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The Economic Return to Health Expenditures

"Runaway" expenditures on health in the United States and what to do about them have been a feature of congressional debate for years. In 1998, the United States spent 13.6% of its GDP on goods and services associated with health care. This represents an enormous increase over time: the spending share was just 5.1% in 1960. It also represents a large number relative to other countries. The 1998 spending shares were 10.6% in Germany, 9.6% in France, 9.5% in Canada, 7.4% in Japan, and 6.7% in the United Kingdom.

Sometimes forgotten in these debates, however, are the enormous benefits that are, at least potentially, associated with this spending. This *Economic Letter* will review several recent economic studies suggesting that the benefits of technological change in medicine have been so large as to overwhelm the costs of health care. While this by no means implies that there is not substantial waste in the spending of particular dollars, it does emphasize that reforms should take care not to stifle the technological progress in medical care.

The overall rise in life expectancy

To begin to measure the return on health care expenditures, many studies consider estimating the economic value of gains in life expectancy, which have been striking. In 1929, life expectancy at birth was 57.1 years in the United States. By 1950, life expectancy had risen to 68.2 years, and by 1990 it was up to 75.4 years.

Assigning an economic value to these gains is obviously very difficult, and attached to any answer will surely be a large degree of uncertainty. Nevertheless, economists have made attempts to estimate the economic value of an extra year of life by looking at the wage premium demanded by workers who undertake more hazardous jobs. Kip Viscusi (1993) reviews these studies and provides some useful numbers. For example, in the early 1980s, the fatality rate in the mining industry was 35.4 per 100,000 employees, while the rate in the services sector was only 2.4 per 100,000 employees.

Other things equal, workers in the mining industry presumably earned a higher wage for taking on this risk, and we can use this information to calculate the implied economic value that workers place on life. The twenty-four different studies reviewed by Viscusi (1993) produce economic values of life in a wide range, from $500,000 to $16 million, with a median value of about $5 million. Since life expectancy during the periods covered by this survey was about 72 years, these numbers imply a value of a single year of life that ranges from about $7,000 to more than $200,000, with a median value of $70,000. One might argue that these economic values ignore other important considerations. In this case, one might view this range as an underestimate of the true value of an additional year of life.

To put an economic value on the gains in life expectancy, notice that longevity rose by almost 8 years over the 40-year period between 1950 and 1990, or about 1 year every 5 years. Therefore one measure of the annual economic value of the gains in life expectancy is equal to one-fifth of the value of a life year. This produces the relatively wide range of $1,400 to $40,000, with a median value of $14,000 per year.

Using a related and more sophisticated methodology, Kevin Murphy and Robert Topel (2002) argue that the gains in life expectancy between 1970 and 1990 in the United States were worth about $2.8 trillion per year in the aggregate, or about $12,000 per person per year, close to the median value reported above.

Is this a large or a small number? By comparison, per capita GDP in 1980 (roughly the midpoint of our time period) was about $20,000. So, taking the median estimates, the gains in life expectancy are equal in value to something like 60% to 70% of per capita GDP each year. Indeed, as William Nordhaus (2002) concludes in his analysis of the gains in life expectancy, "[T]o a first approximation, the economic value of increases in longevity over the twentieth century is about as large as the value of measured growth in non-health goods and services" (page 17).

But at what cost and by what cause?

The rise in life expectancy in the United States in recent decades appears to have an economic value

of something on the order of $12,000 per person per year. But at what cost does this increase come, and how much of the gain is due to medical spending?

One statistic to begin with is that per capita health expenditures in 1980—the midpoint mentioned above—were about $1,800. Thus, the total value of the gains in life expectancy each year swamp the total expenditures on health. However, this is probably not the right comparison for several reasons. First, perhaps not all of the gains in life expectancy should be attributed to medical care. Second, medical care has additional benefits beyond the rise in life expectancy, including increases in the quality of life.

Moreover, even the gains in life expectancy that are due to health care should be matched to spending in a different way. The gains are due either to an increase in the use of existing medical techniques, in which case one probably wants to look at the change in health expenditures, or they are due to advances in medical technology, in which case one probably wants to focus on the level of expenditures for medical research. Still, the annual change in health expenditures is much smaller than the level of spending, and medical research constitutes less than 10% of all health expenditures, so the comparison to the level of per capita health spending is likely to be conservative.

David Cutler and Mark McClellan (2001) offer a more careful comparison of the costs and benefits. Between 1950 and 1990, the present discounted value of the amount an individual could expect to spend on medical care over his or her entire lifetime rose by $35,000. During the same period, life expectancy increased by seven years. Cutler and McClellan calculate the present value of this increased longevity to equal $130,000. Therefore, they conclude, if health expenditures explain more than about a quarter ($35,000/$130,000=27%) of the rise in life expectancy, then these benefits from increased health spending exceeded the costs.

A case study: The treatment of heart attacks

It is useful to consider a specific example in more detail to understand the changes in medical spending and life expectancy. Cutler and McClellan (2001) provide a detailed analysis of the treatment of heart attacks. Between 1984 and 1998, average medical spending to treat a single heart attack case rose from about $12,100 to $21,700. The additional cost primarily represented the more extensive use of surgical intervention rather than the discovery of an entirely new form of treatment. In 1984, only 10% of heart attack patients were treated surgically, while by 1998 more than half were.

One of the benefits of this more expensive treatment appears in increased life expectancy. In 1984, life expectancy of a heart attack victim was 4 years and 11 months. By 1998, life expectancy had risen to 6 years. At a cost of less than $10,000, this additional year of life seems like an especially good deal, given the values of life reported by Viscusi.

Prospects for future progress

Health expenditures in the United States have risen at an extraordinary rate over the last 40 years. Much research in economics, as well as much of the public debate, has focused on the potential waste that could be associated with this spending, and perhaps for good reason. In the presence of an insurance system, individuals may have incentives to consume too many medical services. More recently, however, a number of papers have highlighted the tremendous gains in welfare associated with the declines in mortality that have resulted from technical progress in medical care. It appears that these gains outweigh even the large amount of growth in health spending, so that, in the words of Cutler and McClellan (2001), the increased spending has been "worth it."

The potential gains from further medical innovation and the more widespread application of existing medical techniques remain large. Murphy and Topel (2002) calculate that eliminating deaths from either cancer or heart disease would produce gains in life expectancy worth $47 trillion dollars, approximately five times the GDP of the entire United States. Even a modest reduction in the mortality rate from cancer by 1% would have an economic value of $500 billion. By comparison, the United States invests approximately $35 billion each year in medical research. Reforms to medical care should refrain from stifling medical research and the valuable technological change that it has produced.

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