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POORER, SICKER STATES FACE HEAVIER DRUG COST BURDENS

Rising Burdens Mean Pressure for Action Likely to Grow

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SUMMARY

The share of U.S. personal income consumed by prescription drug costs grew from 1.2 percent in 1998 to 1.8 percent in 2002—rising by one-half in just four years.

The burden of drug costs as a share of income varies enormously among states, from 3.1 percent in Tennessee to 1.3 percent in California. Examining these differences, we found drug cost burdens generally heaviest in poorer, sicker, older states, and where more people are uninsured. The gap between high- and low-burden states has grown.

We found that the strongest determinant of a state's drug cost burden is the number of prescriptions used per person, followed by average income, then average drug price.

In the dozen highest-burden states in 2002, drug costs averaged 2.5 percent of income, nearly twice the 1.4 percent in the 12 lowest-burden states. Burdens were greatest in Tennessee, West Virginia, Kentucky, Louisiana and Mississippi. Others in the top dozen were Missouri, Alabama, Arkansas, North Dakota, Oklahoma, Florida and Michigan.

With today's drug cost burdens, higher spending is not sustainable. Yet 70 million Americans lack drug coverage and millions more are under-insured. High U.S. prices keep coverage unaffordable and mean that many Americans go without needed drugs.

While drug costs are increasingly insupportable everywhere, a crisis is emerging first in states with heavier drug cost burdens, and where burdens recently rose sharply. These states appear likeliest (other things equal) to act politically to reduce drug prices. Note that Maine in 2000 and West Virginia this year were suffering especially high drug cost burdens when they enacted their ground-breaking laws to cut prices.

Cutting drug prices is the only practical way to lower drug cost burdens and expand use of needed drugs. Relying on cuts in use is not desirable or practical. Higher drug use by people in high-burden states is warranted because they are sicker—with more diabetes and heart disease, for example, as documented in this report. Further, where so many people are poor and uninsured, much illness goes untreated. (Lack of access to needed care may also contribute to the low use rates in California and elsewhere.) So slashing use would be clinical folly. It is financial folly as well, since making more pills costs remarkably little.

Price cuts would allow far more prescriptions to be filled. Because higher volumes can restore revenue lost as prices fall, drug makers are wrong to insist that price cuts will harm research. Drug makers' profits and research can be protected—while we buy all needed medications for all Americans, or for everyone in a state, at affordable prices.

With federal aid to help relieve high-burden states, such reforms can win affordable drugs for all while bolstering research. It is financially unaffordable and politically impossible to allow the drug cost burden to continue to soar. It is time to win a victory for competence and compassion.

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I. INTRODUCTION

The West Virginia House of Delegates recently shocked drug industry and other observers when it unanimously passed legislation to tie prescription drug prices in the state to the low prices obtained by several federal agencies. A compromise law enacted in March 2004 created a council to design such a pricing mechanism, subject to a simple up-or-down legislative vote before the November 2004 election.¹

Many states' legislators worry about how to make prescription drugs more affordable to residents. Very few have approved action as bold as the West Virginia measure.

Why West Virginia? Several traits may have spurred action. *West Virginia residents face a particularly heavy burden of prescription drug costs*—with low incomes but high drug spending per person. Maine, which enacted a ground-breaking drug pricing law in 2000, also had an especially heavy drug cost burden. Leadership counts, too: in both states, strong elected leaders sparked and sustained action.

By drug cost burden, we mean a state's prescription drug spending divided by personal income—the share of income going to prescription drugs. Drug spending, in turn, is a product of the number of prescriptions and price per prescription.

This report documents the nationwide rise in the burden of drug costs as a share of personal income—and the striking differences in that burden among the states.² Focusing on burden means considering not only the level of drug spending in a state, but also the state's capacity to absorb it. States facing the highest drug cost burdens will feel the most urgent political need to act to reduce the burden, other things equal. So will states suffering greater increases in the burden of drug costs.

We also examine characteristics of states that are associated with higher drug cost burdens. We find that these tend to be poorer, older states, with higher illness rates.

Drug makers might challenge the term “burden.” They say people should be willing to pay a lot because drugs save lives and money. But with other medical costs soaring, savings claims are questionable. And drugs' rising share of income clearly strains family, employer, and government budgets. High burdens surely bar many Americans from getting needed drugs. We say it's good to get needed drugs, but better to pay lower prices. High prices undermine both research and widespread use of needed drugs, we show elsewhere.³ Cutting prices opens the way to solutions.

This report has five main sections. Section II explains why the growing drug cost burdens nationwide, and especially in high-burden states, are likely to exert growing political pressure. Section III explains differences in burden across the 50 states. Section IV identifies states with high recent increases in drug cost burdens. Section V presents selected conclusions. Appendices offer state-level data and address such matters as defining drug cost burden, more detailed regression results to explain the inter-state difference in burden, and predictors of use rates and prices.

II. THE GROWING DRUG COST BURDEN—FAR HEAVIER IN SOME STATES THAN OTHERS—CAN BE EXPECTED TO SPUR STATE ACTION

The burden of drug costs on income has grown enormously over time and varies enormously from state to state.

The prescription drug cost burden in the United States has risen quickly since 1980, and at an accelerating pace. Over most of the 1980s and 1990s, spending on prescription drugs as a share of income rose steadily.⁴ As shown in Exhibit 1, drug spending was just 0.5 percent of personal income in 1980, but consumed 1.2 percent of income in 1998. The nation's drug cost burden then jumped by about one-half in just four years, to 1.8 percent in 2002.⁵

Exhibit 1

U.S. Prescription Drug Cost Burden, 1980 - 2002

Year	Prescription drug share of personal income
1980	0.5%
1990	0.8
1998	1.2
2002	1.8

Just as important, states vary greatly in the prescription drug cost burdens they carry. (Exhibit 2, on a later page, presents estimates of the burden for each state in 2002, and Exhibit 3 displays graphically the great variation from state to state.)

Some states' governments have aggressively sought or demanded lower prescription drug prices to ease this soaring burden. Other states have been far slower to act.

Three factors help to explain this difference in state action. Observers seeking to understand this variation have sometimes pointed to proximity to Canada or Mexico, or to a state's general political outlook. The stark importance of states' differing drug cost burdens—drug costs as a share of personal income—has been largely ignored.

A. Proximity

Personal awareness of lower prices in Canada or Mexico appears to have spurred people living on their borders to urge their state governments to act. For example,

state and local elected officials, members of Congress, and citizens from Illinois, Maine, Michigan, Minnesota, North Dakota, New Hampshire, and Vermont have been prominent in recent years' efforts to facilitate prescription drug importing. Some of those states' citizens and officials have also been among the most active in efforts to seek lower domestic prices, in their state or nationwide.

In 2000, when Maine passed a ground-breaking law to cut prescription drug prices, observers often noted that residents and legislators knew well of the lower prices in Canada, on its border. Indeed, the first version passed by the legislature aimed to base Maine's prices on those in Canada.⁶

But since ten states border Canada, and others are very close, why was Maine the first to take strong legislative action on drug prices? It is probably no coincidence that Maine had the highest drug cost burden of any border state in 1998.

We believe, though, that proximity to a border will become steadily less important as a predictor of state governments' or federal legislators' efforts to lower drug prices.

In a sense, all Americans live on the border now. When television's *60 Minutes* accompanied Maine seniors on a 1999 prescription drug-buying bus trip to Canada, the rest of the nation began to hear more about the lower prices available north of the border. After five years of debates over importing drugs from Canada and other nations, rapidly growing volumes of imports, and the advent of imports using the internet, more and more Americans have become aware of the price gap between drugs sold here and in other wealthy nations. To paraphrase: "How you gonna keep 'em down on the pharm after they've seen Winnipeg?"

B. Politics

The political environment contributes much to inter-state differences in action to limit drug prices. Some analyses of Maine's efforts highlighted active organizing by labor and seniors' groups, plus campaign finance reform that freed Maine legislators from concern about garnering contributions. (Unions also led a recent coalition in Ohio seeking a ballot question on drug price cuts which pushed the industry to launch a massive opposition effort.)⁷ The innovative efforts to reduce drug prices in both Maine and West Virginia also benefited from the political leadership of far-thinking, decisive, and competent men and women, inside and outside of government.

As drug costs grow, and over 70 million Americans remain without drug coverage,⁸ each state faces a stark political choice: let citizens suffer and die for lack of needed medications; struggle to pay more; or reform.

The politics of drug pricing reforms will continue to be shaped in part by states' traditions of caring for vulnerable citizens, by the extent of influence of the drug makers, the presence of thoughtful and energetic leaders, and more.

At the same time, we believe that political pressure to lower prices will grow in many states, partly in response to rising awareness that drug makers charge far less in other wealthy nations and partly in response to the rising burdens in each state.

C. The varying burden of drug costs across states

Below the surface of proximity and politics is straightforward economics. As the U.S. drug cost burden grows, the need to act to contain drug costs is increasingly urgent.

In the past, some states with high drug cost burdens have been likelier to seek lower drug prices through state action. In the late 1990s, for example, Maine ranked ninth highest of the states in share of personal income going to prescription drugs. As just noted, that burden was higher in Maine than in any other border state.⁹ And West Virginia now ranks second in drug cost burden.

We suggest that, as proximity becomes less important, and as pressure to lower drug prices becomes a more widely diffused political issue, drug cost burdens will be more and more important in identifying which states are likely to act politically to lower drug costs and prices.

Much past discussion of the pressure for action to make medications affordable has focused on seniors, with their greater need for prescription drugs. Indeed, West Virginia and Maine are two of the three oldest states (in share of population over 65). But seniors' share of a state's population alone is inadequate as a gauge of need. To assess the gravity of the drug affordability problem in a state, a measure of income—ability to address the need—is essential.

Estimates of burden for 2002 are given in Exhibit 2, on the next page.¹⁰ States are ranked by burden and listed alphabetically. Exhibit 3 illustrates these in a bar graph.

The burden on states does vary widely. At the extremes, drug costs pose two and one-half times the burden for the people of Tennessee that they pose in California (consuming 3.1 percent versus 1.3 percent of income). In the quarter of states (12 states) with the highest 2002 burden, drug costs averaged 2.5 percent of personal income—nearly twice the 1.4 percent average for the 12 lowest-burden states.

Further, the gap between states may well be expanding. While the nation's drug cost burden overall rose by one-half between 1998 and 2002, as noted earlier, we find that the gap between high- and low-burden states grew even faster.¹¹

Exhibit 3A maps the ranked state burdens for 2002, roughly grouped into quarters.

It is noteworthy that drug cost burdens in 2002 were greatest in southern states. It is also vital to note—at the other extreme—that very *low* burdens in California or other states may signal problems of under-use and lack of access to needed care.

Exhibit 2: THE 50 STATES' DRUG SPENDING AS SHARE OF PERSONAL INCOME

Drug cost burden in 2002	Rx \$ as % of Income	State Rank
Ranked:		
Tennessee	3.1%	1
West Virginia	3.0%	2
Kentucky	2.8%	3
Louisiana	2.6%	4
Mississippi	2.5%	5
Missouri	2.4%	6
Alabama	2.4%	7
Arkansas	2.4%	8
North Dakota	2.3%	9
Oklahoma	2.2%	10
Florida	2.2%	11
Michigan	2.2%	12
South Carolina	2.2%	13
North Carolina	2.2%	14
Nebraska	2.2%	15
Rhode Island	2.2%	16
Pennsylvania	2.1%	17
Iowa	2.1%	18
Kansas	2.1%	19
Maine	2.0%	20
Wisconsin	2.0%	21
Indiana	2.0%	22
Utah	2.0%	23
Montana	2.0%	24
Ohio	1.9%	25
New York	1.9%	26
Delaware	1.9%	27
South Dakota	1.9%	28
U.S. AVERAGE	1.87%	
Georgia	1.8%	29
Texas	1.8%	30
Idaho	1.8%	31
Minnesota	1.8%	32
Vermont	1.8%	33
Arizona	1.7%	34
New Mexico	1.7%	35
New Jersey	1.7%	36
Illinois	1.7%	37
Oregon	1.6%	38
Massachusetts	1.6%	39
Maryland	1.6%	40
Virginia	1.5%	41
Connecticut	1.5%	42
Washington	1.5%	43
Nevada	1.5%	44
New Hampshire	1.4%	45
Wyoming	1.4%	46
Hawaii	1.4%	47
Alaska	1.3%	48
Colorado	1.3%	49
California	1.3%	50

	Rx \$ as % of Income	State Rank
Alphabetical:		
United States ¹²	1.87%	
Alabama	2.4%	7
Alaska	1.3%	48
Arizona	1.7%	34
Arkansas	2.4%	8
California	1.3%	50
Colorado	1.3%	49
Connecticut	1.5%	42
Delaware	1.9%	27
Florida	2.2%	11
Georgia	1.8%	29
Hawaii	1.4%	47
Idaho	1.8%	31
Illinois	1.7%	37
Indiana	2.0%	22
Iowa	2.1%	18
Kansas	2.1%	19
Kentucky	2.8%	3
Louisiana	2.6%	4
Maine	2.0%	20
Maryland	1.6%	40
Massachusetts	1.6%	39
Michigan	2.2%	12
Minnesota	1.8%	32
Mississippi	2.5%	5
Missouri	2.4%	6
Montana	2.0%	24
Nebraska	2.2%	15
Nevada	1.5%	44
New Hampshire	1.4%	45
New Jersey	1.7%	36
New Mexico	1.7%	35
New York	1.9%	26
North Carolina	2.2%	14
North Dakota	2.3%	9
Ohio	1.9%	25
Oklahoma	2.2%	10
Oregon	1.6%	38
Pennsylvania	2.1%	17
Rhode Island	2.2%	16
South Carolina	2.2%	13
South Dakota	1.9%	28
Tennessee	3.1%	1
Texas	1.8%	30
Utah	2.0%	23
Vermont	1.8%	33
Virginia	1.5%	41
Washington	1.5%	43
West Virginia	3.0%	2
Wisconsin	2.0%	21
Wyoming	1.4%	46

Exhibit 3 - Prescription Drug Cost Burden by State: Spending as Percentage of Personal Income, 2002

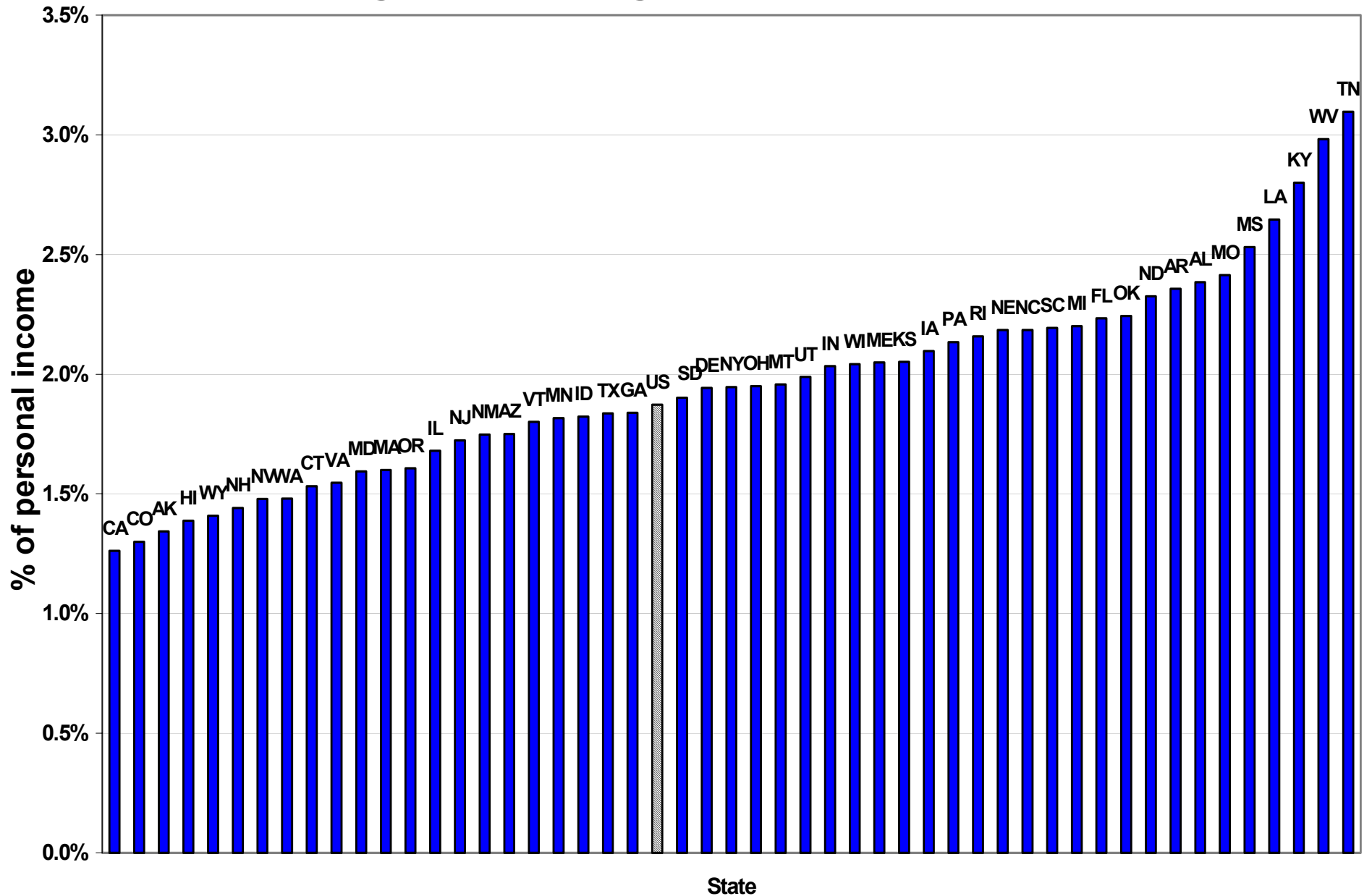
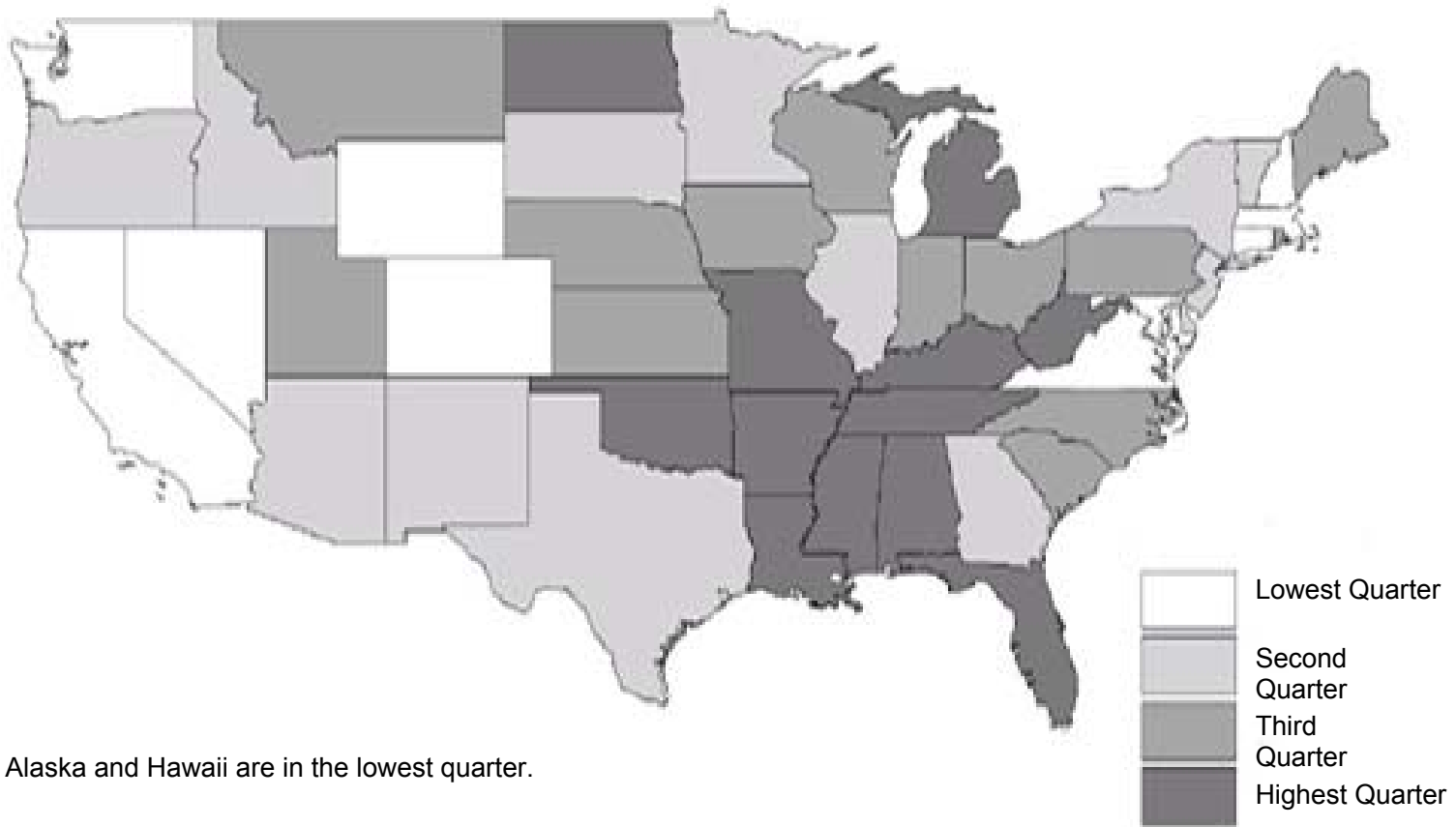


Exhibit 3A
Prescription Drug Cost Burden:
States Grouped in Quarters



III. EXPLAINING DIFFERENCES IN STATES' DRUG COST BURDENS

Variation in drug cost burden among states is very considerable, as shown in Exhibits 2 and 3.

By definition, reflecting simple arithmetic, each state's drug cost burden depends on only three components: the average annual number of prescriptions per person (use rate), the average price per prescription, and the average income per person.

These three factors vary across the 50 states to very different degrees:

- The number of prescriptions per person varies the most,
- followed by average income per person, and
- then by average price per prescription.

Specifically, we find that the number of prescriptions filled per person per year varies twice as much among the states as does price.

Appendix 2 details evidence on the amount of variation—the spread or dispersal across the states—of the values on these and other factors.

Number of prescriptions per person multiplied by average price per prescription equals average spending per person, which itself varies widely among states.¹³

Given the possible importance of drug cost burdens in predicting state action to lower drug prices, it would be helpful to understand which factors explain the wide variations among the states in the burden of their prescription drug costs on citizens' incomes. We do this first by examining the three arithmetic components of drug cost burdens and second by examining underlying factors.

The value and rank on these three components for each of the 50 states, and their ranks on drug cost burden, are shown in Exhibit 8, in Appendix 3. To rank first is to carry the heaviest burden of any state, or have the highest use rate, highest average price, or lowest average income.

A. Analyzing the three components of drug cost burden

To explain drug cost burden variations among states, we first considered the relative importance of the three components of any state's drug cost burden: average number of prescriptions per person (use rate), average price per prescription, and average income per person.

A multiple regression analysis (detailed in Appendix 4) found that:

- The strongest predictor of variation among the states in drug cost burden is the average number of prescriptions per person filled in the year.

- Income per person is second strongest.
 - Third was price per prescription.
- (By definition, these three factors fully account for the inter-state variation in burden.)

It is not surprising that these three rank as predictors in the same order as their variability (as discussed earlier and in Appendix 2). Characteristics that vary little across the states are unlikely to explain variations in the drug cost burden, which itself varies fairly substantially. Because use rates varied twice as much as prices did in 2002, the differences in use inevitably explain far more of the inter-state variation in burden than prices can explain.

B. Analyzing illness, insurance coverage, physician availability, and age

Second, we considered the relative importance of a host of background factors that might explain variations in drug cost burden across the states. These included measures of age and health care system characteristics, along with a few readily-available measures of health status.¹⁴ *This regression analysis excluded the three factors considered in the first analysis.*

The second multiple regression analysis (excluding use, income, and price) identified five predictors of a high prescription drug cost burden in a state:

- The strongest predictor of a high burden was a measure of ill health—a higher rate of adult diabetes.¹⁵
- This was followed by fewer physicians per capita,¹⁶
- higher uninsured shares of the population,¹⁷
- higher death rates from heart disease,¹⁸ and
- greater shares of the population over age 65.¹⁹

Together, these five factors explained 48 percent of variation in states' burdens. National discussion of unaffordable drugs has focused on seniors. We find seniors' share of a state's population to be a predictor of burden, but not the strongest.

Three of these five factors indicate higher burdens where people are sicker and older, consistent with the earlier finding that higher use is the strongest driver of high burdens. This analysis also highlights states with fewer doctors and fewer people insured. These five factors point to high burdens arising in states with serious health and economic problems, where high use is understandable—and many people may still not receive needed drugs. So to lower their burden will require lowering prices.

In Appendices 5 and 6, we present analyses of the predictors of use rate and of average price per prescription. (For readers interested in specific states, Appendix 5 shows how each state compares to the U.S. average on several of these predictors.)

We now look at characteristics of states with the highest and lowest burdens.

C. Comparing states with the highest and lowest burdens

Exhibit 4, on the next page, compares the dozen states with the highest prescription drug cost burdens with the dozen states experiencing the lowest burdens.

While we distinguish the highest- and lowest-burden states, it is important to note that prescription drugs are increasingly unaffordable in all states. Many people in low-burden states still suffer crushing medication costs. Governments even in low-burden states may well decide that public action to reduce drug prices is vital.

In Exhibit 4, the averages of the highest- and lowest-burden quarters of states are compared on 14 characteristics. These comparisons start with drug cost burden and its components (income, drug spending, use rate, and average price per prescription). The exhibit then examines other characteristics that may underlie some of those components, including population age, sample measures of health status, and physician supply. The last column of the exhibit shows the probability of finding the difference between the high- and low-burden states by chance. The exhibit also displays the averages on these characteristics for all 50 states.²⁰

Generally, the states with the highest prescription drug cost burdens were poorer, sicker, and older. The low-burden states had higher average incomes, and younger and healthier populations.

- Citizens of states with the highest drug cost burdens filled substantially more prescriptions per person, but they paid slightly lower prices.
- The highest-burden states had 2002 incomes well below the incomes in the lowest-burden states.
- States with the highest 2002 burdens faced greater increases between 1998 and 2002, with drug costs rising from 1.6 to 2.5 percent of income (up over fifty-six percent). In states with lower 2002 burdens, in the same four years, drug costs rose from 1.0 percent to 1.4 percent of personal income (a forty percent rise).
- The high-burden states suffered worse health, with substantially more deaths from heart disease, and more diabetes.
- People in high-burden states were older.
- High-burden states had substantially fewer physicians per 100,000 residents. This is probably because lower incomes are associated separately both with more illness (and resulting use of prescription drugs) and with fewer physicians.²¹
- The geography (as shown earlier, in Exhibit 3A) is worth noting: the highest-burden states are heavily southern. The lowest-burden states are mainly in the west or, secondarily, in New England.

Exhibit 4

**Comparing the States with High and Low 2002 Burdens:
Mean Values on 14 Characteristics**

	High Burden Quarter of States	Low Burden Quarter of States	Average, All 50 States *	<i>Probability²²</i>
Prescriptions/person, 2002	13.3	8.5	10.8	.0000
Price/prescription, 2002	\$50.83	\$54.91	\$53.13	.0362
Drug spending/person, 1998	\$366	\$293	\$330	.0016
Drug sales/person, 2002	\$658	\$494	\$571	.0001
Income/person, 2002	\$26,227	\$34,020	\$29,659	.0000
Rise in income/person, 1998-2002	15.3%	16.9%	15.6%	.2192
Share uninsured, 2001+2002	14.1%	13.7%	13.5%	.7467
Burden of drug costs, 2002	2.5%	1.4%	2.0%	.0000
Burden of drug costs, 1998	1.6%	1.0%	1.3%	.0000
Rise in burden, 1998 to 2002	56.9%	45.3%	50.0%	.0822
Heart disease deaths/100,000 people (age-adjusted), 2000	210.9	164.2	182.8	.0001
Share of adults with diabetes, 2002	7.5%	5.8%	6.6%	.0002
Share of adults with asthma, 2002	7.7%	7.8%	7.7%	.7193
Share of people over age 65, 2002	13.3%	11.4%	12.4%	.0362
Physicians/100,000 people, 2001	214.0	264.6	238.9	.0497

** Notes: These are simple averages of states' values, not weighted to reflect states' differing population sizes. They differ from the national averages used elsewhere in the report, including in the 50-state comparisons to the national average on components of burden (in Appendix 3) and underlying characteristics such health status (in Appendix 8).*

D. A closer look at the 12 states with highest burdens

To help highlight the issues involved, we focus below on the top quarter of states on drug cost burden. As shown in Exhibit 5, on a following page, the drug cost burdens in these 12 states ranged from 18 percent to 65 percent above the U.S. average.²³

What characteristics pushed these states to the top of the list on drug cost burden? We look briefly at incomes, spending per person, and the two factors that determine spending—prescription use per person and average price per prescription.

1. Income

Five of the states with the highest prescription drug cost burdens are among the nation's ten poorest (Arkansas, Kentucky, Louisiana, Mississippi, and West Virginia). All of the 12 highest-burden states have 2002 per capita personal income below the U.S. average. (Most also have many uninsured residents, as Exhibit 5 shows.)

2. Spending per person

Seven high-burden states are among the top spenders. Tennessee was first in 2002 prescription drug costs per person. Kentucky was second, West Virginia (3), Missouri (5), Louisiana (7), Florida (9), Michigan (11).

Four of those states (Tennessee, West Virginia, Kentucky, and Missouri) strain to finance per person drug spending that exceeds the U.S. average by one-fifth or more—extraordinarily high costs to cover with their below-average incomes.

Other states' suffer high burdens without high drug spending per person. Four states combine prescription drug spending per person roughly at the national average with incomes so low that they carry some of the nation's highest drug cost burdens (Alabama, Arkansas, Mississippi, and Oklahoma). In Arkansas, for example, where income is 76 percent of the national average, the drug cost burden is very high despite per capita drug spending that is 31st in the nation.

3. Prescriptions per person

In the highest-burden states, the average number of prescriptions filled per person ranged from slightly above to far above the national average. The 12 highest-burden states include the five highest on use rates—Tennessee, West Virginia, Kentucky, Alabama, and Louisiana—and eight of the top ten. (Exhibit 5 also shows evidence of the ill health that seems to boost their use rates.) See Appendix 5 for discussion of what contributes to high use rates.

4. Average price per prescription

The average price per prescription was below the U.S. average in most of these twelve highest-burden states. Five of these states—Alabama, Arkansas, West Virginia, Mississippi, and Kentucky—are among the seven lowest states on price.

This is consistent with a finding detailed in Appendix 6: across the states, lower incomes were associated with lower drug prices. The 12 top states on burden all have below-average incomes, as just noted, so lower-than-average prices are to be expected. Drug makers may find that offering lower prices and higher discounts in poorer states, and higher prices in richer states, is desirable to maximize profits.

These high-burden states also include Florida (11th on burden), with the sixth highest average prescription price of any state. But many other states with high drug prices are in the top half of the states on income, so burdens are lower. (For example, New Jersey and New York, second and third on price, are among the highest states on drug spending per person, but high incomes moderate their burdens.)

We find that where prices are higher, use rates tend to be lower, and vice versa.²⁴

Still, burdens tend to remain higher in lower-income states, despite generally lower prices. This is partly because prices vary the least of the three factors that determine burdens. And it is partly because the high rates of illness in lower-income states generate high average numbers of prescriptions per person, more than offsetting lower prices' moderating effects on burdens.

5. Underlying factors

As Exhibit 4 showed, people in the higher-burden states tended to be older and fared worse on our sample measures of health status. Information on these and other characteristics of each of the highest-burden states are detailed in Exhibit 5.

These figures show, for example, that nine of the 12 states are above the U.S. average on the share of adults with diabetes—in some cases 30 percent or more above the national average. All but two of the dozen are above average on the rate of heart disease deaths.

Note that although residents suffer poorer health than average, all but one of these 12 states fall below the national average on availability of physicians. Generally, fewer physicians are found in lower-income states.

* * *

In any individual state, many factors contribute to determining the burden of drug costs, reinforcing or off-setting one another. Appendix 7 offers brief profiles of the two states with the heaviest prescription drug cost burdens, and what characteristics of those states appear to contribute to their burdens. For readers interested in possible underlying contributors to the burden in particular states, Appendix 11 shows comparisons to the U.S. average for each of the 50 states on measures of age, health status, and physician supply.

Exhibit 5

**A Closer Look at the Top 12 States:
What Contributes to Their High Prescription Drug Cost Burdens?**

	Drug Cost Burden, 2002: Rx Spending as Share of Personal Income	Per Capita Personal Income, 2002	Retail Rx Spending per Person, 2002	Average Price of Retail Prescriptions 2002	Average Number of Prescriptions per Person, 2002	Physician-to-Population Ratio, 2001	Share Lacking Health Insurance, 2001-02 Average	Age >65, Share of Residents, 2001-02	Current Adult Diabetes Prevalence Rate, 2002	Heart Disease Death Rate per 100,000 People, Age-adjusted, 2000
U.S. average	1.87%	\$30,906	\$579	\$54.58	10.6	253/ 100,000 people	15%	12%	6.7/ 100 adults	196/ 100,000 people
State data shown here are state's percentage of U.S. average on each measure.										
Tennessee	165%	89%	148%	94%	158%	97%	74%	92%	119%	123%
West Virginia	159	77	123	87	142	87	93	142	130	114
Kentucky	150	82	123	90	138	84	87	108	100	105
Louisiana	141	82	116	92	126	100	126	100	110	107
Mississippi	135	73	99	89	111	67	111	92	133	118
Missouri	129	92	119	101	118	92	73	100	100	109
Alabama	127	83	105	82	128	79	87	108	133	91
Arkansas	126	76	96	84	114	75	109	125	110	101
North Dakota	124	87	108	94	115	87	69	117	81	87
Oklahoma	120	84	101	98	103	64	119	108	104	121
Florida	119	96	115	108	107	93	117	142	104	103
Michigan	118	96	113	101	112	91	74	92	112	111

IV. RISE IN DRUG COST BURDEN

We have shown that the burden of drug costs is a particularly heavy one in many states. Other things equal, states with greater burdens have a higher likelihood of acting politically to win lower drug prices and otherwise try to manage drug costs.

Independent of a state's current burden, a rapid rise in burden can be expected to arouse anger or worry in those who bear the cost—patients, taxpayers, employers, and others. The greatest anger or worry can be expected in states that had heavy burdens in 1998 and then suffered rapid increases in burden.²⁵

From 1998 to 2002, as we saw earlier, the prescription drug cost burden rose by about one-half nationwide.²⁶ In Tennessee, Exhibit 6 shows, drug spending nearly doubled from 1.6 to 3.1 percent of personal income. In five states, prescription drug costs consumed at least a full percentage point more of income in 2002 than in 1998.

Exhibit 6 displays the quarter of states with the greatest rise in burden, as measured by the percentage point increase in drug cost burden between 1998 and 2002. By 2002, eight of those were among the dozen highest-burden states. (Our cost data for the two years are from different sources, but appear reasonably consistent.²⁷)

Exhibit 6

States with Largest Percentage Point Rise in Prescription Drug Cost Burden, 1998 to 2002

	Rx spending as % of personal income, 2002	Rank in 2002		Rx spending as % of personal income, 1998²⁸	Rank in 1998
U.S. average ²⁹	1.9%			1.2%	
Tennessee	3.1%	1		1.6%	6
Missouri	2.4%	6		1.3%	21
North Dakota	2.3%	9		1.3%	22
Louisiana	2.6%	4		1.6%	8
Kentucky	2.8%	3		1.8%	2
West Virginia	3.0%	2		2.1%	1
Utah	2.0%	23		1.2%	32
Kansas	2.1%	19		1.3%	26
Oklahoma	2.2%	10		1.4%	15
North Carolina	2.2%	14		1.4%	18
Iowa	2.1%	18		1.3%	19
Alabama	2.4%	7		1.6%	5

Though four of the states shown in Exhibit 6 (Utah, Kansas, North Carolina, and Iowa) were not in the top 12 in drug cost burden in 2002, they may feel great pressure to act because they have suffered such a steep rise in that burden.

Appendix 8 presents data on all states' percentage rise in drug cost burdens from 1998 to 2002.

States in the lead

It is worth a brief look at the trends in the drug cost burden in two states whose legislators have taken strong steps to limit drug prices.

In 1998, as mentioned earlier, the share of personal income going to prescription drugs was higher in Maine (ranking ninth) than in any other border state.³⁰ Further, analysis of drug spending data indicates that during the preceding four years, from 1994 to 1998, Maine suffered the second-highest rise in drug costs per person in the nation.^{31 32} So Maine took its strong and multi-faceted action on drug prices when its drug costs had been rising sharply and its burden was especially heavy.

On the other hand, between 1998 and 2002, Maine's rise in the drug cost burden was third-slowest in the nation (as shown in Exhibit 10 in Appendix 8). This raises the possibility that drug makers worked to hold down price increases in Maine to try to reduce the political pressure in Maine to legislate price controls, before or even after the state's unprecedented law passed in May 2000. Or this may reflect in part the state government's work in those years on expanding access to Medicaid's drug price discounts, and guiding physicians towards use of lower-priced drugs in Medicaid and in general.³³ Alternatively, this might be a coincidence.³⁴

In 1998, West Virginia had ranked first in the burden of prescription drug costs as a share of income.³⁵ In 2002, it was still extremely high at second, while Tennessee rose to first place.³⁶ (See also the brief profile on West Virginia's drug cost burden in Appendix 7.)

V. CONCLUSIONS

Many of this report's findings on the burden of drug costs and their implications can be divided among three main topics: where, why, and how?

A. Where?

We have documented the substantial variation in the burden of prescription drug costs on the people of different states, and where pressures to lower that burden might be greater, other things equal.

In past years, proximity to the border and state political culture have helped to shape elected officials' interests in acting to lower drug prices.

More recently, as awareness of low Canadian drug prices has risen, and as growing numbers of Americans use the Internet or fax to order from Canadian pharmacies, geography has come to matter less. Internet and fax mean that all Americans are now, in a sense, on the border—within reach of lower-priced drugs. So we are all aware that high U.S. drug prices are no longer natural or inevitable.

Traditional politics, including drug industry influence, may make state action on drug prices seem unlikely in some of the states with the highest drug cost burdens.

As noted earlier, states must choose among suffering, paying more, or reform. And for now, many states are still choosing to pay more—or to act in ways that intensify citizens' suffering. Mississippi, for example, a high-burden state, has just been grappling with whether to implement or repeal newly-legislated massive cuts in Medicaid eligibility. These cuts appear mainly aimed at saving the state the cost of paying for prescription drugs for tens of thousands of poor seniors. Seniors and their families are telling legislators of the looming cuts' devastating effects.³⁷

But political expectations may need to change. Recall, for example, that Senator Trent Lott of Mississippi announced that he would back Congressional action to lower drug prices for Americans by permitting imports.³⁸ Despite his comment that he could no longer justify to his mother the current international drug price gaps, Senator Lott probably wasn't listening only to his mother.³⁹

Given these changes in politics and in the impact of proximity, the growing drug cost burdens themselves are increasingly salient in shaping state action on drug costs.

The problem of making prescription drugs affordable needs to be solved for people in every state. Over 70 million Americans lack drug coverage and millions more are underinsured for prescription drugs.⁴⁰ Each state has hundreds of thousands or millions of citizens who cannot afford to pay the cost of today's drugs and are at risk

of deprivation of needed medications. Many people in every state go without needed drugs, and suffer avoidable pain, disability, and premature death.

In the absence of Congressional action to make prescription drugs affordable to all, state action is vital across the nation. Elected officials from states with greater burdens will feel greater public pressure and face a crisis sooner, other things equal. So will elected officials from states with greater increases in burden.

B. Why?

We have analyzed reasons for states' differences in prescription drug cost burden.

We looked at the three components used to calculate burden—the components that therefore arithmetically explain the drug cost burden. Higher volume of prescriptions per person, lower average income per person, and higher average price per prescription—in that order—explain higher burdens.

Looking beyond the arithmetic, we find that poorer, sicker, and older states suffer greater prescription drug cost burdens. Factors that separately explain or predict higher burdens are a higher rate of diabetes, followed by having fewer physicians per capita, lower shares of the population lacking health insurance, higher death rates from heart disease, and greater shares of the population over age 65.

C. How?

By examining reasons for the differences in drug cost burdens across the states, we can suggest ways states can act to reduce this burden—and to win needed prescription drugs at an affordable cost for their citizens.

The only practical method of lowering drug cost burdens is by lowering prices.

This is true even though the number of prescriptions per person and average income per person are more powerful statistical predictors of inter-state differences in burden than are average prescription prices. Indeed, price is the weakest predictor largely because it varies so little across states. Prices are high almost everywhere.

Statistical predictors of differences, though, have little or no practical bearing on the feasibility of interventions. To lower drug cost burdens, it is far easier to try to lower prices than to try to lower numbers of prescriptions used or raise average incomes.

Lowering the number of prescriptions per person is simply not practical. There are at least two reasons. First, people in states with higher numbers of prescriptions tend to be sicker and older, so—as we have seen—higher use rates may well be

clinically appropriate. Driving down use rates to lower the drug cost burden could well increase patient suffering from heart disease, diabetes, and other problems.

Indeed, many residents of states with high burdens today are likely to still have much unmet need for medical care and for prescription drugs—because they also tend to have low incomes. (Even in some states with far lower burdens—for example, in California, with its high share of uninsured people—lack of access to physician and other health services may also contribute substantially to current low use rates, leaving much need unmet.)

In this context, a push to slash use in order to lower states' drug cost burdens would be clinical folly. But, with their already high drug cost burdens, these states and their people cannot afford to spend more to address their persisting unmet needs.

Second, were some use of drugs in high-burden states considered to be clinically *inappropriate*, lowering prescription volume would still require physician action. And though inappropriate prescribing must be addressed, changing the prescribing patterns of physicians would not be quick or easy.⁴¹

Even if efforts to reduce over-use of drugs somehow succeeded, they would almost certainly be insufficient to free up the funds to meet today's pressing unmet need for medications. (Further, because lower use, other things equal, would slash drug makers' revenues, cuts in use might spur drug makers to raise their U.S. prices even higher.) State action on prices does promise to free up funds to meet pressing needs.

Seeking to slash use rates in order to save money is financial as well as clinical folly—since manufacturing more pills typically costs remarkably little.⁴² The cost of actually producing, distributing, and dispensing the increased volume of drugs needed to meet the needs of all Americans is surprisingly low.⁴³

This makes it a tragedy that any American goes without needed medications—especially since Americans, collectively, will provide drug makers with some \$250 billion in revenue in 2004, about one-half of their world-wide total revenue.⁴⁴

Forcing down use is an unsafe, ineffective, and unnecessary means of reducing drug cost burdens. We conclude instead that lowering drug prices is essential to reduce crushing burdens on income and make medications affordable.

As we have suggested elsewhere, lowering prices need not devastate drug makers' revenues, profits and research. Indeed, we are convinced that reducing prices is essential to protect research—particularly the most valuable breakthrough research.

How can this be?

First, we suggest, today's high U.S. drug prices are inherently unstable. Drug makers know they can't long endure. High prices lead to growing political pressure

to win relief through importing, price controls, and other devices. We believe that drug makers' fear of price controls—which indeed are likely—leads them to try to boost profits by relying more on marketing, mergers, me-too drugs, and price hikes. These are the very steps that will bring price controls nearer.

Drug makers also conduct less breakthrough research than they should. Such research is likely to take many years to pay off, and price controls are likely to materialize before the research succeeds.⁴⁵ Investing in breakthrough research requires confidence of a fair payoff for developing valuable new drugs. That confidence is now absent, largely because of drug makers' insistence on high U.S. prices. But there is an alternative.

Second, as a practical matter, lowering drug prices, alone, will cut drug makers' revenue. Yet lower prices' immediate effects on revenues can and should be offset by higher volumes to fill needs that are currently unmet. Some new sales would flow quickly as prices fall. Some would arise as price cuts permit better private and public coverage. We suggest that price-elasticity of demand for prescription drugs may be substantial, so higher private volumes alone might replace most revenue subtracted by the cut in prices.⁴⁶ Regardless of the share of lost revenue replaced through higher private market demand, the remainder of the lost revenue can be replaced through higher publicly-financed use of needed medications. That's because many patients in need will be unable to afford to pay even the newly discounted private market prices. Happily, lower prices make it easier to design and implement public programs to fill the remaining unmet need for medications. The public money goes further. More people are helped, making such programs more attractive politically. Together, the greater private and public volumes would allow drug manufacturers to replace all of the revenue they would otherwise lose to lower prices.

Indeed, public programs could explicitly guarantee to fill any gap, we have suggested. This guarantee would be a mainstay of a prescription drug piece treaty, one aiming to protect the legitimate interests of all parties.⁴⁷ In addition, drug makers would receive public guarantees that they would be paid enough to cover their small actual added costs of manufacturing and distributing all needed pills for all Americans. Either federal or state governments could employ this method.

Today's regime of high prices is doomed. The only question is whether drug makers will join soon in forging an alternative—one that combines lower prices and higher volume to protect all parties' reasonable interests.

Drug makers now insist that price cuts will harm research. But such a peace treaty, combining higher volume and modest incremental payments, can preserve drug makers' current profits and ability to finance research. Such a package of reforms can protect research—and even lay groundwork for promoting more innovative research (as we discuss elsewhere⁴⁸)—while winning affordable drugs for all.

This approach can frame ways to pay for making prescription drugs available to all and for creating new drugs that will strike a balance satisfactory to today's patients, tomorrow's patients, people who pay all the time, as well as to prescription drug makers.

With money saved on lower prices recycling to pay for the needed medications that patients are going without today, burdens will stabilize. And all who pay will get a better deal for their prescription drug dollars.

Even after prices are cut, however, high-burden states will still require some relief. It is likely that a form of federal action to share the cost burden more equitably among the states will be needed. And political support for this equitable sharing will be much easier to gain as part of a package deal that ensures that all Americans can obtain the medications they need while paying affordable shares of their incomes.

It is financially unaffordable and politically impossible to allow the drug cost burden to continue to soar. It is time to win a victory for competence and compassion.

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Appendix 1

Defining the drug cost burden

We define the burden of prescription drug costs for each state as the share of personal income going to pay for prescription drugs.

Put another way, this is the average prescription drug expenditures per person in a state (numerator) divided by that state's average personal income (denominator).

The numerator, a state's average drug costs per person, can be expressed as the product of the average number of prescriptions per person and the average price per prescription in a state.

Using the shorthand "Rx" for "prescription," this equation expresses the definition:

$$\text{Burden} = \frac{\text{average drug costs/person} = (\text{average Rx/person} * \text{average price/Rx})}{\text{average income/person}}$$

Section III analyzed the relative importance of these three factors—average prescriptions per person, average price per prescription, and average income per person—in explaining differences in burdens across the 50 states.

Appendix 2

Variation across the states on selected characteristics

Drug cost burden and its three components—use rate, price per prescription, and average income per person—vary across the 50 states to very different degrees.

The amount of variation across the states—the spread or dispersal of the values for these and other factors—is measured by the “coefficient of variation,” as shown in Exhibit 7. This is simply the standard deviation divided by the mean—the standard deviation’s percentage of the mean (sometimes called “relative standard deviation”).

In 2002, the unweighted average drug cost burden across the states was 1.96 percent of personal income. (This is an average of the 50 state figures, so it differs from the U.S. average shown elsewhere.⁴⁹) Drug cost burden had a coefficient of variation across the states of 21.5 percent, as seen in Exhibit 7.

Among the three components of burden, use rate varies the most, followed by average income per person, and then by average price per prescription. The 2002 prescription use rate showed a coefficient of variation across the states of 17.8 percent. Average price per prescription was much less dispersed, with a coefficient of variation of only 8.7 percent. Those figures show that the number of prescriptions per person per year varies twice as much across the states as does price.

Average income per person was fairly dispersed, with a coefficient of variation of 14.3 percent.

The *increase* in drug cost burden from 1998 to 2002 averaged 50 percent across the states, with a coefficient of variation of 26.6 percent.

Exhibit 7

Average Values for Selected Characteristics of States, with Coefficients of Variation

Characteristic	Mean	Coefficient of Variation
Drug cost burden	1.96%	21.5%
Prescriptions per person	11.0	17.8%
Average price per prescription	\$53	8.7%
Average income per person	\$29,659	14.3%
Burden rise, 1998-2002	50.0%	26.6%

Note: All data are for 2002 except 1998-2002 rise in burden. The unweighted means are from the 50 state figures, so they do not take account of states’ population differences, and they differ from the U.S. averages shown elsewhere.

Appendix 3 – Exhibit 8: COMPONENTS OF DRUG COST BURDEN ESTIMATES, 2002

States (Bold = 12 Highest Rx \$ Burden as % of Income)	R A N K <i>Burden</i>	Rx Spending/ Person ⁵⁰	R A N K	Personal Income/ Person ⁵¹	R A N K <i>Low=1</i>	Average Price/ Prescription ⁵²	R A N K	Average Yearly Rx Filled / Person ⁵³	R A N K
United States		\$579		\$30,906		\$54.58		10.6	
Alabama	7	\$609	18	\$25,548	11	\$44.80	50	13.6	4
Alaska	48	\$441	45	\$32,799	40	\$64.81	1	6.8	50
Arizona	34	\$461	43	\$26,360	13	\$53.63	18	8.6	45
Arkansas	8	\$555	31	\$23,556	2	\$45.87	49	12.1	10
California	50	\$416	49	\$32,989	41	\$54.08	17	7.7	49
Colorado	49	\$438	46	\$33,723	44	\$52.79	22	8.3	47
Connecticut	42	\$651	12	\$42,468	50	\$58.09	8	11.2	20
Delaware	27	\$623	16	\$32,090	37	\$58.25	7	10.7	27
Florida	11	\$665	9	\$29,758	28	\$58.82	6	11.3	18
Georgia	29	\$530	34	\$28,821	23	\$49.53	40	10.7	28
Hawaii	47	\$415	50	\$29,875	31	\$51.18	31	8.1	48
Idaho	31	\$464	41	\$25,476	8	\$52.77	23	8.8	42
Illinois	37	\$555	30	\$33,053	42	\$54.43	15	10.2	32
Indiana	22	\$570	27	\$28,032	18	\$51.36	29	11.1	22
Iowa	18	\$589	22	\$28,089	20	\$49.49	42	11.9	11
Kansas	19	\$593	21	\$28,905	24	\$51.56	28	11.5	16
Kentucky	3	\$714	2	\$25,494	9	\$48.90	44	14.6	3
Louisiana	4	\$669	7	\$25,296	7	\$49.95	38	13.4	5
Maine	20	\$574	25	\$28,038	19	\$52.70	24	10.9	24
Maryland	40	\$579	24	\$36,303	47	\$62.22	4	9.3	40
Massachusetts	39	\$625	14	\$39,085	48	\$55.85	11	11.2	21
Michigan	12	\$656	11	\$29,816	30	\$55.15	12	11.9	13
Minnesota	32	\$605	20	\$33,322	43	\$61.16	5	9.9	33
Mississippi	5	\$571	26	\$22,550	1	\$48.37	46	11.8	14
Missouri	6	\$688	5	\$28,512	21	\$55.06	13	12.5	7
Montana	24	\$486	39	\$24,831	6	\$49.60	39	9.8	34
Nebraska	15	\$638	13	\$29,182	26	\$53.57	19	11.9	12
Nevada	44	\$452	44	\$30,559	33	\$52.54	25	8.6	44
New Hampshire	45	\$490	37	\$33,985	45	\$50.51	36	9.7	35
New Jersey	36	\$680	6	\$39,461	49	\$64.76	2	10.5	30
New Mexico	35	\$434	48	\$24,823	5	\$51.63	27	8.4	46
New York	26	\$697	4	\$35,805	46	\$63.93	3	10.9	23
North Carolina	14	\$607	19	\$27,785	17	\$51.88	26	11.7	15
North Dakota	9	\$624	15	\$26,852	14	\$51.18	32	12.2	8
Ohio	25	\$569	28	\$29,195	27	\$50.37	37	11.3	19
Oklahoma	10	\$582	23	\$25,936	12	\$53.38	21	10.9	25
Oregon	38	\$463	42	\$28,792	22	\$49.22	43	9.4	39
Pennsylvania	17	\$664	10	\$31,116	36	\$54.43	16	12.2	9
Rhode Island	16	\$666	8	\$30,859	34	\$50.84	35	13.1	6
South Carolina	13	\$559	29	\$25,502	10	\$49.50	41	11.3	17
South Dakota	28	\$513	35	\$26,967	15	\$47.47	47	10.8	26
Tennessee	1	\$855	1	\$27,611	16	\$51.20	30	16.7	1
Texas	30	\$533	33	\$29,039	25	\$56.13	10	9.5	38
Utah	23	\$490	38	\$24,639	4	\$51.04	33	9.6	36
Vermont	33	\$536	32	\$29,764	29	\$51.04	34	10.5	31
Virginia	41	\$507	36	\$32,793	39	\$53.39	20	9.5	37
Washington	43	\$483	40	\$32,638	38	\$54.88	14	8.8	43
West Virginia	2	\$710	3	\$23,794	3	\$47.31	48	15	2
Wisconsin	21	\$613	17	\$30,050	32	\$57.33	9	10.7	29
Wyoming	46	\$437	47	\$31,021	35	\$48.55	45	9	41

Appendix 4

Explaining the inter-state difference in the burden of drug costs

States vary enormously in the burden of prescription drug costs on their citizens. What factors explain or statistically predict those differences?

Explaining differences in burden

The following exhibit displays three factors that explain the variation in the burden of drug costs across states. These three factors are prescriptions per person, income per person, and average price per prescription in each state.

In a multiple regression analysis of the predictors of burden of drug costs, we found that the number of prescriptions per person has a beta statistic of 0.84. This means that a 1.0 percent rise in the number of prescriptions per person is associated with a 0.84 rise in the burden of drug costs. Similarly, a 1.0 percent rise in income per person is associated with a 0.58 percent **drop** in the burden of drug costs (the sign preceding the 0.58 in the exhibit is negative). And a 1.0 percent rise in the price per prescription is associated with a 0.34 percent rise in the burden of drug costs.

The beta statistics are fair measures of the relative importance of the three predictors of the burden of drug costs. So we can say that *the number of prescriptions is the most important explanation of the drug cost burden in a state, followed by income per person and price per prescription.* (More prescriptions, lower income, and higher prices each tend to boost drug cost burdens, other things equal.) More, when explaining differences in states' burdens, we can say that the number of prescriptions is about two and one-half times as important as price, since a beta coefficient of 0.84 divided by a beta coefficient of 0.34 equals 2.47.

Together, these three factors statistically explain 99.1 percent of the variation in burden of drug costs across states—essentially, all of the variation. This is not surprising, since total cost of drugs per person (the numerator of the burden of drug costs) is the product of prescriptions per person and price per prescription, and income per person is the denominator of the burden of drug costs.

Having identified the relative importance of the three factors that predict variations in burden, it is useful to examine the factors that, in turn, predict variations in those. We did not attempt to analyze the second predictor of drug cost burden, income per person, but look here at predictors of higher use and price.

Explaining differences in number of prescriptions per person

The column of data below "Prescriptions/person" in Exhibit 10 shows the factors that, in turn, predict or explain the number of prescriptions per person. These are listed in decreasing order of importance, from percentage of the state population lacking health insurance (the most important factor) to percentage over age 65 (the least important predictor found). The number after each factor is its beta coefficient.

States with

- higher shares of their residents with insurance and
- lower incomes per person

will both tend to average more prescriptions per person, as shown by their negative betas. Thus, poorer states and those with better insurance coverage will both tend to use *more* prescriptions.

The tendency for poor health and financial poverty to run together suggests this finding on income is consistent with these other results on use rates. States with

- higher heart disease death rates,
- higher diabetes rates,
- more physicians per person, and
- more of their population above age 65




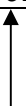

will tend to have *more* prescriptions per person. (See also Appendix 5 on use rates.)

(Beta coefficients are listed only for factors that are statistically significant at 0.05 or less.⁵⁴ If a factor is of interest but does not reach the 0.05 threshold, its relationship is indicated with a plus, indicating a positive association.)

The regression that includes all of these factors has an adjusted R² of 61.5 percent, meaning that these factors explain 61.5 percent of the variation in the number of prescriptions per person among the 50 states.

Exhibit 9

Explaining the Burden of Drug Costs

BURDEN OF DRUG COSTS			
			
Prescriptions/person 0.84	Income/person -0.58	Price/prescription 0.34	R² = 99.1%
			
% uninsured -0.44		Income/person 0.75	
Income/person -0.43		% uninsured 0.20	
Heart death rate 0.36			
Diabetes rate +		R ² = 50.3%	
MDs/person +			
% over 65 +			
R ² = 61.5%			

Explaining inter-state variations in price per prescription

We found that income per person was the main predictor of variations among the states in the average price per prescription. Higher income states had higher drug prices. Indeed, a 1.0 percent rise in income was associated with a 0.75 percent rise in price per prescription. Still, price does not differ very much among the states.

The share of the state's people who lacked health insurance was a less important predictor of average price per prescription. (See discussion in Appendix 6.)

Together, these two factors explained 50.3 percent of the inter-state variation in price per prescription.

The complex roles of income and insurance

Income appears to have a complex set of effects on the burden of drug costs. We offer a few observations. Please note that they rest on analyses of only 50 states.

- Other things equal, lower incomes mean a higher burden, simply as a matter of arithmetic, since burden is defined here as drug spending's share of income. So income inequality among states greatly affects differences in drug cost burdens.
- But other things are not equal here. Income is also associated, separately, with both use rates and drug prices, as we have seen.
 - * Lower incomes are associated with substantially higher prescription drug use rates. This is partly because greater levels of illness are found in low-income states, understandably resulting in greater use of prescription drugs.
 - * The higher use rates more than offset the slightly lower average prescription drug prices that drug makers impose in lower income states.

Similarly, a state's level of health insurance coverage has several effects on burden.

- As discussed in part IIIB, we found in the regression analysis that (after excluding income, use rates, and price as independent variables) states where a higher share of residents were uninsured tend, other things equal, to have higher drug cost burdens. (But note that income remains a part of the dependent variable.)
- Like income, however, insurance status is separately associated with both use rates and average drug prices (as just shown here in Exhibit 9).
 - * States with more uninsured people tend to have lower use rates—a pattern that tends to be offset by the higher use rates seen in states with poorer people and states with worse health status. (See Appendix 5.)
 - * There is a modest tendency (discussed below in Appendix 6), after controlling for income, for states with more uninsured residents to pay higher prices.

Appendix 5

Predictors of variation in states' average drug use rates

Differences in use rates—numbers of prescriptions per person—are the most powerful explanation of differences in prescription drug cost burdens, as reported in Section III. Use rates are followed as a predictor of burden by average income and then average price per prescription.

In the dozen states with the highest use rates, 13.3 prescriptions per person were used on average. This was 56 percent above the rate in the dozen states with the lowest use rates, which averaged only 8.5 prescriptions per person.⁵⁵

What accounts for such differences in use?

The strongest predictor of use rates is the share uninsured. States with fewer of their residents uninsured (high rates of health insurance coverage) tend to have more prescriptions per person, other things equal. Thus, greater insurance coverage appears to mean better access to medications and thus higher use rates.

But in states with higher use rates, average incomes are typically lower. (Lower income tends to be associated with higher use rates, other things equal.) This may appear contradictory, if one is thinking about the purchasing power of poorer states and their citizens.

Clearly, higher use rates are associated with powerful forces—that is, with *forces powerful enough to overcome the depressing effects of lack of coverage on use of prescription drugs*. What are those forces?

The key appears to be that lower income tends to correspond with more illness, and therefore with the need to use more medications. Indeed, the relationship goes in both directions: higher income helps to secure better health, and people in better health can earn more money.

So we see substantial evidence on the impact of health status on use rates. States with higher rates of death from heart disease, higher rates of diabetes, more physicians per capita, and greater shares of the population aged over 65 tend to have greater numbers of prescriptions per person. These factors are discussed here, and figures comparing states to the U.S. average on each are shown in Appendix 11, for readers interested in the details on particular states.

A. *Illness*

States with high prescription drug cost burdens and those with high use rates tend to suffer high burdens of illness.

When we looked at predictors of *burdens*, recall that our second regression analysis—which excluded income, price, and use rates—found the strongest predictor across states to be a high rate of adult diabetes. (See section IIIB, earlier.)

In further analysis, examining predictors of high use rates, we again looked at several conveniently available measures of health status. As noted above, we found:

- A state's heart disease death rate was highly significant in predicting its prescription drug use rate.⁵⁶
- The adult diabetes rate also is positively associated with prescription drug use.

Illness and burden

Let us also briefly consider directly the role of illness and drug cost burden. Many states in the top quarter on drug cost burden have especially high rates of some of the serious medical problems and chronic illnesses that commonly require substantial use of prescription drugs. Data on three sample measures of health status show these examples of major health problems in high-burden states:

- Tennessee ranked second among the states (23 percent above the U.S. average), Oklahoma third, and Mississippi fourth in their age-adjusted rates of deaths from heart disease in 2000. (First was New York, which ranks high on drug spending and price, but where higher incomes hold down the drug cost burden.) Of the 12 highest-burden states, 10 had above-average heart disease death rates.
- Alabama and Mississippi had the nation's highest rate of diagnosed adult diabetes in 2002 (33 percent above the U.S. average), and West Virginia was third-highest. All but three of the top dozen states in drug cost burden have above-average diabetes rates. Indeed, the dozen highest-burden states include seven of the top eight states on prevalence of adult diabetes.
- Maine (33 percent above the average), Kentucky, and West Virginia were first, second, and third, respectively, in the prevalence of adult asthma in 2002.⁵⁷

All of these states except Maine and New York are in the current top 12 states in drug cost burden. Maine (as noted earlier) ranked ninth among states in drug cost burden in the late 1990s, when it took the lead in legislative action for lower prices.

Note that higher rates of illness tend to mean higher prescription drug use, as seen here—and also, as is well recognized, tend to reduce incomes. (The reverse is also

true, of course: lower incomes tend to increase rates of ill health—probably owing partly to inability to afford medications.) So illness rates contribute powerfully to state’s prescription drug cost burdens.

B. Physician supply

Higher physician-to-population ratios were associated with higher use rates, as shown in Appendix 4. Thus, having more physicians apparently tends—if other conditions are equal (that is, after controlling for heart disease death rate, drug price, and share over age 65)—to mean more prescribing.

MDs and burden

But as noted earlier, states with higher burdens tend to have fewer doctors, probably because lower income is associated with both a smaller physician supply and greater drug cost burdens. This highlights a serious problem: physicians are more heavily concentrated in wealthier states, so they are less available where people generally suffer more need for care.

C. Age

One contributor to high drug cost burdens is age. Older residents are likelier to need medications. As noted earlier, our regression analysis found that a state’s share of residents over age 65 helps explain its rate of prescription drug use.

Some older states are prominent among the highest states on prescriptions per person, including West Virginia (which is tied with Florida for the greatest share of residents over age 65). The high-use states, Arkansas, Rhode Island, North Dakota, and Pennsylvania, are also among the dozen states with the most residents over age 65. Further, of the dozen states with the most prescriptions per person, none but Tennessee is younger than the U.S. average on this measure.⁵⁸

But some states don’t fit this pattern. For example, Louisiana, Missouri, and Nebraska also have among the highest use rates yet are only at the national average in share over 65.

Evidently, despite the national debate’s emphasis on drug affordability for seniors, the percentage of seniors in a state is only one of the factors shaping use rates.

Age and burden

Let us also briefly look directly at the association between seniors’ population share and drug cost burdens. West Virginia and Florida top the nation with 17 percent of their residents who are over 65 (a share 42 percent above the U.S. average).⁵⁹ Arkansas ranks fourth (tied with Montana and Rhode Island) by this measure, and

North Dakota is also among the dozen oldest states. Notably, Maine, which also felt early pressure to contain drug costs, ranks third on this measure of age.

By contrast, California, Colorado, and Alaska, the states with the lowest drug cost burdens, are all among the half dozen youngest states. Alaska, with the fewest residents over age 65, also has the fewest prescriptions per person.

Age alone, however, is clearly not the main driver of high drug cost burden. In the multiple regression discussed above, the share of older residents was only the sixth-strongest predictor of burden.

Indeed, five of the 12 highest-burden states (Tennessee, Mississippi, Michigan, Louisiana, and Missouri) are average or slightly below average in their share of residents over 65, and three others are just slightly above the U.S. average.

Another measure of age, residents over age 75, highlights fewer states as older, and in doing so, may help illuminate why states' drug cost burdens and number of seniors are not linked more closely.⁶⁰ Of twelve states above the U.S. average (6 percent) on share over age 75, six are in the top third of states on per capita personal income. These include Connecticut, New Jersey, and Massachusetts, the three highest-income states. So the states that are the oldest by this measure are also disproportionately higher income states—one indication that higher income tends to correspond with better health and longevity. But drug cost burden is lower (other things equal), by definition, when incomes are higher. So these higher-income older states diminish the link between age and drug burden.

Appendix 6

Predictors of states' drug prices

Price is the weakest factor of the three (price, use, and income) that arithmetically determine states' prescription drug cost burdens. It is also the factor showing the least variation among the states.

The reported average price for retail prescription drugs sold in each state in 2002 shows only modest variation. Among the quarter of states (12 states) with the lowest *prices*, the average price was \$48.22. The average price in the quarter of states with the *highest* prices was \$59.71, or 24 percent higher.⁶¹

Income is the strongest predictor a state's drug prices, we found in our regression. A 1.0 percent rise in a state's average income was associated with a 0.75 percent expected rise in average price per prescription. Aspects of this relationship will be discussed shortly.

In addition, after controlling for income in the multiple regression analysis, as reported in Appendix 4, a mild, subsidiary, positive relationship was unmasked between the share of residents uninsured in a state and the average prescription price. Thus, a higher share of the population uninsured tended to be associated with higher average prices paid per prescription. But this is substantially less powerful than the relation between income and price.⁶²

Why might prices differ across states? Numerous factors beyond the scope of this study may come into play, including several that bear on income. Some of these may mean differences in the mix of drugs, and some may mean differences between states in prices for the same drug. For example,

- To maximize revenue and profits, drug makers may well impose higher prices in wealthier states and lower prices in poorer states, charging what the market will bear (possibly by varying the discounts that they give).
- Lower average prices in a poorer state may result when prescribers avoid higher-priced medications, knowing patients cannot afford them.
- Higher-income people can simply afford to fill prescriptions for higher priced drugs that other people leave unfilled.
- The mix of payers (patients themselves, various private insurers, Medicaid, and more) for prescription drugs varies from state to state, and so may the level of discounting obtained, as well as the share of prescriptions paid for out of pocket.
- The mix of drugs prescribed may vary for numerous reasons. For example, some states' policies do more than others to encourage use of generic drugs.

Further, it is worth noting that some factors thought to affect drug prices may not yield the differences commonly expected. For example, HMOs' negotiation of selective contracts with pharmacies do not appear to bring states lower prescription prices, despite HMOs' claims. We have found elsewhere that, in recent years, average prescription prices actually have been higher in states that let HMOs and insurers restrict which pharmacies patients can use than they are in states with laws guaranteeing free choice of pharmacies.⁶³

But for all this, as noted earlier, the resulting differences in prices among the states are only about one-half of the differences in use rates (Exhibit 7).

Appendix 7

Brief profiles of the two top states on drug cost burden

Tennessee – The nation’s heaviest drug cost burden

High costs and use

- Prescription drug costs in Tennessee consumed 3.1% of personal incomes in 2002, nearly two-thirds above the national average of 1.9%, and 1st in the nation.
- That burden, up from 6th in 1998, appears to be rising faster than in any other state.⁶⁴
- Tennessee also has the nation’s highest prescription drug costs per person (48% above the U.S. average) and uses the most prescriptions per person (58% above the U.S.).
- These top-ranked costs must be paid for with incomes 11% below the U.S. average.
- Average price per prescription in Tennessee was mid-ranked, 30th in the nation in 2002, but the price rise from 2001 was apparently the steepest seen in any state.⁶⁵

Why the extraordinarily high use rate? Possible problems, advantages, and explanations

- The state carries a heavy disease burden, ranking 2nd (23% above the U.S. average) in age-adjusted heart disease death rate,⁶⁶ and 5th (19% above the U.S.) in adult diabetes.
- Evidence suggests that high levels of inappropriate prescribing may boost use rates.⁶⁷
- Access to care may be better than average (11% uninsured vs. 14.9% U.S.).
- Apparent use may be raised somewhat by dispensing for many out-of-state patients.⁶⁸
- Intra-state variations may be important. Use rates are said to rise from west to east.

West Virginia – 2nd highest in drug cost burden

- Prescription drug costs consumed 3.0% of personal incomes in 2002 in West Virginia.
- It ranks 3rd on drug cost per person, and 2nd on use rate (42% above the U.S. average).
- Burden is so high despite having the nation’s third-lowest average prescription price.
- Income per capita is low—77% of the U.S. average (3rd-lowest among the states).
- About 14% of residents were uninsured in 2001-2, close to the U.S. average.
- It ties Florida as the oldest state, with the share age 65+ at 42% over the U.S. average.⁶⁹
- Illness rates are high, 3rd-highest in prevalence of both diabetes (30% above the U.S. average) and adult asthma (21% above),⁷⁰ and 5th in heart disease deaths (14% above).
- A greater share of the population has at least one disability than in any other state.⁷¹

Appendix 8 – Exhibit 10
AGE, M.D. SUPPLY, AND SELECTED HEALTH MEASURES BY STATE

	Share of people age >65, 2001-2 ⁷²	Adult diabetes rate, 2002 ⁷³	Age-adjusted heart disease deaths, 2000 ⁷⁴	Physician supply, 2001 ⁷⁵
U.S. average rate	12%	6.7%	196/100,000 people	253/ 100,000 people
State rates as percentage of U.S. average				
Alabama	108	133	91	79
Alaska	58	70	72	73
Arizona	100	93	89	77
Arkansas	125	110	101	75
California	83	109	98	98
Colorado	83	73	66	93
Connecticut	117	87	86	141
Delaware	100	103	107	94
Florida	142	104	103	93
Georgia	75	107	90	81
Hawaii	108	87	61	108
Idaho	92	87	78	62
Illinois	100	100	102	104
Indiana	108	103	100	80
Iowa	108	85	99	70
Kansas	117	90	82	82
Kentucky	108	100	105	84
Louisiana	100	110	107	100
Maine	133	99	90	97
Maryland	92	104	105	148
Massachusetts	108	84	77	166
Michigan	92	112	111	91
Minnesota	83	69	62	104
Mississippi	92	133	118	67
Missouri	100	100	109	92
Montana	125	79	66	83
Nebraska	100	79	69	89
Nevada	92	88	93	69
New Hampshire	108	87	101	97
New Jersey	117	96	106	120
New Mexico	117	91	79	84
New York	108	101	124	151
North Carolina	100	103	101	93
North Dakota	117	81	87	87
Ohio	108	107	108	96
Oklahoma	108	104	121	64
Oregon	92	85	71	93
Pennsylvania	117	100	102	115
Rhode Island	125	87	111	133
South Carolina	108	121	99	86
South Dakota	108	88	89	77
Tennessee	92	119	123	97
Texas	83	110	104	80
Utah	67	73	60	79
Vermont	100	81	93	133
Virginia	100	93	85	98
Washington	92	87	85	97
West Virginia	142	130	114	87
Wisconsin	100	78	88	93
Wyoming	100	76	76	69

Appendix 9

Rise in burden

Exhibit 11 displays the rise in drug cost burden in all 50 states from 1998 to 2002, with states ranked by percentage rise. These data differ from those in Exhibit 6, which ranks the states with the highest rise by looking at the difference (not the percentage increase) in their 1998 and 2002 drug cost burdens. As this exhibit indicates, four of the states with the heaviest 2002 drug cost burdens (Tennessee, Missouri, North Dakota, and Louisiana) are among those that experienced the largest percentage rise in burden over the previous four years.

Exhibit 11

Rise in Burden by State, 1998 – 2002

Rank on % rise	State	1998-2002 % rise	Burden 2002	Burden 1998	Rank in 1998	Rank on % rise	State	1998-2002 % rise	Burden 2002	Burden 1998	Rank in 1998
1	Tennessee	90.4%	3.1%	1.6%	6	26	Nebraska	48.2%	2.2%	1.5%	13
2	Missouri	82.2%	2.4%	1.3%	21	27	Massachusetts	48.2%	1.6%	1.1%	43
3	North Dakota	75.5%	2.3%	1.3%	22	28	Alabama	46.5%	2.4%	1.6%	5
4	Alaska	71.5%	1.3%	0.8%	50	29	Oregon	46.2%	1.6%	1.1%	41
5	Louisiana	68.4%	2.6%	1.6%	8	30	Georgia	45.4%	1.8%	1.3%	27
6	Minnesota	67.5%	1.8%	1.1%	42	31	Ohio	45.3%	1.9%	1.3%	20
7	South Dakota	63.7%	1.9%	1.2%	34	32	Indiana	45.1%	2.0%	1.4%	17
8	Kansas	61.1%	2.1%	1.3%	26	33	Idaho	45.0%	1.8%	1.3%	29
9	Utah	59.9%	2.0%	1.2%	32	34	Rhode Island	43.1%	2.2%	1.5%	12
10	Wisconsin	58.9%	2.0%	1.3%	25	35	Vermont	42.7%	1.8%	1.3%	28
11	North Carolina	58.4%	2.2%	1.4%	18	36	Mississippi	42.2%	2.5%	1.8%	3
12	New York	56.3%	1.9%	1.2%	31	37	South Carolina	41.5%	2.2%	1.6%	11
13	Montana	56.2%	2.0%	1.3%	30	38	West Virginia	40.8%	3.0%	2.1%	1
14	Oklahoma	55.9%	2.2%	1.4%	15	39	Florida	40.5%	2.2%	1.6%	7
15	Iowa	55.9%	2.1%	1.3%	19	40	Hawaii	39.5%	1.4%	1.0%	46
16	Kentucky	55.9%	2.8%	1.8%	2	41	Delaware	38.1%	1.9%	1.4%	16
17	New Mexico	55.1%	1.7%	1.1%	36	42	Virginia	37.9%	1.5%	1.1%	37
18	California	54.5%	1.3%	0.8%	49	43	Connecticut	37.5%	1.5%	1.1%	40
19	Texas	53.0%	1.8%	1.2%	33	44	Pennsylvania	37.4%	2.1%	1.6%	10
20	Colorado	53.0%	1.3%	0.8%	48	45	Arkansas	35.6%	2.4%	1.7%	4
21	Nevada	51.7%	1.5%	1.0%	47	46	Arizona	35.2%	1.7%	1.3%	24
22	Illinois	50.6%	1.7%	1.1%	39	47	New Jersey	32.7%	1.7%	1.3%	23
23	Michigan	49.4%	2.2%	1.5%	14	48	Maine	30.8%	2.0%	1.6%	9
24	Maryland	48.6%	1.6%	1.1%	44	49	New Hampshire	27.5%	1.4%	1.1%	35
25	Washington	48.5%	1.5%	1.0%	45	50	Wyoming	25.9%	1.4%	1.1%	38

NOTES

¹ West Virginia H.B. 4084, passed by the legislature on 13 March 2004, and signed into law. The legislature would be asked first to pass a concurrent resolution accepting the pricing schedule presented to it by a commission. If it declines, it may take up a proposal to tie prices to the Federal Supply Schedule. H.B. 4084, § 5A-3C-6(e).

² We define the burden of prescription drug costs for each state as the share of personal income going to pay for prescription drugs. This is described in detail in Appendix 1. The burden affects the state as a whole. Personal income is a simple measure reasonably reflecting capacity to pay not only for patients themselves but also for the state overall.

Some might suggest that gross state product might be a better denominator. We use personal income rather than gross state product as the denominator for several reasons. First, data on state personal income are usually about two years more current than are data on gross state product. Second, personal income and gross state product are very closely correlated. We calculated that state personal income and gross state product in 2001, the latest year for which both were available at this writing, correlate at $R_p = 0.9977$ (in a simple Pearson product-moment correlation). For both the personal income and gross state product data, see Bureau of Economic Analysis, U.S. Department of Commerce, Regional Economic Accounts, <http://www.bea.doc.gov/bea/regional/data.htm>, access confirmed 26 June 2004.

³ See, for example, Alan Sager and Deborah Socolar, "Ensuring a Supply of Affordable Drugs," *Boston Globe*, 21 June 2004, http://www.boston.com/news/globe/editorial_opinion/oped/articles/2004/06/21/ensuring_a_supply_of_affordable_drugs/.

⁴ Unless otherwise noted, all data on prescription drug spending in this report concern retail or outpatient spending. This excludes spending on drugs for hospital inpatients and for most nursing home patients.

⁵ Calculated from prescription drug spending data from the Centers for Medicare & Medicaid Services, Office of the Actuary, National Health Statistics Group, "Table 2: National Health Expenditures Aggregate Amounts and Average Annual Percent Change, by Type of Expenditure: Selected Calendar Years 1980-2002," <http://www.cms.hhs.gov/statistics/nhe/historical/t2.asp>; and from data on personal income from Bureau of Economic Analysis, <http://www.bea.doc.gov/bea/regional/data.htm>.

Note that this estimate of U.S. drug cost burden for 2002, 1.8 percent of income, is slightly below the 1.9 percent estimate shown elsewhere in this report. Using the 1.8 percent figure here is consistent with the rest of the time series shown. (The later 1.9 percent burden estimate reflects the slightly higher 2002 U.S. drug spending figure from the Kaiser Family Foundation/ Verispan-Scott Levin data set, which provided figures on state-level 2002 drug spending.) These CMS data on retail prescription drug sales reportedly include estimates of mail-order sales, and are "adjusted to account for manufacturers' rebates that reduce insurers' net payments for drugs." (See *National Health Accounts: Definitions, Sources, and Methods Used in the NHE 2002*, p. 15, <http://www.cms.hhs.gov/statistics/nhe/definitions-sources-methods/dsm.pdf>.)

⁶ See, for example, Carey Goldberg, "New England Lawmakers Consider Drug Strategies," *New York Times*, December 17, 1999; Alexander Colhoun, "USA, Get on the Bus: Extreme Answers to Prescription Drug Problems," *Christian Science Monitor*, 18 April 2000; Carey Goldberg, "Maine Enacts a Law Aimed at Controlling Cost of Drugs," *New York Times*, 12 May 2000; and Ed Silverman, "Maine's radical Rx: Rural state finds itself front and center in a national debate," *Newark Star-Ledger*, 8 October 2000. On the version of the Maine law originally approved by the legislature, see, for example, Carey Goldberg, "Maine Passes Law to Set Drug Prices," *New York Times*, 12 April 2000. Other New England border states had been looking to Canada as well, as described in Carey Goldberg, "New England Lawmakers Consider Drug Strategies," *New York Times*, December 17, 1999.

⁷ Labor's contributions in Maine are highlighted usefully in Ramón Castellblanch, "Challenging Pharmaceutical Industry Political Power in Maine and Vermont," *Journal of Health Politics, Policy and Law*, Vol. 28, No. 1, Feb. 2003, pp. 109-132. See also Donald W. Light, Ramón Castellblanch, Pablo Arredondo, and Deborah Socolar, "No Exit and the Organization of Voice in Biotechnology and Pharmaceuticals," *Journal of Health Politics, Policy and Law*, Vol. 28, Nos. 2-3, April-June 2003, pp. 473-507; and Chris Mooney, "Remember the Maine: A small state casts fear in the heart of Big Pharma," *American Prospect*, 1 September 2003, <http://www.prospect.org/print/V14/8/mooney-c.html>. On Ohio, see Mooney, and see Jackie Calmes, "Drug Lobby Plays Hardball in Ohio," *Wall Street Journal*, 9 April 2003.

⁸ Alan Sager and Deborah Socolar, *A Prescription Drug Peace Treaty: Cutting Drug Prices to Make Prescription Drugs Affordable for All and to Protect Research – with State-by-State Savings*, Boston: Health Reform Program, Boston University School of Public Health, 5 October 2000, www.healthreformprogram.org. The figure of 70 million, calculated for 2000, has increased subsequently owing first to the rise in the number of Americans without any health insurance, and second to the rise in the number of Medicare patients lacking prescription drug insurance. The latter is attributable largely to the decline in corporate retiree health insurance—and this, in turn, is attributable largely to the rise in prescription drug prices.

⁹ Calculated from U.S. Health Care Financing Administration prescription drug data on state health expenditure estimates for 1998, downloaded from <http://www.cms.hhs.gov/statistics/nhe/default.asp>

¹⁰ State drug cost burden estimates for 2002 are calculated from prescription drug spending and volume data reported at The Kaiser Family Foundation, State Health Facts Online, www.statehealthfacts.org. Data Source: Verispan Scott-Levin, Source^(TM) Prescription Audit: Special Data Request, 2003, and from data on personal income from Bureau of Economic Analysis. These data exclude mail-order prescriptions (which are included in the data from the federal government, used here for states for 1998, and for the national time series). The Verispan Scott-Levin data on spending and prices do not systematically take account of discounts or rebates negotiated between pharmacies and prescription drug makers or insurers, or resulting from bulk purchasing arrangements. (Personal communication, Barb Wentworth, Kaiser Family Foundation, 7 July 2004.) Thus, the state data for 2002 tend to understate volume and spending because of the omission of mail-order sales, but also to overstate spending because they do not systematically reflect discounts and rebates. We are grateful to have convenient access to these state-level data. It is likely that more refined analyses will be possible in the future, as even better data become available.

¹¹ For example, there was a 65 percent increase in the gap between the state with the 12th-highest burden and the 39th-highest state during those four years. This remains true at the extremes as well: the gap between the 5th- and 45th-highest state rose by 66 percent between 1998 and 2002.

¹² Note that the estimate of U.S. drug cost burden for 2002 as 1.87 percent (rounded elsewhere to 1.9 percent) percent of income is slightly above the 1.8 percent estimate that was shown in Exhibit 1, on the rise in U.S. burden over time. That 1.8 percent figure, as noted above, reflects federal government data on national health care spending, available in a long time series. The 1.87 percent burden estimate reflects the slightly higher 2002 U.S. drug spending figure from the Kaiser Family Foundation/ Verispan-Scott Levin data set, which provided figures on state-level 2002 drug spending.

¹³ Among all of the states, the range in prescription drug spending per person is wide, with spending in Tennessee slightly more than double that of Hawaii and California. (Authors' calculations from spending and volume data that are reported at The Kaiser Family Foundation, State Health Facts Online, www.statehealthfacts.org. Data Source: Verispan Scott-Levin, Source^(TM) Prescription Audit: Special Data Request, 2003.)

¹⁴ We examined three measures of major health problems—diabetes, heart disease, and asthma—which suggest need for prescription drugs and which were conveniently available through the Kaiser Family Foundation, State Health Facts Online, www.statehealthfacts.org, and elsewhere. We did not attempt to compare a wide variety of health status measures; other measures of ill health may prove still more powerful in predicting drug cost burden (and use rates, which we examine later).

¹⁵ Adult rates of diagnosed diabetes reported at The Kaiser Family Foundation, State Health Facts Online, www.statehealthfacts.org. Data source: "State-specific Estimates of Diagnosed Diabetes Among Adults" and "Prevalence of Diabetes," Diabetes Surveillance System, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Department of Health and Human Services, 2004. Available at <http://www.cdc.gov/diabetes/statistics/prev/state/table16.htm> and <http://www.cdc.gov/diabetes/statistics/prev/national/tprevage.htm>.

¹⁶ Please note that we are not saying that having fewer physicians per capita causes a higher drug cost burden as a share of income. Rather, we would suggest that states with higher rates of many illnesses often have lower average incomes, and these states also tend to have fewer physicians per capita.

Data on physician-to-population ratios are from the American Medical Association, as reported in Table 163, *Statistical Abstract of the United States*, 2003, <http://www.census.gov/statab/ranks/rank18.xls>. That table "excludes doctors of osteopathy, federally employed persons, and physicians with addresses unknown. It includes all physicians not classified according to activity status."

¹⁷ "Health Insurance Coverage in the United States: 2002," U.S. Bureau of the Census, P60-223, September 2003, Table 4, <http://www.census.gov/prod/2003pubs/p60-223.pdf>. We used the two-year averages, for 2001-2002, because two-year averages are more accurate, particularly for states with fewer people. Note that these data are on people who

lack coverage entirely. Because many people with some health coverage—notably Medicare patients without supplemental coverage—lack prescription drug benefits, far more people are uninsured for prescription drugs.

Results of the regression might have changed somewhat if it used estimates on the shares of *people without prescription drug coverage* (see, for example, our earlier state estimates in Alan Sager and Deborah Socolar, *A Prescription Drug Peace Treaty: Cutting Drug Prices to Make Prescription Drugs Affordable for All and to Protect Research – with State-by-State Savings*, Boston: Health Reform Program, Boston University School of Public Health, 5 October 2000, www.healthreformprogram.org).

¹⁸ Age-adjusted heart disease death rates per 100,000 population, 2000: National Vital Statistics System data, CDC, from U.S. CDC, *2003 State Health Profiles*, p. 116, <http://www.cdc.gov/epo/shp/pdf/SHP2003.pdf>.

¹⁹ Share of population over age 65 for 2001-2002 reported at The Kaiser Family Foundation, State Health Facts Online, www.statehealthfacts.org. Data source: Urban Institute and Kaiser Commission on Medicaid and the Uninsured estimates based on pooled March 2002 and 2003 Current Population Surveys. KFF reports that the total U.S. numbers are based on March 2003 estimates.

²⁰ Note that an average of figures for all the states (not weighted by their populations) is different from the national average.

²¹ We included physician supply in our analysis to learn whether having more physicians in a state would mean higher prescription drug use and cost burdens, other things equal. As discussed in Appendix 4 and Appendix 5, higher numbers of physicians were associated with higher use rates. But we found that where there were more physicians, there were also lower drug cost burdens. Those tend to be richer states. Again, this is probably because higher income is independently associated both with having more physicians and with lower drug cost burdens.

²² This figure indicates how likely it is that the difference shown, between high and low states, would result simply from chance, rather than reflecting a real difference between the groups. For example, the difference between high-burden and low-burden states on 2002 prescription drug sales per person is so great that it has only a one-in-ten-thousand likelihood of arising by chance. The same is true for the difference on heart disease death rates. On the other hand, the high probabilities listed for both the share uninsured and the asthma rate indicate that the difference shown between the two groups of states is so small that it is very likely to be a matter of chance. That is, it does not reflect a significant difference.

²³ We acknowledge that looking only at the top dozen states is inevitably arbitrary. We note that six states are virtually tied with tenth-ranked Oklahoma (with drug costs equaling about 2.2 percent of personal income); of those, Florida and Michigan are included here in the top 12.

²⁴ In a separate analysis across the states, we found a negative correlation between average price and the average number of prescriptions per person, with an R-squared of – 0.35. Note, of course, that this depicts correlation, not causation.

²⁵ And, as Exhibit 4 showed, states with a higher 2002 burden tended to have greater 1998-2002 increases.

²⁶ As noted earlier, the estimate that U.S. drug cost burden averaged 1.8 percent in 2002, shown in Exhibit 1, rested on data from the Centers for Medicare & Medicaid Services. The estimate in Exhibit 6, 1.9 percent, reflects the slightly higher 2002 U.S. drug spending figure from the Kaiser Family Foundation/ Verispan-Scott Levin data set, which provided figures on state-level 2002 drug spending.

²⁷ Although the data on drug spending per capita by state are from two different data sources (Verispan-Scott Levine data from www.kff.org for 2002, and federal government data for 1998), we found a Pearson correlation of 0.8046 between them. Ranks on state burden are fairly consistent; only 14 states (28 percent) changed by more than 5 positions between 1998 and 2002. (Assuming changes are not artifacts of the use of different data sources, substantial changes in a state's rank on drug cost burden between 1998 and 2002 could reflect change in drug spending, personal income, or both.)

The 2002 figures from Verispan Scott-Levin do not reflect mail order pharmacy sales; this may skew the apparent evidence on change because the 1998 data from the federal government reportedly do include mail-order sales. The 2002 burden and rise may be understated in states where use of mail-order rose substantially more than average.

A similar caution is necessary because, as noted earlier, the 2002 state figures do not systematically take account of discounts and rebates, while the federal government's data reportedly are adjusted to that end. It is likely, however, that the reports from pharmacies underlying the 2002 figures do in fact reflect some such price reductions, and that the 1998 figures do not fully reflect rebates, which are rarely made public. To the extent that these sources do differ, the estimated rise in burden may be overstated, although fluctuations over time in the extent of drug discounting further complicate the picture. It is reassuring, however, that using a consistent national time series, we saw in Exhibit 1 a similar rise in burden of about one-half (from 1.2 percent in 1998 to 1.8 percent in 2002) over that period for the U.S. as a whole.

²⁸ Calculated from prescription drug expenditure data by state for 1998 from U.S. Department of Health and Human Services, Centers for Medicare and Medicaid Services, Office of the Actuary, at <http://www.cms.hhs.gov/statistics/nhe/default.asp>.

³⁰ Calculated from prescription drug expenditure data by state for 1998, from U.S. Department of Health and Human Services, Centers for Medicare and Medicaid Services, Office of the Actuary, at <http://www.cms.hhs.gov/statistics/nhe/default.asp>, and from data on personal income from Bureau of Economic Analysis.

³¹ Maine increase was second only to the rise in Delaware, where personal income is substantially higher, and burden therefore is lower.

³² Maine's rise in drug spending per capita was also second-highest from 1990-1998. Note that these figures for the period before 1998 are for drug spending, not burden. Calculated

from prescription drug expenditure data by state for 1990, 1994, and 1998, from U.S. Department of Health and Human Services, Centers for Medicare and Medicaid Services, Office of the Actuary, at <http://www.cms.hhs.gov/statistics/nhe/default.asp>. (Data not shown here.)

³⁴ The adjacent state of New Hampshire enjoyed an even slower rise in drug cost burden from 1998 to 2002 (as shown in Exhibit 10 in Appendix 8).

³⁵ Alan Sager, *Testimony on the Pharmaceutical Availability and Affordability Act of 2004, HB 4084*, West Virginia Legislature, 19 February 2004, www.healthreformprogram.org; and Alan Sager, "Feeling Ill? Senate Stripped Drug Bill of Mandatory Pricing Provision," *Charleston Gazette*, op. ed., 5 March 2004.

³⁶ Burden for 2002 calculated from drug spending and income data reported at The Kaiser Family Foundation, State Health Facts Online. Data Source: Verispan Scott-Levin, Source^(TM) Prescription Audit: Special Data Request, 2003. Prescription drug spending per capita in Tennessee also soared. It rose from tenth place in 1998 to first in 2002, more than doubling, for a steeper climb than in any other state.

³⁷ The people cut off of Medicaid, despite some officials' claims, will not be able to rely on Medicare instead. That's because Medicare's coverage will not be remotely as good as Medicaid's. Neither the newly introduced Medicare discount cards nor the program planned for 2006 provide comprehensive, affordable coverage. This is "the deepest cut in Medicaid eligibility for senior citizens and the disabled that has ever been approved anywhere in the U.S.," reports Bob Herbert, "Punishing the Poor," *New York Times*, 11 June 2004, <http://www.nytimes.com/2004/06/11/opinion/11HERB.html>. See also, for example, Julie Goodman, "Lawmakers hear Medicaid recipients' pleas," *Clarion-Ledger*, 9 June 2004, <http://www.clarionledger.com/apps/pbcs.dll/article?AID=/20040609/NEWS010504/406090396/1002>.

³⁸ See, for example, Robert Pear, "Senator Lott Says He Will Back Drug Imports," *New York Times*, 12 March 2004; Robert Pear, "Group of Senators Agrees on Drug Imports," *New York Times*, 21 April 2004. Senator Lott is among the nine original co-sponsors of S.2328, the Senate bill to permit drug imports that was introduced by Senator Byron Dorgan (ND) on 21 April 2004.

³⁹ " 'I cannot explain to my mother any longer why she should pay twice or two-thirds more than what is paid in Canada and Mexico,' said Mr. Lott..." (As quoted in Robert Pear, "Senator Lott Says He Will Back Drug Imports," *New York Times*, 12 March 2004.)

⁴⁰ Alan Sager and Deborah Socolar, *A Prescription Drug Peace Treaty: Cutting Drug Prices to Make Prescription Drugs Affordable for All and to Protect Research – with State-by-State Savings*, Boston: Health Reform Program, Boston University School of Public Health, 5 October 2000, www.healthreformprogram.org. This figure has risen since 2000 owing to the rise in the number of Americans without any health insurance, and also to the rise in the number of Medicare patients lacking prescription drug insurance. The latter is attributable largely to the decline in corporate retiree health insurance—and this, in turn, is attributable largely to the rise in prescription drug prices.

⁴¹ Current use rates probably reflect much inappropriate prescribing (nationally, and especially in some states). But good systematic evidence to document national levels of inappropriate prescribing, let alone differences by state across the full range of drug categories, is apparently not available. One reason is that much remains to be learned about appropriate prescribing practices. Many problems—some attributable to weak foundations of scientific evidence and to misleading uses of science—have been identified. Apparently undesirable prescribing patterns should be challenged. Still, some persisting efforts to change inappropriate over-prescribing have not yet succeeded, suggesting that few such patterns are likely to change quickly or easily.

⁴² A few new drugs are exceptions, particularly some biotech products.

⁴³ We estimate, for example, that the average marginal cost of manufacturing is about 5 percent of retail price. See Alan Sager and Deborah Socolar, *A Prescription Drug Peace Treaty: Cutting Prices to Make Prescription Drugs Affordable for All and to Protect Research, with State-by-State Savings*, Boston: Health Reform Program, Boston University School of Public Health, 5 October 2000.

⁴⁴ IMS Health, "IMS Reports 8 Percent Constant Dollar Growth in 2002 Audited Global Pharmaceutical Sales to \$400.6 Billion," www.imshealth.com, accessed 26 February 2003.

⁴⁵ See Alan Sager and Deborah Socolar, "Ensuring a Supply of Affordable Drugs," *Boston Globe*, 21 June 2004, http://www.boston.com/news/globe/editorial_opinion/oped/articles/2004/06/21/ensuring_a_supply_of_affordable_drugs/.

⁴⁶ The RAND health insurance study estimated a price-elasticity of demand of only about 0.3. But this was conducted in the 1970s—a very different world of pharmaceuticals, one with far fewer high-cost chronic-use drugs than are prescribed today. The price-elasticity for such drugs can be expected to be much greater than for a short course of antibiotics, for example. Further, the RAND study intentionally and for good reason excluded older or disabled patients, those most likely to need high-cost chronic-use drugs. Drug companies' advertising and marketing have probably shifted price-elasticity as well. We therefore suggest that the present price-elasticity is substantially above 0.3. See Alan Sager and Deborah Socolar, *How Much Would Drug Makers' Profits Rise under a New Medicare Prescription Drug Benefit? A Response to PRI/PwC's Undocumented and Disjointed Critique of our 31 October 2003 Report*, 2nd Edition, Boston: Health Reform Program, Boston University School of Public Health, 12 April 2004, www.healthreformprogram.org.

⁴⁷ See, for example, Alan Sager and Deborah Socolar, *A Prescription Drug Peace Treaty: Cutting Prices to Make Prescription Drugs Affordable for All and to Protect Research, with State-by-State Savings*, Boston: Health Reform Program, Boston University School of Public Health, 5 October 2000.

⁴⁸ This approach is outlined in Alan Sager and Deborah Socolar, "Ensuring a Supply of Affordable Drugs," *Boston Globe*, 21 June 2004, http://www.boston.com/news/globe/editorial_opinion/oped/articles/2004/06/21/ensuring_a_supply_of_affordable_drugs/.

⁴⁹ The 50-state average burden of 1.96 percent exceeds the nationwide average of 1.8 percent because there are many states with smaller populations but relatively high burdens.

⁵⁰ As reported at The Kaiser Family Foundation, State Health Facts Online, www.statehealthfacts.org. Data Source: Verispan Scott-Levin, Source^(TM) Prescription Audit: Special Data Request, 2003.

⁵¹ Calculated from data on all retail prescription drug sales by state, as reported at The Kaiser Family Foundation, State Health Facts Online, www.statehealthfacts.org. Data Source: Verispan Scott-Levin, Source^(TM) Prescription Audit: Special Data Request, 2003. Ranks calculated by the authors. (Note: The Verispan Scott-Levin sample apparently does not include mail-order pharmacies.)

⁵² Average prices reported at The Kaiser Family Foundation, State Health Facts Online, www.statehealthfacts.org. Data Source: Verispan Scott-Levin, Source^(TM) Prescription Audit: Special Data Request, 2003. Ranks calculated by the authors.

⁵³ Number of prescriptions per capita reported at The Kaiser Family Foundation, State Health Facts Online, www.statehealthfacts.org. Data Source: Verispan Scott-Levin, Source^(TM) Prescription Audit: Special Data Request, 2003. Ranks calculated by the authors.

⁵⁴ That is, if the closeness of the factor's relation with burden would be found by chance fewer than five times in 100.

⁵⁵ For the range, the prescription drug use rate in Tennessee (16.7 per person) is two and one-half times (or 146 percent above) the rate in Alaska (6.8).

⁵⁶ As noted earlier, the heart disease death rate is in part a gauge of severe heart disease, but may also reflect the quality or accessibility of care available to patients.

⁵⁷ Adult Self-Reported Current Asthma Prevalence Rate (Percent) and Prevalence (Number) by State or Territory: BRFSS 2002, Table C1, <http://www.cdc.gov/asthma/brfss/02/current/tableC1.htm>

⁵⁸ Tennessee, the state showing the highest use rate, is slightly younger than the U.S. average by this measure, with 11 percent of its residents over age 65, as compared with 12 percent nationally, according to the Census Bureau's 2002-2003 Current Population Survey. Other analyses, however, have described the state as slightly older than the national average (including Richard Gurley, *Prescription Drug Costs in Tennessee*, Nashville: Office of Research, Office of Comptroller of the Treasury of Tennessee, November 2002, pp. lii, 42-44, <http://www.comptroller.state.tn.us/orea/reports/tcdrugfinal.pdf>). In contrast, in the 2000 Census, Tennessee had a median age of 35.9 years to 35.3 for the nation, and it equaled the U.S. average of 12.4 percent of residents age 65 and over. The state may appear younger than the U.S. average in the measure used here owing to limitations of the smaller sample in the CPS, even with two years' of data pooled. (Share of population over age 65 for 2001-2002 reported at The Kaiser Family Foundation, State Health Facts Online, www.statehealthfacts.org. Data source: Urban Institute and Kaiser Commission on Medicaid and the Uninsured estimates based on pooled March 2002 and 2003 Current

Population Surveys. KFF reports that the total U.S. numbers are based on March 2003 estimates.)

⁵⁹ Share of population over age 65 for 2001-2002 reported at The Kaiser Family Foundation, State Health Facts Online, www.statehealthfacts.org. Data source: Urban Institute and Kaiser Commission on Medicaid and the Uninsured estimates based on pooled March 2002 and 2003 Current Population Surveys. KFF reports that the total U.S. numbers are based on March 2003 estimates.

⁶⁰ Share of population over age 75 for 2001-2002 reported at The Kaiser Family Foundation, State Health Facts Online, www.statehealthfacts.org. Data source: Urban Institute and Kaiser Commission on Medicaid and the Uninsured estimates based on pooled March 2002 and 2003 Current Population Surveys. KFF reports that the total U.S. numbers are based on March 2003 estimates.

⁶¹ Calculated from average prices reported at The Kaiser Family Foundation, State Health Facts Online, www.statehealthfacts.org. Data Source: Verispan Scott-Levin, Source^(TM) Prescription Audit: Special Data Request, 2003. Note that these refer to the high and low quarters of states on *prices*, so the results differ from those in Exhibit 4, which concerns the high- and low-*burden* quarters. Note also that several high-price states have large populations, so the highest-priced quarter of states includes roughly 40 percent of the nation's population, and only 14 states have prices above the U.S. average.

⁶² Note, too, that there was no relationship found between the share uninsured and average drug price in a simple Pearson correlation. (See also Exhibit 4, which suggests that the difference in the share uninsured between the high- and low-burden states was not statistically significant.)

⁶³ In 23 states with strong pharmacy-freedom laws, prescription prices averaged \$51.67 in 2002, but prices in 21 states with no freedom of choice averaged \$54.36 per prescription—or five percent higher. See Alan Sager, "Prescriptions cheaper, closer – Pharmacy freedom of choice for R.I.," *Providence Journal*, 22 April 2004, http://www.projo.com/opinion/contributors/content/projo_20040422_22ctsager.203c4d.html. Disclosure: Dr. Sager has served as a paid consultant to the Rhode Island Pharmacy Freedom of Choice Campaign. (See 2004 and 1999 reports at www.pharmacychoicenow.org.)

Our studies documenting problems of reduced patient access to pharmacies date to before that work. See, for example, Alan Sager and Deborah Socolar, *Pharmacy Closings in Massachusetts, 1980-1995*, 15 May 1997, and Alex Pham, "Massachusetts Lost 26.4% of Drugstores in 15 Years: Study Concludes Minority Areas Were Hit Hardest," *Boston Globe*, 14 May 1997.

⁶⁴ Prescription drug spending per person apparently rose faster than in any other state over those four years, while income rose at about the national rate.

⁶⁵ Price increases and average prices reported at The Kaiser Family Foundation, State Health Facts Online, www.statehealthfacts.org. Data Source: Verispan Scott-Levin, Source^(TM) Prescription Audit: Special Data Request, 2003. Ranks calculated by the authors.

⁶⁶ Note that heart disease death rates may be affected not only by disease prevalence but also by the quality and accessibility of care, including inappropriate prescribing practices.

⁶⁷ The state comptroller's office cited evidence that Tennessee has the nation's highest rate of penicillin use (and a high rate of penicillin resistance), and ranked first in spending on calcium channel blockers, a drug type whose use in some instances has been questioned, and suggested that these patterns need more investigation. It also reported recent Novartis data showing that per person spending in Tennessee was the nation's highest in 13 of 32 classes of prescription drugs (62 percent above the U.S. per capita average for estrogen products, for example). The numbers of prescriptions per capita in 20 categories were at least 40 percent above the national average. (Richard Gurley, *Prescription Drug Costs in Tennessee*, Nashville: Office of Research, Office of Comptroller of the Treasury of Tennessee, November 2002, pp. 33-34, 46, 63. <http://www.comptroller.state.tn.us/orea/reports/tcdrugfinal.pdf>.) Similar evidence on number of prescriptions for 2002 in Tennessee can be seen at www.novartisvin.com.

⁶⁸ Among the states, Tennessee attracts the second-largest net inflow of patients for physician, hospital, and other services, and many may find it convenient to fill prescriptions near their caregiver. See Anne Martin and others, "Health Care Spending During 1991-1998: A Fifty-State Review," *Health Affairs*, July-August 2002, pages 121-122, Exhibit 5.

⁶⁹ West Virginia also ties Florida, Maine, and Kansas on residents over age 75, with eight percent. Share of population over age 75 for 2001-2002 reported at The Kaiser Family Foundation, State Health Facts Online, www.statehealthfacts.org. Data source: Urban Institute and Kaiser Commission on Medicaid and the Uninsured estimates based on pooled March 2002 and 2003 Current Population Surveys. KFF reports that the total U.S. numbers are based on March 2003 estimates.

Further, according to the Census Bureau, "West Virginia also has the highest median age of any state." As reported in U.S. Bureau of the Census, "Anniversary of Americans with Disabilities Act," CB04-FF.11, 26 May 2004 (emailed).

⁷⁰ U.S. CDC, "Adult Self-Reported Current Asthma Prevalence Rate (Percent) and Prevalence (Number) by State or Territory," BRFSS 2002, Table C1, <http://www.cdc.gov/asthma/brfss/02/current/tableC1.htm>

⁷¹ The Census Bureau reports that 24 percent "of West Virginia residents 5 or older...have at least one disability, the highest rate in the nation." U.S. Bureau of the Census, "Anniversary of Americans with Disabilities Act," CB04-FF.11, 26 May 2004 (emailed).

⁷² Share of population over age 65 for 2001-2002 reported at The Kaiser Family Foundation, State Health Facts Online, www.statehealthfacts.org. Data source: Urban Institute and Kaiser Commission on Medicaid and the Uninsured estimates based on pooled March 2002 and 2003 Current Population Surveys.

⁷³ Adult rates of diagnosed diabetes reported at The Kaiser Family Foundation, State Health Facts Online, www.statehealthfacts.org. Data source: "State-specific Estimates of Diagnosed Diabetes Among Adults" and "Prevalence of Diabetes," Diabetes Surveillance System, National Center for Chronic Disease Prevention and Health Promotion, Centers for

Disease Control and Prevention, Department of Health and Human Services, 2004.
Available at <http://www.cdc.gov/diabetes/statistics/prev/state/table16.htm> and
<http://www.cdc.gov/diabetes/statistics/prev/national/tprevage.htm> .

⁷⁴ Age-adjusted heart disease death rates per 100,000 population, 2000: National Vital Statistics System data, CDC, from U.S. CDC, *2003 State Health Profiles*, p. 116,
<http://www.cdc.gov/epo/shp/pdf/SHP2003.pdf>

⁷⁵ Physician-to-population ratios are from the American Medical Association, as reported in Table 163, *Statistical Abstract of the United States*, 2003,
<http://www.census.gov/statab/ranks/rank18.xls>

That table “excludes doctors of osteopathy, federally employed persons, and physicians with addresses unknown. Includes all physicians not classified according to activity status.”