs. Over the past 20 years, patients have benefited from longer, better lives, as well as reduced disability and less hospitalization. The value of these improvements alone, which do not capture all the patient and societal benefits provided through health care, far outweigh increases in health care spending.

This report underscores a critical fact that must be part of every health policy discussion: health benefits have *clear, quantifiable, economic* value. Such policy discussions should encompass elements of not only costs of health care, but also the added benefits. Policymakers in the U.S. are increasingly interested in whether, and the degree to which, investments in health care are worth the costs. This report provides important new findings that quantify improvements in health resulting from these investments. These improvements and this report represent an essential element of the debate over health care costs, building upon a growing body of evidence that suggest these benefits are, indeed, worth the costs.

Glossary

ACE Inhibitor (ACEI) – Class of drugs used to lower blood pressure by inhibiting angiotensin-converting enzymes (ACEs), which help the conversion of angiotensin to angiotensin II.

Aneurysm – Localized widening/ballooning-out of a vessel, resulting in a “bulge” that can weaken the vessel's wall and cause a rupture; may occur in the brain, increasing blood pressure and resulting in a stroke.

Angiotensin II Receptor Blocker (ARB) – Class of drugs used to lower blood pressure by blocking angiotensin (eventually converted to angiotensin II), which causes blood vessels to constrict, raising heart rate and blood pressure.

Angioplasty – Procedure that re-opens blocked/narrowed arteries to the heart by using a catheter to insert a balloon in the blocked/narrowed portion of the artery; the balloon is then inflated to widen the artery. Also known as percutaneous transluminal coronary angioplasty (PTCA).

Antiplatelet – Class of drugs that inhibit blood clot formation by keeping platelets (the body's natural blood-clotters) from binding together; also known as “clot-busting” drugs.

Beta-blocker – Class of drugs used to lower blood pressure by blocking beta receptors on the surface of heart cells.

Cardiac catheterization – Process to examine the heart by inserting a thin tube/hollow needle (catheter) into a vein or artery and passing it into the heart, often to open blockages.

Carotid endarterectomy – Surgery to remove plaque build up in the carotid arteries.

Computed Tomography (CT) – Method of examining body organs by scanning them with X-rays and then using a computer to construct an image based on the X-rays.

Coronary Artery Bypass Graft (CABG) – Procedure used to re-route blood supply around a blocked section of a coronary artery by removing healthy blood vessels from another part of the body (e.g., leg or chest wall) and surgically attaching these vessels to the diseased artery in such a way that blood flows around the blocked section.

Glucose – Sugar.

Glycoprotein inhibitor – Class of drugs that inhibit proteins that cause clot formation; often used in the management of cardiovascular patients.

Hemoglobin A1c – Measure of blood glucose levels captured in a lab evaluation that provides an average of blood glucose levels over 2-3 months.

Implantable Cardiac Defibrillator (ICD) – Device that delivers pacing or electric countershock to the heart when an abnormal rhythm is detected.

Magnetic Resonance Imaging (MRI) – Method of gathering images of body organs by using nuclear magnetic resonance of protons to produce proton density images.

Mastectomy – Complete removal of the breast.

Microcoil surgery – Minimally invasive surgical procedure used to treat aneurysms, which can often lead to stroke if left untreated.

Microvascular complications – Collective term that refers to diabetic retinopathy, neuropathy, and nephropathy.

Percutaneous Coronary Intervention (PCI) – Collective term used to describe minimally invasive cardiovascular procedures, such as angioplasty and stenting.

Percutaneous Transluminal Coronary Angioplasty (PTCA) – See angioplasty.

Revascularization – Process to restore blood flow to a body part through angioplasty, stents, coronary artery bypass graft or by dissolving blood clots with drug therapy.

Statin – Class of drugs that lower cholesterol levels by blocking enzymes essential to cholesterol production.

Stent – Tiny wire mesh device used to keep blood vessels open; classified as either bare-metal or drug-eluting.

Stereotactic core needle biopsy – Procedure to obtain tissue sample by taking two separate X-rays of the breast to locate the lump, and then, with only local anesthetic, using a needle to obtain a tissue sample.

Thrombolysis – Process of dissolving blood clots through drug therapy.

Thrombolytic – Drug used to dissolve or break up clots that block blood flow; also known as “clot-busting” drug.

Ultrasound – High-frequency sound vibration that can be translated into an image and is often used to make medical diagnoses.

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For additional information or to review the full report, *The Value of Investment in Health Care*, please visit the MEDTAP website at www.MEDTAP.com.

For a list of references used for this summary brochure, please view the full report.