Insurance And New Technology: From Hospital To Drugstore

The effect works both ways: Costly new technology stimulates coverage, while improved coverage stimulates costs.

by Patricia M. Danzon and Mark V. Pauly

ABSTRACT: This paper traces the relationship between insurance coverage and the technology-induced shift of the locus of medical care and medical spending from the inpatient to the outpatient setting. This shift was accompanied by an increase in the extent of private insurance coverage for outpatient treatments; technological change both caused the increase in coverage (for more costly treatments) and was affected by it (as lower user prices increased the demand for new types of care). Changes in insurance administration technology also facilitated the transformation. Some aspects of the change may have been inefficient, because of the presence of tax subsidy and legal requirements to cover costly new technologies of low effectiveness, but the transformation appears thus far to have worked better for private insurance than for Medicare.

One of the most substantial transformations in the U.S. health system has been the technology-driven shift of the locus of care and of spending from the inpatient sector to the outpatient sector. During 1980–1998 the reported share of total personal health expenditures attributed to hospital spending fell from 42 percent to 33 percent, while the share of outpatient spending rose; the share of outpatient drug spending alone rose from 5 percent to 8 percent (Exhibit 1). Even these data understate the shift away from inpatient care because they conceal the shift from inpatient to outpatient care within the hospital sector.

Many factors have contributed to this transformation. Our focus here is on the introduction and diffusion of technologies that improved the effectiveness of care delivered in outpatient settings relative to inpatient settings and its relationship to insurance. Whether laser eye surgery, oral antibiotics, or medications to treat ulcers or mental illness, these new technologies helped to empty inpatient beds. In this paper we focus primarily on outpatient pharmaceuti-
cals, but we also consider other outpatient care.

More than four of every five dollars spent on medical services over this period came from third-party payers—insurers, both public and private. For this reason, analysis of the relationship between the shift in the pattern of care and the form and level of insurance coverage is of considerable importance. Analysts commonly view the relationship between insurance coverage and “quality” of care as one of mutual causation.¹ In this paper we apply that approach to a specific and important aspect of recent technological change: the shift of activity to the outpatient sector, and especially to the use of outpatient prescription drugs. There are two broad questions to be addressed here. One considers changes in insurance as a cause of changes in care use: To what extent was this shift encouraged or facilitated by changes in the insurance system? The other question considers changes in the way care is provided as a cause of changes in insurance coverage: To what extent was the pattern of insurance coverage influenced by this shift?

Here we look at total “insurable” expenses—the types of services insurance usually covers—and then look separately at inpatient expenses, outpatient drug expenses, and other outpatient expenses. Because drug expenses represent an easily identified source of technological change, we pay special attention to them.

During the years we studied, growth in outpatient spending, especially drug spending, was accompanied (more than is customarily noted) by a very high rate of growth in aggregate insurance coverage for outpatient expenses. Drug spending grew as drug coverage grew. We suggest that this positive correlation reflects a two-way causal relationship: Increasingly generous insurance coverage caused increases in spending on both old and new products, but the discovery and development of beneficial but costly new products stimulated demand for insurance to cover those costs.

There was also a change in insurance technology itself—specifically, the application of managed care techniques to pharmacy benefits. In the case of drug coverage, with its multiple small claims, the payment/control systems developed by pharmaceutical benefit

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**EXHIBIT 1**

Health Spending, By Cost Share Category, Selected Years 1960–1998

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<tbody>
<tr>
<td>Hospital care</td>
<td>34.6%</td>
<td>38.3%</td>
<td>41.5%</td>
<td>36.7%</td>
<td>34.9%</td>
<td>34.6%</td>
<td>34.0%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Physician services</td>
<td>19.7%</td>
<td>18.6%</td>
<td>18.3%</td>
<td>20.9%</td>
<td>20.3%</td>
<td>20.1%</td>
<td>20.0%</td>
<td>20.0%</td>
</tr>
<tr>
<td>Prescription drugs</td>
<td>10.0%</td>
<td>7.5%</td>
<td>4.9%</td>
<td>5.4%</td>
<td>6.1%</td>
<td>6.6%</td>
<td>7.2%</td>
<td>7.9%</td>
</tr>
<tr>
<td>All other</td>
<td>35.7%</td>
<td>35.6%</td>
<td>35.3%</td>
<td>37.0%</td>
<td>38.7%</td>
<td>38.7%</td>
<td>38.8%</td>
<td>38.8%</td>
</tr>
</tbody>
</table>

management (PBM) firms were different in structure from and have had different effects than the traditional indemnity approach. We argue that the availability of this potentially less costly and more convenient insurance has contributed to the increase in number of persons with drug coverage, and possibly even to the increase in total drug spending.

One important policy question is whether this pattern of changes in technology, in coverage, and in spending represents an improvement on balance; an even more important question is whether the changes could have been (or could now be) made better. We explore both of these normative questions later in the paper.

**A Brief Description With Old And New Data**

Beginning in 1980, spending shares (Exhibit 1) and the rate of decline in out-of-pocket payments (Exhibit 2) increased for outpatient care (represented by physician and drug spending), relative to inpatient care and total medical care spending. In particular, the relatively large upsurge in growth of insurance coverage for drugs from 1980 to 1998 was strikingly associated with rates of growth in drug spending that were high relative to past trends and to growth of all other personal health spending components. This increase in coverage almost certainly stimulated the use of existing drugs and may have permitted the market to accommodate more costly but beneficial technologies.

To better understand how insurance coverage for drugs changed,

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**EXHIBIT 2**

**Out-Of-Pocket Spending And Real Spending Growth Rates For Prescription Drugs And Personal Health Care, Selected Years 1960–1998**

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Percent paid out of pocket</td>
<td>96.2%</td>
<td>82.4%</td>
<td>66.0%</td>
<td>48.3%</td>
<td>33.9%</td>
<td>31.6%</td>
<td>29.1%</td>
<td>26.6%</td>
</tr>
<tr>
<td>Average annual change in percent paid out of pocket (percentage points)</td>
<td>-a</td>
<td>-1.4</td>
<td>-1.6</td>
<td>-1.8</td>
<td>-2.9</td>
<td>-2.3</td>
<td>-2.5</td>
<td>-2.5</td>
</tr>
<tr>
<td>Average annual change in out-of-pocket payments</td>
<td>-a</td>
<td>-1.5%</td>
<td>-2.2%</td>
<td>-3.1%</td>
<td>-7.0%</td>
<td>-7.0%</td>
<td>-8.0%</td>
<td>-9.0%</td>
</tr>
<tr>
<td>Real annual growth rate in spending</td>
<td>-a</td>
<td>4.6%</td>
<td>1.1%</td>
<td>7.5%</td>
<td>7.4%</td>
<td>10.8%</td>
<td>11.8%</td>
<td>14.0%</td>
</tr>
</tbody>
</table>

**Total personal health spending**

| Percent paid out of pocket | 58.3% | 39.0% | 27.8% | 23.6% | 19.5% | 19.3% | 19.5% | 19.6% |
| Average annual change in out-of-pocket payments | -a | -4.0 | -3.4 | -1.6 | -3.8 | -1.0 | 1.0 | 1.0 |
| Real annual growth rate in spending | -a | 7.6% | 5.6% | 6.4% | 4.7% | 3.1% | 2.8% | 3.9% |


a Not applicable.
b Deflated by gross national product (GNP) implicit price deflator; continuous growth rates, relative to previous period.
we used data from the 1987 National Medical Expenditure Survey (NMES) and the 1996 Medical Expenditure Panel Survey (MEPS) to estimate changes over time in the number of persons with insurance of any type, the number of insured persons with expenses in each category, and the proportion of expenses (for everyone, for those with any insurance, and for those with insured expenses) in each category. We examine the population under age sixty-five who were not in Medicaid or other government programs; this is the population most likely to buy stand-alone private insurance.

From 1987 to 1996 both the proportion of persons in this population who incurred outpatient drug expenses and the proportion who had received drug insurance benefits grew (Exhibit 3). Since the proportion of the insured population under age sixty-five barely changed during this period, the clear implication is that the form of coverage changed in a way that paid more benefits for outpatient prescription drugs. There was little change in the proportion of the bill paid by insurance for those who had drug coverage. In contrast, the proportion of this population incurring inpatient expenses actually fell (data not shown). The proportion of inpatient expenses paid by insurance was also approximately constant (although at a very high level).

In short, insurance coverage for drugs did improve over this period, but the improvement was not in the breadth of coverage (percentage of expense paid) for those who used drug coverage, but rather in the proportion of people who had new drug coverage added to their previous coverage and used it. The newer forms of managed drug coverage generally required lower deductibles than

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**EXHIBIT 3**


<table>
<thead>
<tr>
<th></th>
<th>1987</th>
<th>1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>All persons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent with prescription drug expenses</td>
<td>56.2%</td>
<td>64.7%</td>
</tr>
<tr>
<td>Expenses per capita</td>
<td>$83</td>
<td>$244</td>
</tr>
<tr>
<td>Real expenses per capita</td>
<td>$107</td>
<td>$244</td>
</tr>
<tr>
<td>Benefits per capita</td>
<td>$36</td>
<td>$139</td>
</tr>
<tr>
<td>Ratio of benefits to expenses</td>
<td>43.9%</td>
<td>56.8%</td>
</tr>
<tr>
<td>Percent with insured expenses</td>
<td>27.5%</td>
<td>64.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Insured persons³</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Expenses per capita</td>
<td>$203</td>
<td>$438</td>
</tr>
<tr>
<td>Benefits per capita</td>
<td>$133</td>
<td>$282</td>
</tr>
<tr>
<td>Ratio of benefits to expenses</td>
<td>65.3%</td>
<td>64.2%</td>
</tr>
</tbody>
</table>

**SOURCES:** Data for 1987 are from the National Medical Expenditure Survey. Data for 1996 are from the Medical Expenditure Panel Survey.

³ Insured spending is greater than zero.
for traditional indemnity insurance; this could account for some increase in use of drugs by those with coverage. However, this is surely insufficient to account for the large growth in the percentage incurring insured expenses. We therefore conclude that most of the increase was caused by an increase in persons having drug benefits as part of their insurance coverage, not simply more frequent use by those who already had coverage.

**Shifts In Spending Composition**

One simple view would interpret this positive correlation between insurance coverage and outpatient drug spending as reflecting the familiar theory of moral hazard from insurance: People spend more when insurance or some other third party is paying. But that theory recognizes that at the end of the day, consumers must pay the bill, through higher insurance premiums. Similarly, in employment-based coverage, theory and evidence suggest that the level and structure of coverage reflect workers’ preferences. This perspective therefore forces the question back a step, to ask why an increase in insurance coverage that was going to have this effect would occur in the first place. We provide supporting evidence for the novel argument that the growth in insurance coverage was itself stimulated by growth in the range and effectiveness of drugs available, which raised the typical individual’s expected drug expense.

What expenses will people choose to insure against (given that they choose to buy some health insurance)? Let us ignore moral hazard for the moment. The theory of rational insurance purchasing suggests that when insurance has positive (net) administrative costs, the likelihood that an expense is covered depends on the size of that expense relative to its expected value (probability times amount of expense). Simply put, if I can buy full coverage of a high-probability moderate loss or a low-probability large loss for the same annual premium, and if the premium is proportional to the average insurance benefit, I should prefer coverage for the large, infrequent loss. The intuition is that the unpredictable loss that is large relative to my wealth hurts me more than the more frequent but more affordable smaller loss.

This theory explains why health insurance began by covering inpatient care. When health insurance was introduced in the first half of the twentieth century, large bills were much more likely to be generated by a hospital stay than by visits to the doctor or purchases of the (relatively few) effective drugs available at the time. (Of course, insurance was largely created by hospitals and doctors to provide the mutual benefit of permitting large bills to be paid, but the new product was attractive to consumers, regardless of its ori-
gin.) Coverage of outpatient drugs and physician office visits was absent or incomplete in early insurance policies because such expenses typically would not add up to enough expense to justify paying an insurance plan’s administrative costs. That outpatient services also display greater moral hazard than inpatient care probably also contributed to their incomplete coverage.

Beginning in the 1980s, several things changed. First, and most importantly for our story, technology changed to permit the offering of more effective but more costly outpatient drugs and procedures. Second, managed care plans developed new ways to control the worst moral hazard and to lower the cost of administering frequent small outpatient claims. For drugs, the techniques of managed pharmacy benefits include negotiating lower prices from manufacturers and lower dispensing fees from pharmacists, and using point-of-service card technologies that greatly reduce the time and hassle cost to the patient of obtaining reimbursement. One notable omission from the usual managed care reimbursement armamentarium was the use of capitation for drugs, although some plans did put physicians at risk for the cost of prescribed drugs.

We illustrate the growth in the level and form of drug expense by comparing the distribution of medical expenses between the NMES (1987) and the MEPS (1996) surveys. We begin by examining total “insurable” expenses in both periods. Average total expenses for the population under age sixty-five not covered by public insurance increased by 34 percent (about 4 percent per year) over this period (Exhibit 4). Total expenses remained highly skewed, with the top quartile spending 83 percent of the total in 1987; this measure fell slightly, to 80 percent, in 1996. A different picture emerges for drug spending: Expenses per capita rose 194 percent, and the proportion of spending in the top quartile rose from 64 percent to 71 percent. Other outpatient expenses fell somewhere in the middle. In short,

**EXHIBIT 4**

<table>
<thead>
<tr>
<th></th>
<th>Expenditures per capita</th>
<th>Ratio, 1996 to 1987</th>
<th>Percent of total spending for those in the top quartile of total spending</th>
</tr>
</thead>
<tbody>
<tr>
<td>All spending</td>
<td>$1,242</td>
<td>$1,688</td>
<td>1.34</td>
</tr>
<tr>
<td>All spending less drugs</td>
<td>1,159</td>
<td>1,424</td>
<td>1.23</td>
</tr>
<tr>
<td>Drug spending</td>
<td>83</td>
<td>244</td>
<td>2.94</td>
</tr>
<tr>
<td>Outpatient</td>
<td>422</td>
<td>708</td>
<td>1.68</td>
</tr>
<tr>
<td>Inpatient</td>
<td>553</td>
<td>473</td>
<td>0.86</td>
</tr>
</tbody>
</table>

**SOURCES:** Data for 1987 are from the National Medical Expenditure Survey. Data for 1996 are from the Medical Expenditure Panel Survey.
outpatient expenses increased rapidly on average—more rapidly than did other kinds of spending—and shifted toward persons who were high total spenders in other categories. These shifts clearly created incentives for consumers to purchase outpatient drug coverage. The slight decline in the proportion of inpatient expenses in the top quartile would not have been enough of a shift to provoke a change in the form of inpatient coverage. Persons with large hospital bills remained the most financially vulnerable. But both the (relative) increase in the average size of hospital spending and (especially) the shift of drug spending toward the sickest persons with the highest total spending would have made it more rational to have coverage for drugs.

**Insurance Effects On Expenditures**

The previous discussion assumed that the shift in drug and outpatient spending was exogenous, driven by patients’ demand for new and innovative technology (and possibly other reasons). But might not some of the increase and shift in spending be explained by the substantial changes in outpatient insurance coverage? To answer part of this question, we perform this counterfactual thought experiment for drug spending growth. We imagine that all of the influences on demand and spending occurred except for the growth of drug coverage. If drug coverage had held constant at its 1987 level, what would we expect to have happened to the growth in spending?

The key parameter for answering this question is a measure of the impact of the reduction of out-of-pocket cost or “user price” of a medical service on the quantity people use. This effect is usually measured as an “elasticity,” which answers the question: If the user price is reduced by some percentage amount, by what percentage amount does the quantity used increase? Estimates of this effect range from 0.3 to 0.5 for pharmaceuticals.¹ (For a change in price from one level to another, we generally calculate the percentage change as the change in price divided by the average, or “midpoint,” of the beginning and ending price. So, for example, if insurance reduced the price the user pays for a prescription from $50 to $30, that $20 decline would be described as a 50 percent price reduction, since \( \frac{20}{0.5(30 + 50)} = 0.5 \). The average percentage of each prescriptions cost not covered by insurance fell from approximately 54 percent in 1987 to 32 percent in 1996; using midpoints, this represents a 51 percent reduction in average user price. (The calculation: \( \frac{54 - 32}{0.5(54 + 32)} = 0.512 \).) The elasticity estimates suggest that had this decline not occurred, the quantity of drugs purchased (and therefore total spending, other things equal) would have been 15–25 percent lower than it actually was. (The calculation: using the lower
elasticity estimate of 0.3, the percentage change in quantity equals 0.3[0.51], or 15.3 percent; using the higher estimate of 0.5, it is 0.5[0.51], or 25.5 percent). Actual drug spending per capita (adjusted for economywide inflation) grew about 90 percent over this period; we therefore conclude that 17–28 percent ([0.15/0.90] to [0.25/0.90]) of that real spending growth was directly attributable to the growth in insurance coverage.

However, this calculation is probably an underestimate, for three reasons. First, it ignores the possibility that some of the introduction of new products or the development of new uses for existing products would not have occurred if drug coverage had remained at its 1987 level. Second, it ignores the possibility that coverage might have influenced the use of other demand-stimulating devices, such as increased drug advertising to physicians or directly to consumers. Finally, improvements in insurance technology that lowered the consumer’s time and “hassle” cost for obtaining an insured prescription drug probably also raised the quantity demanded.

Causation Revisited

Complexity arises in large part because cause and effect run in two directions. Growth in outpatient drug spending surely both was caused by more generous insurance coverage and created incentives for people to choose insurance that covered that spending. For an analysis to be useful in predicting future trends and informing policy, it must look to exogenous influences outside the insurance-expenditure system that arguably kicked off these changes.

- **Technologic change.** We have already noted a major role for technological change. On the one hand, discoveries in medical science fueled research and development on new and better products and services that were eventually brought to market. On the other hand, developments in information technology, especially the use of online real-time communications links, permitted changes in insurance technology that led to lower cost and to more rapid and more accurate processing of small claims, especially for outpatient pharmaceuticals. The provision of online integration of prescription filling, claims submission, and copayments at the pharmacy reduced administrative costs and improved customer convenience.

- **Rising tax rates.** Another, less obvious but possibly important, contributor was rising marginal tax rates, beginning with the tax changes in the George H.W. Bush administration, which lowered the net price of insurance arranged through employment. This applies to all medical services, so it cannot explain the growth in coverage of drugs relative to other services.

- **Prospective hospital payment.** Another factor that is endo-
genous to medical care but not to pharmaceuticals per se is the growth of prospective reimbursement for inpatient care. As is well known, this created strong incentives for hospitals to discharge patients as soon as possible, and use of pharmaceuticals made such practice patterns more feasible. Similarly, the shift to outpatient surgical procedures may have been facilitated in part by the availability of drugs to manage reactions or infections. In such cases, drugs substitute for inpatient care and complement other outpatient services, reinforcing the overall shift to the outpatient sector. In other cases, the development of less invasive surgical procedures also contributed. Moreover, many of the new drugs are not close substitutes for other medical services; rather, they permit outpatient treatment of conditions that would otherwise have gone untreated or been poorly treated by earlier medications.

**Growth of income.** One other exogenous influence is the growth in real income. (Of course, the accompanying growth of nominal income also pushed people into higher marginal tax brackets and intensified the tax subsidy.) In the United States, medical spending has grown faster than income over the longer term, although growth rates have been similar in the recent period of high prosperity. In either case, there is little doubt that rising income increases the demand for medical care in general, and probably for new technology in particular. The influence of rising income on the demand for insurance (in the absence of tax subsidy) is ambiguous: If my income rises, I am less threatened by a given above-average expenditure, but I am more able to “afford” insurance. However, it is almost certainly true that rising incomes weakened the demand for insurance that limits the choice and use of care through managed care–based devices such as requiring pretreatment approval or limiting the choice of providers. This may have contributed to the more common use of open rather than closed formularies for drugs. Regulatory restrictions on closed formularies and any-willing-provider legislation also may have contributed to the relatively generous form that managed pharmacy benefits have taken.

**Drug advertising.** The reduction of restrictions on direct-to-consumer (DTC) advertising is another factor; we address it in more depth elsewhere. The argument is that more extensive insurance coverage increased the effectiveness of DTC advertising because the insurance insulated consumers from the cost of the higher-price advertised products.

**Analyzing causal relationships.** Without attempting a conclusive categorization of causes as endogenous or exogenous—since that is ultimately a question of perspective—this general description of causal relationships suggests that both higher total spending...
and higher insurance coverage for beneficial outpatient services were stimulated by the development of financially burdensome outpatient care bills, improvements in the efficiency with which insurance can pay those bills, and greater tax advantages to insurance relative to out-of-pocket payment. The spread of insurance coverage then had a multiplying effect on spending (possibly including greater willingness of hospitals to discharge patients early or physicians to terminate visits promptly), and subsequent feedback of higher costs into the demand for insurance (by those able to afford insurance).

Evaluating The Changes

If our description of the process of spending change and insurance change is accepted, how do we evaluate it? Was it desirable, was it efficient (in the sense of adding more benefits than costs), and was it in the social interest? We approach these big questions by asking the following: (1) Are there aspects of these changes that are obviously inefficient or undesirable? (2) Are there seemingly desirable changes that have not yet occurred?

- Undesirable influences. Tax subsidy. On the first point, one conclusion is crystal clear: The tax subsidy inappropriately distorts coverage decisions, for drugs as for other medical services. It causes coverage to be too generous, managed care to be too lax, and spending to be too high. People are more willing to buy new products at high gross prices because the tax subsidy has induced them to purchase coverage with lower cost sharing; the same subsidy also reduces demand for managed care plans that limit drug spending or high administrative costs by shifting nonmonetary “hassle” costs to the insured persons. While we know the direction of the distortion here, we have no definitive estimates of how much spending or spending growth is inefficient. We have already noted that the spread of prescription drug coverage accounts for a large portion of the increase in spending, but we do not know how much less extensive coverage would be without the tax subsidy.

- Inability to limit coverage. Inefficiency would also occur if insurers were unable or unwilling to deny coverage for new technologies whose benefits, although positive, are less than costs. John Goddeeris has suggested that the spread of insurance coverage, in stimulating the demand for higher-quality or more-intensive care, may have contributed to the introduction of new technologies that cost more than they are worth. However, insurers—even otherwise passive indemnity insurers—clearly could restrict coverage, primarily for experimental procedures and some “lifestyle” prescription drugs. Their ability to exclude from coverage a high-cost and only mildly beneficial new technology that, on balance, generates more
cost than benefit may be limited by administrative costs, by lawsuits, by state regulation, and by the conundrum that most technologies are highly beneficial in at least some uses.

Multiple insurance sources. Another impediment to selective limits occurs when physicians treat patients who are covered by multiple insurers. Any single insurer may then find it difficult to enforce exclusion of a type of treatment that other insurers cover. This problem will remain as long as legal rules of customary care and perhaps general public perceptions continue to support the idea of a single standard of medically necessary or appropriate care, rather than explicitly recognizing that appropriate treatment may differ across patients, depending on their preferences and willingness to pay. Perhaps even more seriously, new technology that improves welfare if limited to a subset of beneficiaries may not be able to be so limited.

Other market failures. Other familiar causes of market failure may also come into play here. Buyer ignorance may assist the introduction of technologies that are not worth their cost. The process of determining the effectiveness and the cost of new technologies is research that itself has a public-good dimension. Also, the public subsidy of research through such institutions as the National Institutes of Health could be carried too far and lead to excessive development and use of new technology. (The implicit subsidy to private-sector development provided by taxpayer-subsidized research will be more likely to lead to excessive technology than to excessive average profits for firms that commercialize research, since there are no barriers to entry in using such research.)

If we take the level of patent protection as given, beyond the obvious undesirability of poorly targeted subsidies and excessive regulation, on balance there is as yet no real evidence of other undesirable insurance influences on the process of innovation. (There are always mistakes, discovered after the fact, that are held up as examples of “waste,” but such types of bad judgment and bad luck qualify as inefficiency only if we can reasonably have known beforehand that they would not work out well.)

Potential improvements. Coverage across services. Are there better ways for insurance to be configured in view of the changes in technology that have shifted the locus of care to the outpatient sector? The most fundamental message for optimal insurance design—whether indemnity or managed care—is that the historical U.S. practice of developing coverage on a service-by-service basis is generally undesirable. Other countries have similar problems: They may have developed broad coverage initially, but their administration is typically more “silo based” than is true in the United States. In contrast, insurance that protects consumers against financial loss
should make payments based on a person’s total medical care spending, not on the size of the components of that spending. Differences in moral hazard across services may call for differences in coinsurance, but even choosing these devices appropriately requires that the insurer for one service take account of cost offsets from insurance-induced use on claims for other services.

Has the private insurance market offered such coverage? To a considerable extent, it has for the private sector. Even traditional indemnity insurance—as much of it as remains—generally makes coverage (deductibles, stop-loss provisions) depend only on the total of all expenses over a given time period, rather than on the component parts. Because of differences in moral hazard, the ideal coinsurance rates may differ for inpatient compared with outpatient care, but by and large both deductibles and stop-loss provisions are determined by the total of all spending, regardless of site. With such an arrangement, the terms of the insurance policy do not need to be altered when technology shifts the preferred place or type of care.

Managed care coverage usually takes a more explicit, integrated view, with even the possibility of altering coverage, formularies, and copayments to take account of both the costliness of outpatient care and the possibility for encouraging care that generates cost offsets for inpatient or physician services. The administrative complexity of dealing with so many different illnesses, services, and products means that the coordination is not always finely tuned (although disease management aspires to that goal), but there surely is considerable effort in this direction. The main remaining design flaw in U.S. insurance coverage is in the Medicare program, which does not cover outpatient drugs. Instead, most people obtain supplemental private coverage for drugs, either through an employer-paid post-retirement benefit or individually in the Medigap market.

Combating adverse selection. The other source of problems is adverse selection, which occurs to some extent in the under-sixty-five markets but which is most severe with Medicare. One way to reduce the likelihood of adverse selection is to offer only “bundled” policies, so that people who expect to be high users of some particular drug or medical service cannot select policies with especially generous coverage for just those products and services. If they were permitted to do so, insurers’ costs and premiums would be pushed up, thus driving away lower risks.

Adverse selection for drug coverage is made even more severe because of the higher persistence of above-average use for drug coverage compared with other kinds of coverage. Recent research indicates that more people remain unusually high spenders for drugs than for other typically insured medical care. If insurers are not able
or permitted to adjust premiums for the chronic conditions associated with these higher rates of drug use (as Medigap insurers often are not), adverse selection is the predictable outcome. Combining drug coverage with other coverage may be one solution to this problem; requiring people to precommit to coverage with guaranteed renewability may be another. The solution is not guaranteed, since adverse selection in one component of total benefits, if large enough, could also lead to a death spiral or severe problems for all-inclusive coverage. But as long as the coverage experiencing severe adverse selection remains a relatively small fraction of the total, overall selection problems can be reduced by bundling the coverage.\(^9\)

**Effect on technology use.** If these problems were solved, what would happen to technology? The most obvious answer is that a solution would improve the welfare of the elderly by protecting them against shocks to their budgets associated with the onset of a condition whose best treatment is expensive drugs. Some cost containment features might be permitted by greater coordination (especially in a managed care setting), but the outcome may well be that drug spending would increase still further. But if beneficiaries’ welfare would increase by more than the value of the spending, we should here (as elsewhere) be happy rather than upset about new technology and “inflation.”

Beyond Medigap and the tax subsidy, are there other correctable problems in insurance coverage of new technologies in outpatient care and drugs? We have already mentioned the problem of “spillover effects” when multiple insurers offer different products. This fragmentation of coverage may inhibit the development of both useful care management techniques and useful evaluative information about care management, quality, and new technology.\(^{10}\) The solution to this problem has already been discovered: the closed-panel health maintenance organization (HMO) whose providers receive the bulk of their patients from a single plan. But that solution has consumer acceptance problems of its own.

**Concluding Comments**

The significant shift of the place where medical resources are consumed from the inpatient to the outpatient setting has been matched—to a degree that is surprising in a “nonsystem”—by a corresponding shift in insurance coverage. As rates of use of outpatient care and spending per capita grew, so did insurance coverage. Had insurance coverage for outpatient care been frozen over the past decade or so, spending in that sector would have been lower by significant amounts; drug spending growth alone would have been reduced by about one-quarter.
However, we suggest that such restraint might well have been false economy, both because the growth in spending for new products or new uses for existing products provided valued health benefits, and because risk-averse persons gained from having insurance cover types of care that are generating larger bills, even if the insurance contributes in part to those costs. There are worse things than growth in medical spending, and some measures that would surely slow the growth in spending may do more harm than good.

We conclude, therefore, that recent experience provides an excellent example of the process of mutual interaction between insurance coverage and new technology that economists have frequently discussed: Costly but beneficial new technology stimulated insurance coverage, while new insurance coverage stimulated costs (and probably new technology as well). Are there then reasons to be concerned about the results of this process? Our investigation of this question rounds up the usual suspects. The tax subsidy to employment-based insurance pushes people who are not poor to have too much insurance and promotes insurance that is too lax in limiting the rate of introduction and use of technologies that do some good at a high cost. Legislative or legal restrictions force people to take insurance that covers such things, even if they prefer to leave them out, to hold premiums down.

Beyond these two perennial influences, we found a few clues about additional causes but no smoking guns. The organizational separation of insurance coverage into inpatient and outpatient services (and especially into drug and nondrug coverage) seems likely to cause problems. The harm from having one insurer cover inpatient care and another cover drugs is likely to be especially acute for Medicare. The role of publicly funded research is probably important as well, especially in the long run, but is difficult to evaluate.

The private sector has responded to shifts in technology with new insurance products and new insurance technologies. Thus far, the public sector has lagged behind. Beyond these qualitative evaluations, the absence of tools, techniques, and information for direct measurement of costs and benefits makes drawing definitive conclusions difficult. However, the availability of choices in competitive private insurance markets leads us to expect that actual decisions about new technology and new insurance will work out reasonably well. If some technology has benefits that are so small relative to its
cost that consumers are better off without it (or better off without insurance coverage of it), private insurers will offer policies that leave it out. There are administrative costs to making such exceptions, but that simply means that the harm done will have to be greater than the administrative cost of preventing it, a situation that does not seem to present a very high bar.

There are no obvious existing technologies that appear to do more harm than good, and there are no obvious candidates for technologies that ought to be offered in the market but are not. Transparency is probably the most important thing for policy to offer—people should know what their insurance covers (or does not) and why. This is as important for public insurance, such as Medicare, as it is for private insurance.

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NOTES

5. Danzon and Pauly, “Health Insurance.”
8. MEDSTAT data show that of the insureds who were in the top quartile of drug spending in 1994, 76 percent were still in the top quartile in 1995, 69 percent in 1996, 63 percent in 1997, and 60 percent in 1998. For those who were in the top quartile of inpatient and outpatient spending in 1994, only 47 percent were still in the top quartile in 1995, 43 percent in 1996, 42 percent in 1997, and 40 percent in 1998. Authors’ tabulation of unpublished MEDSTAT claims data.