

# **The Future Costs of Health Care in Aging Societies: Is the Glass Half Full or Half Empty?**

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## **Abstract**

There is great concern that modern rich nations will not be able to afford the future health care costs of aging societies. Cohort change-based estimates of population aging alone suggest large increases in future costs, without differentially higher growth in underlying, residual or in technology related costs. Accounting for these costs pushes the future costs even higher. However, these estimates ignore both the increased willingness and ability of the current and future elderly to pay these costs, and the likely future benefits of these expenses in terms of increased health status, improved quality of life and increased longevity from new and better medical treatments, pharmaceuticals and the like. Drawing on recent examples of the net benefits of pharmaceuticals from the United States and other nations, we argue that these benefits also need to be taken into account. We also suggest that once a socially determined level of health care benefits are provided by the public sector, the elderly should be able to privately pay for additional treatments which might also have high health benefits. The primary public policy issues are two. First, avoid the unnecessary and inefficient costs of excessive technological medicine (where waste is rampant; costs are below benefits, and therefore the marginal value of treatment is low). Second, directly address the question of the distribution of the costs of new medical advances and existing cost-effective treatments for the elderly by determining how much of these costs should be borne by public programs (financed by workers or from general revenues) vs. how much the low income elderly themselves can and should pay for. In this light, plans to subsidize the cost of treatments based on ability to pay are important policy considerations for future cohorts of older persons.

## I. Introduction

This paper considers the multitude of issues involved with estimating the future costs and benefits of health care expenditures for and by the aged (those aged 65 and over) in the rich nations of the world. We argue that there is much hope (and perhaps not so much despair as some of the literature suggests), when one considers future outlays for health care and their relative costs and benefits in an aging society. In other words, with some distributional exceptions, the glass is more than half full and we should welcome cost effective medical advances which directly and substantially improve the well being of older generations.

We proceed by assessing the recent literature and forecasts of acute health care expenses by and on behalf of, the elderly, both public and private.<sup>1</sup> We include a subset of the Office of Economic Cooperation and Development (OECD) nations in our analyses for purposes of being both concise and for offering some depth in terms of institutions, the distribution of costs (as well as their levels), and recent developments in pharmaceuticals and related treatments. We first assess the relatively barren literature on future health care costs in aging societies. As noted by Henry Aaron (2000), almost all forecasts tend to be wrong once we get to the end of the period being forecast; yet forecasts are useful in that they help us to focus on the key elements and parameters that will determine future outlays.

Next, and more substantively, we discuss some of the issues involved in forecasting health care expenses for the elderly, including differences in assumptions about the adoption of technology, new prescription drugs, and use of both new and established treatments. We discuss the underlying income elasticity of demand for health care and institutional mechanisms which are liable to effect health care spending and financing patterns among the old. Unlike previous authors, we discuss the benefits (in terms of quantity and quality of life) as well as the costs of increased health care services among older persons. We conclude with a frank discussion of the

likely future costs and benefits of health care in rich aging societies, including suggestions for health care policy research and policy considerations for financing these expenditures.

## **II. What We Know About the Future Costs of Health Care in Rich Aging Societies**

“Demography is not Destiny” (National Academy on an Aging Society—NAAS 1998) to quote a recent report. But because future demography can be forecast with much greater accuracy than can future incomes, productivity, or health care costs, and so everyone who addresses this issue begins with future demography (OECD 1998, 2000; Mayhew 2000a). When one looks, it is clear that our populations will become older very rapidly in the early 21<sup>st</sup> century, with the proportionately largest increases in population over the next several decades coming at the oldest ages, i.e., 85 and above (OECD 1998, 2000). This phenomenon of population aging will occur at differential speeds in different nations. For instance, it has already begun to have effects in Sweden and Japan (Mayhew 2000b), with other nations 10 to 20 years behind these two.

Most of the increase in aged populations is being fueled by ever-larger members of elders, not by added lifespan at older ages (OECD 2000; Spillman and Lubitz 2000; Cutler and Meara 2001). This is not to say that increasing longevity at older ages will not occur; in fact it has occurred with increasing regularity over the past 25 years (Cutler and Meara 2001). There is debate over whether one can continue to add about one year per decade to life expectancy at older ages over the coming decades (e.g., OECD 1998). However, the debate on finite vs. infinite life spans is only part of the debate. What matters is the growth in total number of extra years of life among those who will reach a given age (e.g., 65, 75, or 85), and the quality of those lives, not in the actual number of persons who will survive to much older ages. That is, the number of persons who will live to 85 or 90 years of age is far more important to future health care costs

than is the question of whether the oldest person in society will reach ages 125, 130 or above. Whatever the nuance studied, there will be a disproportionate growth in very old populations in the near future in almost all OECD countries (OECD, 1998). In fact, some argue that these increases will occur in almost every country, developed and underdeveloped. (Center for Strategic and International Studies, 2001).

### **Basic Spending Patterns**

The reasons for concern in the growing number of aged as it relates to health care outlays are captured in Tables 1 and 2, and Figure 1. In the three rich nations with recent estimates for total health care spending (Canada, United States, United Kingdom), we find that older persons use between 4.5 and 7.5 times the level of health care spending that younger persons aged 45 to 64 (Table 1) use.<sup>2</sup> In Table 2, where the ratios are for the over-65 to the under-65, per capita spending for those aged 65 and over is roughly four times above that for the non elderly, but with substantial variance, from 4.7 or 4.8 in Canada and Japan, to 2.7 and 3.0 in Germany and France. Figure 1 suggests that a similar pattern persists for all of the “more developed countries” (OECD plus Central and Eastern Europe), in the mid-1990s. Thus, we are dealing with a nearly universal phenomenon. Older persons consume larger quantities of health care than do younger persons at any given point in time in all rich nations.

In the high health care consumption nation of the United States, the ratio was “only” 4.5 to 1 around 1990, but the overall level of spending in 1995 was more than \$12,000 per person aged 65 and over (Table 2), almost twice as much as was spent in Canada, the next highest nation. A large part of this spending is because the United States is a richer nation, as 5.0 percent of the gross national product (GDP) is currently spent on health care for and by the aged in the United States, compared to 4.6 percent in Canada (Table 2). In Canada and the United Kingdom, where much larger fractions of spending are funded by the public sector, the ratios of older to

younger spending are much higher, with the very old 7.5 and 6.0 times as expensive as the base groups (Table 1), despite the fact that the United Kingdom spends only 2.8 percent of GDP on elder health care (Table 2). Hence, both overall income levels and institutions for health care provision seem to have an affect on relative and absolute levels of health care spending on the aged.

More controversial is the differential trend in health care spending by age among the elderly. Figure 2 contains two charts on the trends in the age distribution medical spending, one for the United States (Panel A) and the other for the United Kingdom (Panel B). These are the only two sets of trend data available to us at this time. They clearly demonstrate very different patterns. The panels are not fully comparable because the United States includes all spending (public and private), while the United Kingdom panel includes only outlays by the National Health Service (NHS), which is roughly 90 percent of all health care spending in the United Kingdom. Patterns over time in the United Kingdom from 1982 to 1992 are fairly stable and are very different from the 1963 to 1987 (or even the 1977 to 1987) patterns in the United States.

In the United States health care usage amongst the elderly increases rapidly at older ages—much more rapidly than costs among other age groups. In part this is a reflection of the elders' increased ability to pay for health care; in part it reflects inefficiencies in the Medicare program which pays the largest share of health care costs amongst the aged; and we will argue below—in part it is due to the increasing effectiveness of technological medicine in increasing the quality and quantity of life amongst the elderly. In the United Kingdom, technological diffusion is lower; incomes of the aged have grown by less; and while health care spending differences across age groups are still very large, they have not grown, and indeed may have fallen over the past decade.

Clearly the trends in these ratios reflect the different institutions of health care provision in these two nations, as well as differential availability and usage of care, and differences in medical practice (e.g., see Aaron and Schwartz 1984).<sup>3</sup> It seems clear from these graphs that explaining these differential trends is important to understanding the future pattern of health care spending among the elderly. It is also clear that in both countries, we spend substantially more on healthcare for the aged than for the non-aged.

### **Combining Demography and Expenditures: The Burgeoning Literature on Forecasting Future Patterns of Health Care Costs**

Most forecasters of future health care costs among the elderly make use of three basic pieces of information to make their forecast: (a) the age-specific spending summarized above; (b) the forecast future number of persons at each age; and (c) some assumption about the growth of “real” health care spending (or the “underlying rate of growth of expense”), both public and private, relative to GDP growth. Some mixing and matching of these three elements produces the “future cost of elder health care” in each nation. Mayhew (2000a, 2000b) and Robson (2001) provide the two most recent studies in this genre, though others have preceded them (e.g., Fuchs 1998; OECD 1998). A brief review of these studies begins this section.

Mayhew (2000a) builds a simple model of demographic and technological change in both more and less developed countries, where he assumes an underlying growth rate of health expenditures of 3 percent, the same as the growth rate of GDP. This growth assumes constant technological change, which subsumes major changes in medical treatments, service delivery and the like. In other words, the differential growth of healthcare costs versus other costs is simply assumed to be the same, with the underlying growth rate in health care expenses assumed to be exogenously determined. In contrast, Cutler (1995) and Cutler and Sheiner (1998) and Blumenthal (2001) find a distinctly different and growing role of technology and new treatments in health care costs in the United States with “technological change” (new diagnostic and

therapeutic approaches and increased usage) explaining over one-half of real per capita growth in health care costs over the past decade. Moreover, when forecasters assume that technology adoption grows at the same rate in the future as in the past, future public health insurance costs for the United States elderly increase by more than twice as much by 2030, as when they are assumed to grow only with GDP. Fuchs (1998) has a similar finding.

In fact, the assumed rate of increase of health care expenses due to technological change is a key variable in projecting the future health care costs of any given population and especially for the elderly (Blumenthal 2001; Cutler 1995; Cutler and Sheiner 1998; Walker 2001, Mohr, et al., 2001). Because these changes in availability and usage of new pharmaceutical drugs, medical interventions, and new procedures have especially benefited older persons, these forces have helped to create the changing patterns of medical expenses for the elderly found in Panel A of Figure 2, in the United States. Why similar forces were not in play in the UK is not known.

According to Mayhew (2000a), OECD health care costs have grown at 5.7 percent per year from 1960 to 1995, with about 1.3 percent due to changing demography (mainly population aging) and the rest (4.4 percent) due to technological change and general economic growth (of 3.4 percent per year). Thus, the underlying rate of growth in health care costs over and above GDP has been about 1 percent per year (or 4.4 minus 3.4 percent) across the OECD nations. Because this model includes forecasts for the former Soviet Union and Central and Eastern Europe (CEE) countries where growth is slower, Mayhew assumes a 3 percent underlying growth rate for medical expenditures, and the same rate of growth for GDP in the future for the OECD nations. His model predicts that population aging will add an additional 0.8 percent per year (and other demographic change adding another 0.3 percent) from 1995 to 2020. Clearly the assumed “underlying rate of growth” of health care (“the technology effect”) is the key factor here, of the total predicted rise in costs 4.1 percent per year, 3.0 comes from the underlying

growth (of GDP and health care) and 0.8 percent from population aging. If real health care spending were assumed to continue to grow 1 percent faster than GDP, as it did in the 1960 to 1995 period, the final health care costs would be much higher than predicted, growing at 5.1 percent per year.

The study by Robson (2001) for Canada is typical of single country studies (e.g., see Cutler and Meara 1999; Spillman and Lubitz 2000 for the United States). The model again is built on population aging and age-specific health care expenses linked to some underlying increase in health care expenses and GDP growth. This model also assumes that per capita health care costs in the future will increase only with general economic growth, and not at the historical 0.8 percent per year faster rate of growth compared to GDP per capita in Canada alone over the past several decades. Again, if the historical rate of health care cost growth persists, Canadian spending will be much higher in 2020 than is forecast by Robson.

In fact, in a recent testimony to the United States Congress, David Walker (2001:7), Director of the United States General Accounting Office, argued that virtually all United States forecasts (e.g., Congressional Budget Office) for future health care costs in the Medicare program had converged on a forecast increase in spending of 1 percent per year above the rate of growth of GDP. If we were to add this assumption to the Mayhew model, overall health care costs per capita, as a share of GDP, would be substantially larger than the 12.8 percent he forecasts for 2020 in the more developed countries. Similar simulations by Fuchs (1998) indicate that Medicare would increase from 4.5 to 5.2 percent of GDP by 2020 and that total personal health care spending for (and by) the elderly alone would be close to 10 percent of United States GDP by 2020, more than twice the 5 percent observed by the OECD for 1995 in Table 2. In fact, 1 percent real growth may be a low estimate. A recent study for United States overall health care outlays projects that the residual (technology related) growth rate of overall health care expenses

will be 1.5 to 2.0 percent a year, over and above other factors driving overall health care costs over the next 5 years (Mohr, et al., 2001). The effects of population aging would presumably add to this effort.

Another interesting variable in the Mayhew model is the mix of public vs. private finance. He assumes a 40 percent share for private finance.<sup>4</sup> Because privately financed expenses have historically been growing more slowly than public expenses in most countries, the assumed share reduces the rate of growth in overall expenses based on historical data. But such a relationship may not endure.<sup>5</sup> The mix of public and private shares may therefore be important determinants of future health care expenses and expenditures. Clearly these shares are also linked to institutional arrangements in each nation and to the distribution of income and wealth, which determine private and public ability to pay for health care.

For instance, in most OECD nations, social spending demands for cash social retirement are already high and are assumed to grow much higher by almost all forecasters (e.g., Smeeding and Smith 1998; Gruber and Wise 2001; OECD 1998). Thus, public cash social retirement expenditures for the elderly will increase as a percent of GDP due to population aging. To these expenses we must add the cost of the aged to health care budgets as discussed above. In the United States, for example, the forecast is that health care cost outlays for the elderly will exceed cash income costs for social retirement before 2020 (England 2001; Shoven, Topper, and Wise 1994). Thus, the double public burden of population aging through higher health care costs and higher cash income support costs are forecast. Add to this the growing demand for public tertiary (higher) education spending in most OECD countries, and one finds alarmingly strong pressures on future social expenditure budgets (OECD 1998, 2000). If public expenditure or health care is therefore constrained by these pressures what about private expenses? This too is a key question for forecasters.

In summary, using assumptions that constrain the underlying rate of growth of technology to match that of GDP, demographic change drives the health care cost results in most models and we end up with virtually all of the growth in health care costs for the elderly in OECD countries over the next 20 years being driven by population aging. There is also strong evidence that the two highest cost nations, Canada and the United States, and the OECD nations in general, have experienced health care cost increases that are about 1 percent higher than the growth rate of GDP per se. The results are sensitive to the “technological” growth assumptions, and perhaps also to the mix of payers (public vs. private) in each nation. Moreover, if GDP growth slips below forecasts, there is no mechanism that will guarantee that health care costs will slow as well, since population aging, and not economic growth, is the force behind the rise in health care costs in most nations. Hence, Mayhew (2000b) forecasts that if GDP growth slows by 1 percent in Japan while health care costs in Japan continue at their current rate, overall Japanese health care expenses will rise from 9.4 to 12.1 percent of GDP in 2020. Already Japanese efforts are underway to shift part of these increased costs to the elderly themselves (Yomiuri Shimbun 2001).

### **Added Features and Concerns**

The studies mentioned above and others we have reviewed also point to three additional factors which have been considered in making these forecasts and that should enter into subsequent discussions.

First, Spillman and Lubitz (2000) find that increased longevity per se, has a much smaller effect on increased acute care spending than on long-term or chronic care spending. In fact, the costs of death for acute care increases only marginally with advanced age. Hence, the “volume”

of aged will have a much larger effect on expenses for acute care than will living to increased ages among the already old. Cutler and Sheiner (1998) have similar findings.

Second, the cost of death appears to be a minor part of total health care costs and, in fact, may be decreasing at older ages as persons assume greater control of the surroundings and choice of treatments as they die (Spillman and Lubitz 2000; Cutler and Sheiner 1998). Thus, the “rising costs of dying” are not a prime force in higher elder health care costs in the United States, at least.

Finally, our paper excludes reference to changes in disability and their effect on both acute and long-term (or chronic-care) expenses. The general consensus in the literature is that age-specific disability rates appear to be declining in many countries, but increased numbers of very old will likely offset this effect and increase both acute and long-term care costs in most nations (e.g., Cutler 2001a; 2001b; Wolf 2001). Trends toward deinstitutionalization of long-term care, increasing demands for home care, and the roles of public funding, private funding, and “family” (in kind) provision of long-term care services all have relatively unknown effects in this context (Jacobzone 2000; Jacobzone et al. 1998; Mayhew 2000a; Crimmins 2001; Waidmann and Manton 1998).<sup>6</sup> In fact, Cutler (2001a) argues that improved medical treatments are one of the reasons for decreasing rates of disability amongst the old in the United States.

## **Summary**

At this point, the estimates we have for future expenditures on health care are rather mechanistic and speculative. What is known is that future costs of health care will increase in aging societies with population aging being a key driving force. In part, this is because the forecasters assume that health care costs will rise only as fast as GDP. They do not generally consider that technological change will continue to push up health care expenses as societies adapt new treatments and methods, especially those which are consumed by the elderly. In part,

the historical trend may continue because the elderly have greater demand for health care in general and are increasingly able to register these demands. It may also continue because the elderly are more informed consumers of health care than are forecasters, as they perceive the benefits of higher health care expenses (not just their costs) better than do forecasters or government policymakers. In fact, what has so far remained absent from these discussions are the benefits of health care to the elderly, the possible links between acute care and disability status, and the question of who should therefore pay for the increasing costs of health care for the aged. We now turn to these issues.

### **III. Future Health Care Costs: Other Considerations**

This section has three themes: the effects of rising incomes on health care demand among the elderly; the benefits of health care advances in general and amongst the elderly in particular; and finally, the discussion of who will pay for health care in the future. The consideration of these factors provides a better context and a more rounded context where we might determine how policy ought to react to the rising costs of health care in aging societies.

#### **Income Elasticity of Demand for Health Care**

It is now a well-known fact that on average, the median disposable incomes of the old (those aged 65 and over) are at a par with or higher than, those of the younger populations in most OECD countries (e.g., Smeeding and Smith 1998; Smeeding and Sullivan 1998; OECD 2000; 2001). Moreover, the median incomes of the elderly have been rising faster than those of the younger populations in recent decades in at least five OECD countries for which we have comparable data on these incomes (Smeeding and Sullivan 1998). And the relatively recent run up in stock prices (even with a downturn in the stock market in 2001), and rising home prices may have further increased elder wealth, on average, as well (Smeeding and Smith 1998). To be

old and poor is now more a function of the distribution of income among the old than the level of elder income relative to the incomes of younger generations (Smeeding 1998).

As can be seen in the final column of Table 2, there has been a large positive overall income elasticity of demand for health care in OECD countries in general over the past 30 years. That is, for every \$1.00 increase in personal income, there is a 114 to 140 percent increase in health care outlays among the overall population at large. For most countries, the elasticity is remarkably similar, in the 1.14 to 1.21 range, with the United States an outlier at 1.40. Thus, the amount of incomes that nations are willing to spend on health care, and the amounts individuals are willing to spend as well, are very income elastic. This fact should not be ignored by forecasters.

To understand how this trend affects the elderly, we would need information on the trend in elder out-of-pocket health expenses (or on outlays for the elderly) in many nations. Recently we have developed estimates of out-of-pocket spending as a percent of income in four countries circa mid-1990's (Table 3). These are out-of-pocket expenses for acute care, drugs, and premiums for public insurance and supplemental private insurance. In other words, they cover all expenses for acute care over and above expenses paid by public payers (Medicare and Medicaid in the United States; NHS in the United Kingdom, and their equivalents in Canada and France). These are, to our knowledge, the only such comparative data available on this topic.

They show several patterns of note:

- Medical care expenses vary enormously across both countries and age groups.
- Out-of-pocket medical expenses increase by age (except in the United Kingdom)<sup>7</sup> and are a larger share of income for single female-headed households (due to their lower incomes) than for couples.
- Outlays were highest in the United States, followed by France, Canada, and then the United Kingdom.

Clearly the elderly have both willingness and ability to pay for health care over and above public expenditures on such care. And, we argue below, this willingness to pay will increase in the future.

The only solid information we have in the trend in out-of-pocket expenses comes from the United States, however, where a particular set of institutions affect health care demand.<sup>8</sup> Earlier (Figure 2, Panel 1) we indicated a large overall rise in per-capita health care expenses by age group within the United States from 1963 to 1987. In large part, this was fueled by out-of-pocket expenses rising faster than incomes, in addition to the increase in Medicare expense. Figure 3 presents trend estimates in out-of-pocket expenses for the elderly as a percent of income in the United States for the 1965 to 2000 period, and predicted outlays for the 2005 to 2025 period (Moon 2000; Maxwell, Moon, and Segal 2000).

These data show that the introduction of Medicare in 1965 drastically reduced out-of-pocket health care expenses for the United States elderly, but only to about 11 percent of income in 1970. Since 1970 these expenses have grown to almost 22 percent of rising elderly incomes by 2000. Moreover, under current projections, they will rise to almost 30 percent of income by 2020. It should be noted that Medicare pays roughly one-half of the acute care costs of health care for the aged (see endnote 7). And so, even with hospital and doctor insurance covered by public programs, future out-of-pocket outlays will grow in the United States as elderly incomes grow.

The news from the United States is that where health services are plentiful, and even when only partially insured, people will purchase them. The institutional arrangements in America are likely to be different from those found in other nations. More products are available and patients therefore have more choices. Despite the relative lack of insurance for prescription drugs, the elderly spend freely on these medical treatments. In fact, the elderly, which are about

13 percent of the United States population, accounted for 42 percent of all prescription drug sales in the United States in 1999 (Harris 2001). In other countries, which offer a lesser range of choices and with higher public subsidies, one might expect a lower level and lower rate of growth of out-of-pocket expenses. However, even if levels of spending differ, the trend toward greater spending is liable to be higher among nations where elderly incomes are growing. This growth may be particularly large if public health care budgets are constrained, if treatments are available, and if elders see value in such expenditures over and above public outlays.

### **Benefits of New Health Care Treatments and New Pharmaceuticals**

Research on the benefits of technological advances in medical care, medical research, and medical advances more generally is still in its infancy. Yet recent work by Cutler and McClellan (2001), Cutler et al. (1995), Lichtenberg (2001a, 2000b, 2002) and Topel and Murphy (2001) suggest that the net benefits of public health expenditures for research, new treatments, and increasing access to high quality health care has produced gains in longevity in the United States that are very cost-effective. The cost of added medical care per life year gained is roughly \$11,000, far below the average value of an added life year of \$100,000 (Cutler and McClellan, 2001) to \$150,000 (Lichtenberg 2002), according to Lichtenberg (2002). Studies of return on new pharmaceuticals, cataract treatments and other treatments support these estimates for the general population. While these added years may not be as high a quality of life as many would desire (Crimmins 2001), the cost effectiveness of treatments in the United States is indeed high. Similar estimates for the elderly compared to other groups, are not yet available, but there is increasing evidence that the quantity (life expectancy at older ages) and quality of life at older ages is increasing and that newer and more advanced medical treatments for the elderly are an important part of the reason for these increases (Cutler and Meara 2001; Deaton and Paxson 2001).

Recent changes in the use and availability of pharmaceuticals among the elderly present a case study in health care change, cost, and benefit among the elderly. Pharmaceuticals, particularly those that represent “break through drugs,” those that are used to treat chronic disease, or change the focus of care, represent a growing sector of the health care economy in all of the seven countries studied by Freund et al. (2000). Whether financed through public or private payment, purchase of pharmaceuticals by governments and individuals represents one of the fastest growing components of health expenditure, a trend that will likely be exacerbated when the genomics revolution is fully in force early in this century. Previous estimates of aging and health care costs do not carefully consider the role of pharmaceuticals as an agent of technological change or how their resulting benefits may change the profile of future outlays. Similarly, how publicly or privately financed insurance plans may deal with the additional expenditure burden created by the use of new drugs is never carefully modeled in estimates of future health care costs.

It is only recently that the rate of growth and level of health care outlays for pharmaceuticals have become an international concern. Adequate data on which to predict future pharmaceutical expenditures is scarce and there have been few empirical papers on the topic as a result. At the present time the best data and papers, to our knowledge, on pharmaceutical benefits at the patient level of aggregation come from the United States. Survey data on pharmaceutical use by patients or on FDA-type approvals overtime do not exist in Europe for example. Cross-national studies that use data from the OECD almost exclusively are restricted to “countries,” not persons in countries, as the unit of analysis.

In a series of recent studies, Lichtenberg (1996, 2001a, 2001b, 2002) attempts to estimate empirically the impacts of drugs on mortality, morbidity, overall health expenditures, as well as on hospital use and other types of medical care utilization. In particular, he focuses on the

question whether newer and more innovative drugs have greater benefits than those approved years ago. Corroborating his earlier studies using aggregate United States data (Lichtenberg 1996), recent analysis of survey data by Lichtenberg (2001a, 2001b, 2002) reinforce the finding that a great deal of the increase in life expectancy is due to new drugs, and that life expectancy has increased secularly with pharmaceutical innovation.

Lichtenberg's survey data are taken from a household survey, the 1996 MEPS (Medical Expenditure Panel Survey), a nationally representative sample of all non-institutionalized Americans. Household respondents total over 22,000 and the level of detail is impressive, including the person's medical condition, medical events, and interventions. The prescribed medicine file of events contains over 171,000 observations including the type of drug used and the amount and source of payment for each drug event used by each person. Lichtenberg merges information collected from the Food and Drug Administration (FDA) indicating the year in which the active ingredient comprising the drug was first approved. The year of approval indicates the "age" of the drug and is used to model whether aging drugs have less prominent positive impacts than newer ones. Overall, he finds that the "replacement of older by newer drugs results in a reduction in mortality, morbidity and total medical expenditures" (Lichtenberg 2001a, 2001b). Overall, of course, new drugs are more expensive than older drugs prescribed for the same medical condition. In the MEPS, a 15-year-old drug replaced by one roughly five years old increases the cost of a prescription drug by about \$18 on average. However, this is more than offset by a lesser frequency of dying, fewer work loss days and less hospital utilization, summing to a reduction in total health care expenditure of \$71. Lichtenberg (2001c) reports that the cost of new drugs for the elderly are three times as large as are the cost for the non-elderly, but the average level of other health care expenses saved by the elderly who use these new treatments are much higher as well. Therefore the effects for the elderly, a savings of about \$4 in other costs

for each \$1 spent on new drug treatments, are roughly of the same proportion as for the non-elderly. These costs reflect only savings in health care expenses and take no account of the effect on lifespan or quality of life amongst the elderly from new drugs.<sup>8.5</sup> Thus, they are a lower bound estimate of the total benefits of such drugs, and should be taken as illustrative at this point. Were these estimates to hold true for other nations, it seems evident that some “up front” expense for health care might produce benefits of increased quality and quantity of life, and perhaps even lower overall health care costs per life year amongst the old as well as the young.<sup>9</sup>

As newer drugs are discovered, particularly those using the technique of genomics, the increase in drug expenditures is likely to grow faster, but so will the benefits for both the young and the old. Whether and how much the rise in total health care costs might be slowed by the advent of new drugs, especially those beneficial to the elderly is an open question. And, how applicable Lichtenberg’s results are to the greater European and world context also is unknown. A clue that the benefits of drugs are likely similar, is found in Frech and Miller (1999). Frech and Miller conducted an extensive cross-national analysis of pharmaceutical consumption patterns and prices. Using 1996 OECD data, and making appropriate adjustments for purchasing power parity, they estimate the impact of pharmaceutical consumption on life expectancy and infant mortality and find positive impacts at age 60 in 21 countries. However, they are unable to estimate whether the affects of higher prices and drug consumption (which vary quite a bit across countries), are offset by the benefits when converted into dollars or some other common numeraire.

There should also be a word of caution amongst all of this good news. While substitution of newer drugs and newer treatments for older ones seems cost-effective, the expansion of treatments to larger populations of users may not always be cost effective. Cutler and McClellan (2001) point to several studies of more extensive treatment for breast cancer, which do not seem

to have led to cost effective use. Therefore with all new treatments and new drugs, policies that eliminate waste and which limit the adoption of treatments to those populations where they are cost effective are needed.

An analysis by Freund et al. (2000) of seven countries (United States, Canada, United Kingdom, Australia, Japan, New Zealand, and Germany) indicates that financing variables and methods for assessing the cost effectiveness of new drugs will affect future outlays, though in ways that are hard to estimate empirically across countries. Freund and her co-authors study the ways in which the private insurance system in the United States and the public systems in the other six nations use differing benefits structures and cost control mechanisms to arrest the growth in pharmaceutical expenditure. Though for differing reasons, all the countries now use some combination of formularies, negative lists (indicating which drugs are not reimbursable), co-payments and cost-benefits analysis. Future studies of aging and health care costs that hope to improve forecasts must begin to track all these variables in each national context and to estimate the benefits and costs of drugs and other treatments in a systematic way.

By far, the most important lesson to be learned here is that governments and policy analysts consider only the costs of new treatments and new drugs, and ignore the benefits. For instance, the current debate in the United States centers on the costs of adding a Medicare drug benefit for all, or only some lower income seniors. As the range and number of new and expensive drugs increase in the United States, these “up front” costs will increase even further. Whatever the costs, and assuming at least some tangible benefit, higher income elderly and their physicians will find a way to afford them. Lower income elders, without Medicare subsidies, will have a harder time affording these drugs. Thus, in every society facing these costs, decisions about what is to be made available to whom and at what cost will be on the public agenda for many years to come.

## **The Distribution of Costs**

There is also a downside to the United States experiences with elder health care and with new drug treatments. While the elderly on average spend high fractions of income on health care as seen in Figure 3 and in Table 2, these costs vary greatly amongst elder population subgroups. In the United States, where 80 percent of the elderly own their own houses, where durables purchased are infrequent, and food costs are low, spending 20 to 25 percent of the median or higher elder household's income on health care is not considered out of line, given the likely benefits which elders are receiving for this care. On the other hand, because insurance is only partial, and because public insurance programs for low income elderly are more parsimonious, then are those for workers and for retirees with additional subsidized coverage, there is also a great variance in expense and access to treatment across income groups and health groups (Institute of Medicine 2001).

Figure 4 suggests that out-of-pocket expenses will be particularly large among United States citizens who are older, more disabled, and who have less public support. In particular, the burden is high among low-income older women. What is interesting in this chart are two things. First of all, the variance across age, gender, and health groups (reflecting, in part, differential health status and access to additional health insurance in the United States) is large. Second, the fact that these burdens are so high among those least well off is a matter of public concern. In fact, recent studies show that delays in care, restricted access to medications, and lower quality of care among the elderly, are liable to reduce quality of life, increase disability, and lead to additional hospitalization and institutionalization (Soumerai et al. 1991, 1993, 1994, 1999). Thus, public policies, which limit coverage and quality of care, can have adverse effects on those not able to afford the full menu of health care treatments available to most United States elders. Still, we note that even where insurance and income are low; the elderly are willing to spend a

great deal of their incomes (and for many to also draw down their assets) for health care (see also McGarry and Schoeni, 2001).

This suggests that the public and private spheres need to work interactively to first put a floor beneath basic health insurance coverage, and second to decide which health care goods and services will be provided or subsidized by the public sector and which will have to be privately purchased. If policy is guided by making cost-effective treatments available to all who would benefit from them, and not only for those who can afford them, policy will be well served. The debate on Medicare prescription drug coverage in the United States today is largely about these decisions.

#### **IV. Summary and Conclusions**

Most analyses of the future health care costs of an aging society are entitled something like “The Fiscal Challenge of an Aging Industrial World” (England 2001). They point to the steep overall costs of aging for social retirement, acute and chronic health care costs. They speak of rationing, large intergenerational fiscal inequities, and the like. They conclude something like the following:

“In sum, it is important to recognize the expanding financial risks for governments that medical technology poses for aging populations. Demographic miscalculations have already taken a significant toll on welfare state finances. Continued increases in longevity, combined with intractably low birthrates, raise the danger that government old age benefit systems could collapse unless appropriate reforms are adopted in the near-term.” (England 2001: 3).

The major problem we find with these discussions is that they do not consider the benefits as well as the costs of health care improvements. And were they to examine the benefits more specifically, researchers and nations may rethink the way that health care treatments for the elderly are financed and provided. Clearly, rising incomes among the old, and the perceived (and

oftimes now substantiated) benefits of improved medical treatments and technologies, will improve both elder willingness and ability to pay for these treatments. More studies of the type undertaken by Lichtenberg (2001a, 2001b, 2002), Cutler and McClellan (2002) in the United States can help identify future net benefits and costs, not only for prescription drugs, but also for hip replacement, cardiac treatment, oncology, and other types of treatments.

As long as public health organizations can certify the likely benefits of these treatments, they should be made available to elder consumers. And as long as national health care agencies continue to push for cost-effective use of new technologies and drugs, the major issue in future health care costs among the aged will be “who should pay?” not “should these be available?”

We believe that future income security policy and health care policy should be integrated rather than treated separately. These policies should set limits on what is expected from public vs. private expense, due to competing budgetary needs and due to the rising ability of the elderly to pay for their own care. Society should protect the at-risk elders from both low incomes and high medical expense for equity sake, but then let non-poor elders spend their own money on additional treatments, drugs, and other medical services which directly improve their quality and quantity of life. After all, what better expenditure can these increasingly rich generations make?

## Endnotes

1. We do not discuss issues of long-term care, but rather limit this paper to acute care outlays alone. For a discussion of disability at older ages and long-term care services in a cross-national context, see Jacobzone (2000) and Jacobzone et al. (1998).
2. These figures can be made more stark by comparing elder expenses to even younger age groups (e.g., see Figure 1), but our objective is not to startle but to soberly assess. Similar ratios are found in Japan by Mayhew (2001)
3. More comparable charts for added countries should be a high research priority in OECD nations.
4. Victor Fuchs (1998) reports slightly higher figures for the United States where personal spending is roughly 50 percent of total acute care spending by the elderly.
5. Interestingly, Musgrove (1996) finds that while private medical expense is negatively related to GDP per capita, the decline in the private share from 1960 to 1980 has been stopped since 1980. Additional comparative studies on the private spending are also needed.
6. The United States evidence, as summarized by Spillman and Lubitz (2000:1415) is as follows: “If longevity increases because of reduced morbidity and mortality from diseases that are expensive to treat, then Medicare costs may be reduced. If longevity increases as the result of expensive treatments, Medicare costs may rise. The costs of both acute and long-term care increase with the level of disability. If increased longevity is accompanied by declines in rates of disability, as suggested by recent studies, then the effect of increased longevity on health care expenditures may be moderated.” Crimmins (2001) expresses similar sentiments.
7. United Kingdom expenditure figures refer to the two-week period during which expenses were observed and may therefore be biased downward.
8. Medicare, the primary insurance vehicle for the aged, covers hospital and physician care, but not prescription drugs or other treatments. Outlays for Medicare cover only about one-half of all elder acute care costs and are supplemented in three ways: for the poor elderly, via Medicaid which covers some drugs and almost all out-of-pocket Medicare-related expenses; many well-to-do elderly have (former) employer provided retiree insurance which covers Medicare and other costs; and finally, most middle income elderly buy expensive supplemental “medigap” coverage which pays some fraction of Medicare-related costs and other costs (see Smeeding and Sullivan 1998; Holden and Smeeding 1991).
- 8.5. A large part of the value of additional healthy life years can take the form of added productive work. For the already retired and for the very old, these gains are zero yet we

should also attribute some benefit, and therefore some willingness to pay for the added length and quality of life for the aged. Thus the reduction in other healthcare costs associated with newer treatments and newer drugs for the aged are a lower bound of the total benefits of these new treatments.

9. Because many new prescription drugs cost less in other nations compared to the United States, their benefits may be even larger. See also Frech and Miller (1999).

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**Table 1. Ratio of Per Capita Health Care Spending by Age**

<b>Age</b>	<b>Canada</b>	<b>United Kingdom</b>	<b>United States</b>
45-64	100	100	100
64-78	227	180	200
75-84	410	350	265
85+	750	600	450

Source: United Kingdom: Mayhew (2000, Table 2.1); Canada: Robson (2001, Figure 1); USA: Cutler and Meara (1991, Figure 1, Table 1).

**Table 2. Health Spending for the Elderly in Eight Countries, 1993-1995**

<b>Country</b>	<b>Percent of Total Health Spending on the Elderly</b>	<b>Ratio of Health Spending for Persons Age 65 and Older to Persons under Age 65</b>	<b>Estimated Percent of GDP Spent on Health Care for the Elderly</b>	<b>Elder Health Spending per Capita, 1997<sup>a</sup></b>	<b>Income Elasticity of Demand of Health Care, 1970-1998<sup>b</sup></b>
Australia (1994)	35	4.0	3.0	\$5,348	1.20
Canada (1994)	40	4.7	3.6	6,764	1.21
France (1993)	35	3.0	3.4	4,717	1.14
Germany (1994)	34	2.7	3.5	4,993	1.19
Japan (1995)	47	4.8	3.4	5,258	1.18
New Zealand (1994)	34	3.9	2.5	3,870	1.17
United Kingdom (1993)	43	3.9	2.8	3,612	1.20
United States (1995)	38	3.8	5.0	12,090	1.40

<sup>a</sup>United States dollars per elderly person

<sup>b</sup>Authors' calculations of sample income elasticity of health care expenses per capita compared to GDP per capita.

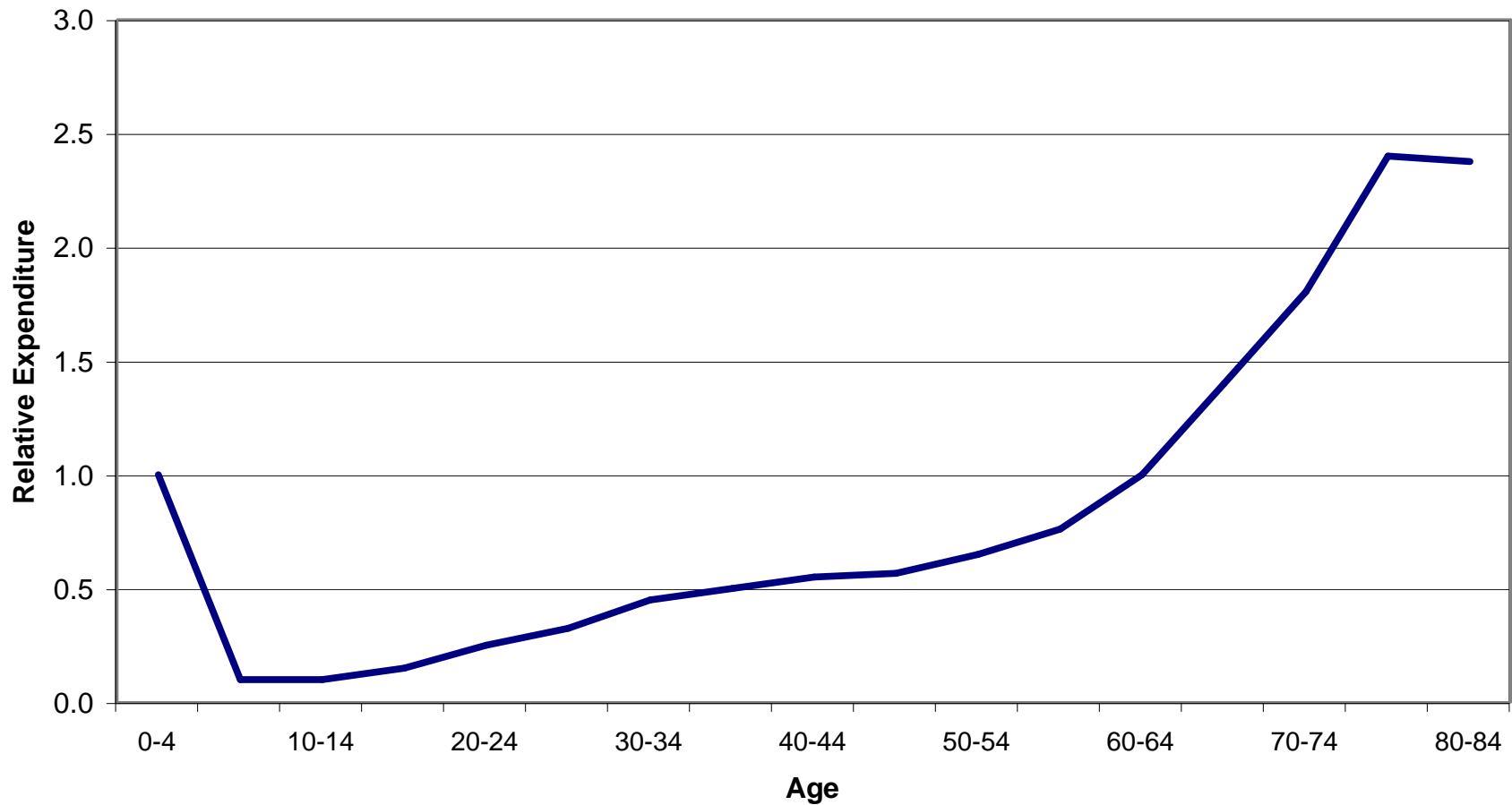
Sources: *OECD Health Data 1999* (Paris: Organization for Economic Cooperation and Development, 1999); and authors' calculations; Anderson and Hussey, 2000.

**Table 3. Out of Pocket Medical Expenses for Households with Such Expenses  
as a Percentage of Net Disposable Income in Four Nations in the Mid 1990s**

	<b>United States 1997</b>	<b>Canada 1994</b>	<b>United Kingdom 1995</b>	<b>France 1994</b>
<b>All Households</b>	<b>8.84</b>	<b>2.86</b>	<b>1.85</b>	<b>5.60</b>
Single Female	15.33	3.88	2.50	7.13
Single Male	9.30	3.38	1.87	2.84
Married Couple	10.99	3.27	1.68	6.44
<b>All Households Head &lt;65</b>	<b>7.24</b>	<b>2.69</b>	<b>1.86</b>	<b>5.17</b>
Single Female	7.94	3.91	2.90	5.42
Single Male	6.78	3.29	1.86	2.34
Married Couple	6.98	2.84	1.50	5.34
<b>All Households Head 65-74</b>	<b>16.25</b>	<b>3.81</b>	<b>1.54</b>	<b>7.45</b>
Single Female	20.08	3.66	1.63	7.72
Single Male	16.25	3.59	1.78	4.37
Married Couple	16.75	4.07	1.68	7.83
<b>All Households Head 75+</b>	<b>21.31</b>	<b>4.14</b>	<b>2.22</b>	<b>8.44</b>
Single Female	24.62	4.00	2.71	9.75
Single Male	20.48	4.16	2.04	4.74
Married Couple	21.38	4.45	2.57	8.49

Source: Luxembourg Income Study.

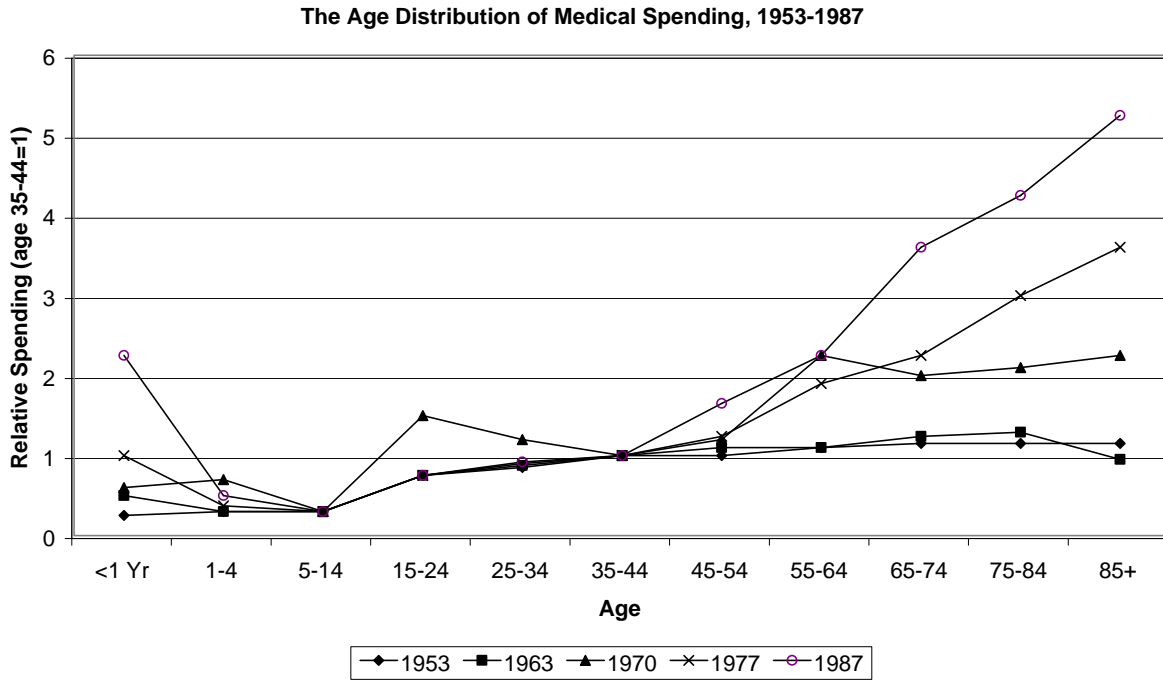
**Figure 1.**  
**Relative Health Care Expenditure by Age Group (age 0-4=1.0) in 1995 for**  
**More Developed Countries <sup>1</sup>**



Note: <sup>1</sup> More developed countries include the OECD nations plus Central and Eastern Europe (CEE).  
Source: Mayhew (2000, Figure 22, page 9).

**Figure 2. The Trend in Health Care Spending by Age**

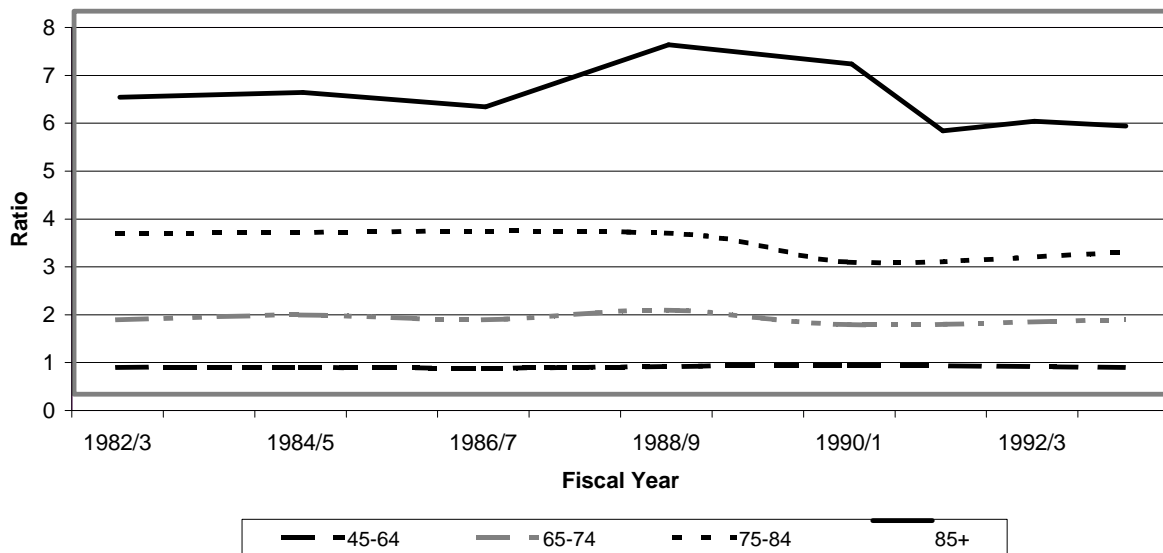
**Panel A. United States**



Note: 1953 age groups include: 0-5, 6-17, 16-24, 25-34, 35-54, 55-64, and 65+. Relative spending for 5-24 year olds was constructed assuming a uniform age distribution. Dashed lines in 1953 connect all age groups which were combined when calculating relative spending.  
 Source: Cutler and Meara (1999, Figure 1)

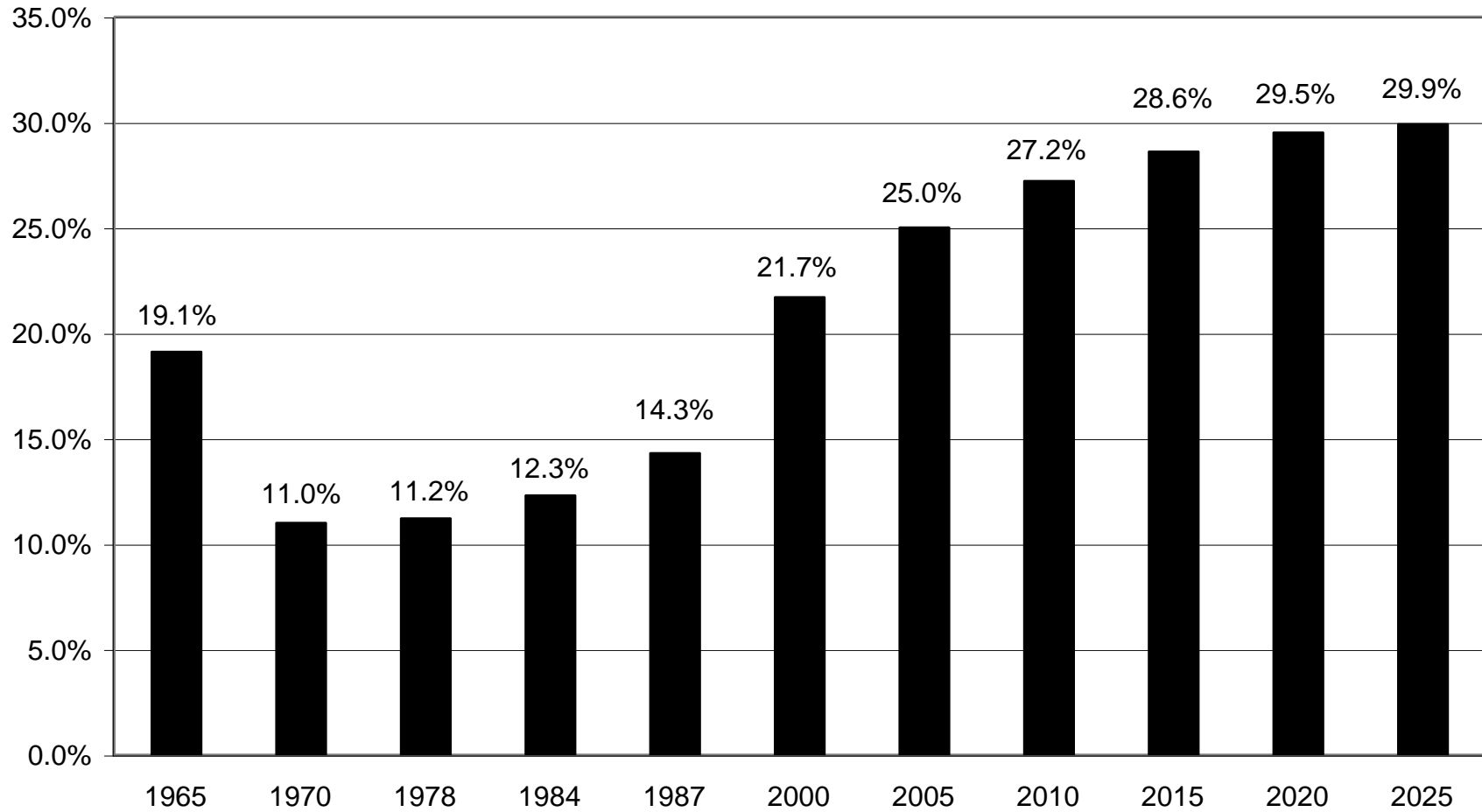
**Panel B. United Kingdom**

**Ratio of Per Capita Health Expenditure in Different Age Groups to Average Per Capita Health Expenditure Calculated Over All Age Groups, England and Wales, circa 1982 to 1992**



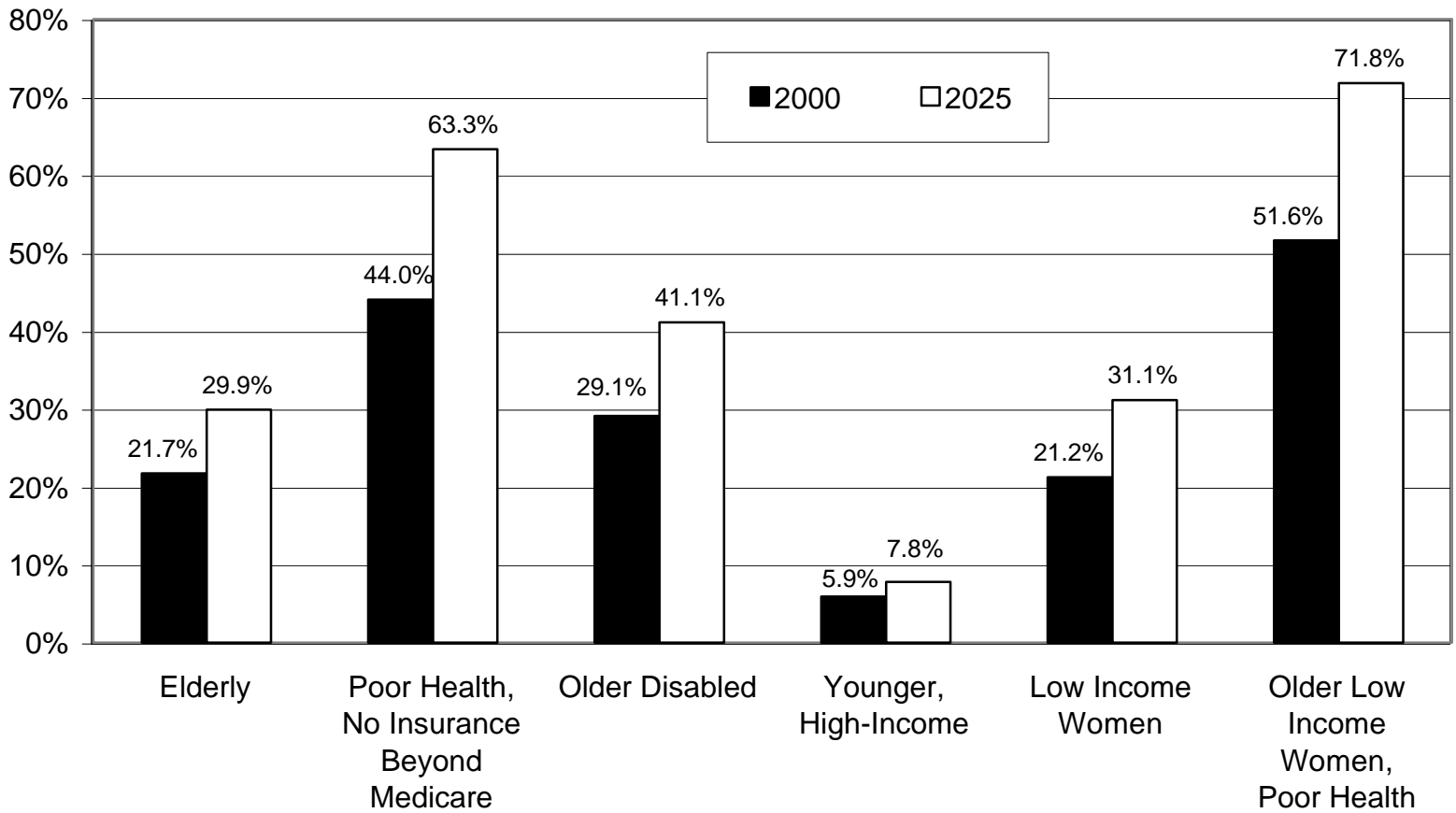
Source: UK Department of Health, personal correspondence as cited in Mayhew (2000, Figure 2, page 7).

**Figure 3.**  
**Acute Health Care Spending by Elderly as Share of Income;**  
**Actual and Projected Amounts**



Source: Authors' calculations from National Health Expenditure and Current Population Survey as in Moon (2000, Figure 1) and Maxwell, Moon and Segal (2000, Figure 12). Spending includes out of pocket costs for all health insurance premiums, copayments, deductibles, and all expenses on uncovered services.

**Figure 4.**  
**Projected Out-of-Pocket Spending as a Share of Income**  
**among U.S. Cohorts, 2000 and 2025**



Source: The Urban Institute's 1999 Medicare Projections Model; Maxwell, Morris and Segel (2000, Figure 13).

## Figure A

$$HC_t = \text{Sum}_{xn} [ HC_{xn} ( D_{xn} ) ]$$

Where:

$HC_t$  = Total health care costs in year t for all persons ( $\text{Sum}_n$ ) in all age categories ( $\text{Sum}_x$ )

$D_{xn}$  = Numbers of persons (n) in age category (x) in year t

$HC_{xn}$  = Total cost of health care per person (n) in age category (x) in year t

Notes:

- (1) Dividing through by  $GDP_t$  gives you health care costs as a fraction of GDP in any year (t), or say t + 20, etc.
- (2) Separating out the changes in  $D_{xn}$  and  $HC_{xn}$  allow you to say how much of changing health care costs are attributable to population aging (number of n's in each x) or age-specific health care costs (costs per person in age group x)
- (3) The assumption that one makes about changes in  $HC_t/GDP_t$  are also important, and most forecasters (analysts) assume the ratio is unitary—i.e. that health care costs will grow at the same rate as GDP in the future: despite much evidence that this is, was, and will not be true. In fact HC is likely to grow about 1 percentage point per year faster than GDP.
- (4)  $HC_t$  can also be separated into its component parts: e.g.: public sector insurance, private sector insurance, and direct out-of-pocket expenses.