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Adverse Selection and the Challenges to Stand-Alone Prescription Drug Insurance

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Executive Summary

This paper investigates a possible predictor of adverse selection problems in unsubsidized stand-alone prescription drug insurance: the persistence of an individual's high spending over multiple years. Using Medstat claims data and data from the Medicare Survey of Current Beneficiaries, we find that persistence is much higher for outpatient drug expenses than for other categories of medical expenses. We then use these estimates to develop a simple and intuitive model of adverse selection in competitive insurance markets and show that this high relative persistence makes it unlikely that unsubsidized drug insurance can be offered for sale, even with premiums partially risk adjusted, without a probable adverse selection death spiral. We show that this outcome can be avoided if drug coverage is bundled with other coverage, and we briefly discuss the need either for comprehensive coverage or generous subsidies if adverse selection is to be avoided in private and Medicare insurance markets.

I. Introduction

Providing insurance coverage against expenditures for prescription drugs through unsubsidized but sometimes regulated private insurance markets has proved to be difficult. Medigap policies for the elderly provide only limited coverage and are not taken by many of those over 65. Of those not covered by employer-paid plans, only a small fraction of seniors take a Medigap policy that pays anything for drugs. For people under age 65, drug-only coverage is almost unavailable, and some managed-care insurers are putting upper limits on the bundled coverage they do offer. In this paper, we use novel methods applied to claims data to show that adverse selection is an important cause of the absence of or limits to stand-alone drug coverage for both populations.

We also argue that private markets without substantial subsidies will not be able to offer stand-alone drug coverage. This means, we will show, that such coverage is neither to be expected nor desired for the under-65 population; the more integrated coverage that characterizes managed care may therefore be more feasible than a return to the old Blue system in which each type of provider fielded a separate type of insurance. We also show that Medicare policy makers should likewise be cognizant of the chance of adverse selection for stand-alone coverage. If stand-alone coverage is not feasible for the under-65 population, as we show, that analysis also provides evidence that it is also likely (perhaps even more likely) not to be feasible for the over-65 population. Examination of adverse selection in the under-65 market is of interest in its own right, both as a test of the general hypothesis that unsubsidized, unbundled coverage is not feasible and as a warning that such coverage is neither to be encouraged nor expected.

We then go further to develop a method that shows what type of bundling and/or what types and levels of subsidies would be needed to make voluntary drug coverage (public or private) workable. We illustrate these methods with data for both the under-65 and the over-65 (Medicare) populations.

II. Adverse Selection in Concept and Application to Prescription Drugs

A potential threat to the efficiency and even the feasibility of unsubsidized private-market insurance coverage for any expense is adverse selection. Adverse selection occurs when potential insurance buyers are better able to predict their expected benefits from insurance than are insurers, or when insurers are forbidden to charge higher premiums to those they expect to claim higher benefits. Such special buyer knowledge, should it occur, can have many causes, but adverse selection by new health insurance purchasers is surely more likely if there are health conditions known to the buyer for which above-average expenditures will persist over time (Crippen 2002).

If the insurer is not as well informed as is the buyer about the existence of these conditions, or the insurer is not permitted to charge higher premiums to those expected to have higher expenses, a buyer with high and persistent expenditures in one period will be eager to obtain generous insurance coverage of that type of expenditure for the next period at premiums that do not fully reflect the higher expected benefits. Similarly, those with low expected expenses will be less willing to pay insurance premiums that substantially exceed their expected claims.

While insurers may ask applicants about prior-period spending, it will be difficult for them to enforce truthful revelation for prospective purchasers they have not previously insured and for whom they have no prior claims data. Community rating rules may prevent them from gathering or using that information. Because group insurance typically does not vary the premiums with risk across options, and because Medicare itself is likely to use a uniform premium for any drug coverage option, in what follows we usually assume pure community rating. We do, however, inquire whether using adjusted community rating (adjusting premiums for age and gender) would make a difference and find that it would not. In summary, adverse selection in the sale of new coverage is likely to be a more serious problem, other factors being equal, for conditions and medical product expenditures that persist over time than for conditions and product expenses which are unexpected and generally resolve fairly quickly (by patient recovery or death).

Another vehicle used by buyers to engage in adverse selection when consumers can choose among different health plans (in individual or group markets) is an ability to select the details of coverage for various types of expenses. Most generally, it is easier for buyers to engage in adverse selection if they can pick and choose the amounts and types of coverage rather than take or leave a predetermined broadbased policy. If a person knows that he or she had high previous-period medical expenses on certain medical goods or services, adverse selection is enhanced by the ability to choose coverage that only (or primarily) covers these costs.

Thus, we investigated the persistence over time of high levels of spending for a type of medical care that is often a candidate for selective coverage: outpatient prescription drug expense. The problem of adverse selection is thought to be especially acute in individually chosen, unsubsidized, but regulated and partially community-rated Medigap drug coverage. The failure of basic Medicare to cover outpatient drugs has meant that seniors with incomes above the Medicaid limits seeking such coverage must do so largely in the currently unsubsidized private market, either in the form of supplementary Medigap coverage or a managed-care plan with such coverage. For the under-65 population, there is at present much less stand-alone drug coverage than in Medicare (probably for the reasons we identify), but the extent of coverage can vary across the options available to employees in larger firms or to purchasers in the individual market.

Several sources of data exist for prescription drug benefits for both under-65 and over-65 (Medicare) populations. Because we wanted to investigate the effect of combining, or bundling, drug coverage with other coverage, this study required information on a population's use of benefits for all covered medical services as well as for drugs. Because we wanted to examine persistence over a reasonably long period of time, we wanted data that covered multiple years. Therefore we examined two sets of data: (1) a large sample of claims data for drugs *and* other kinds of medical spending for a working-age population and (2) data on Medicare beneficiaries from the Medicare Current Beneficiary Survey (MCBS). We also used a subanalysis of workers in the five years before Medicare eligibility at age 65 to show that the problem of persistence in spending is worse for them than for younger adults because the extent of and prevalence of persistent expenditures increases with age.

The key issue in predicting the extent of adverse selection is the distribution of expected expenses in a population charged a uniform insurance premium. We propose a simple method to estimate this distribution and to use this estimate along with an assumption about the strength of risk aversion to see if adverse selection is likely to emerge.

Our research differs from that presently available in several ways. Some studies examine the persistence of drug spending from one year to the following year only (Ettner 1997; Long 1994; van Vliet 1992; Wouters 1991, Coulson and Stuart 1992), but we follow spending over periods of three to five years. Some studies looked at long-term persistence for total medical-care spending (Eichner et al. 1998), but none explored the category of drug spending. Some studies also looked at adverse selection (and moral hazard) in the Medigap market as a whole (Wolfe and Goddeeris 1991). They used sophisticated (but rather fragile) econometric methods to determine adverse selection and separate it from moral hazard. They also did not look at drug spending and drug coverage specifically. In contrast, we use a different method based on direct estimation of the distribution of risks to judge the likelihood of adverse selection, and we apply that method to drug coverage as well as comprehensive coverage. The recent study by Atherly (2002) is closest to ours because it looks at adverse selection in Medigap drug coverage, but it does not consider more comprehensive drug coverage or stand-alone drug coverage.

III. Methods

First we explore the relative importance of persistence in prescription drug expenditures compared to other expenditures. To show the impact of persistence and selective coverage on adverse selection, we then take the analysis two steps further. In the first step, we simulate the equilibrium premiums in insurance markets for drug coverage alone and for comprehensive (all medical services) coverage. We show that adverse selection under community rating or with some risk rating is much worse in the former case than in the latter, in two senses. First, the ratio of the market equilibrium premium to the premium that would have prevailed if all (risk-averse) people bought coverage is higher for unsubsidized stand-alone drug insurance than for comprehensive coverage: because of the widely skewed distribution of expected expenses, low-risk people would need to pay proportionately much more than their average expenses. Even fairly risk-averse people at the median risk level would be unlikely to pay the premiums that insurers must charge to cover their costs. Second, the risk premium is smaller for stand-alone drug coverage than for comprehensive coverage precisely because drug expenses are so predictable. Indeed, for many plausible values of consumer risk premiums and some plausible assumptions about insurer premium rating, we show that it is impossible to offer stand-alone drug insurance at premiums that will cover its costs: unsubsidized insurance suffers from a death spiral.

In the second step, we illustrate the level of subsidies that would be needed to make stand-alone coverage workable. We then offer some observations on the policy trade-offs, for both Medicare and the private sector, between subsidies and the bundling of coverage.

Our initial analysis is based on claims data provided by the Medstat group for a large sample of workers and adult dependents with comprehensive insurance that covered prescription drugs over a five-year period from 1994 to 1998, inclusive. We use this data set to develop estimates of adverse selection in unsubsidized insurance for the under-65 population; the large size of this database allows us to examine the impact of several variants of the basic model. We then use the validated basic model to analyze adverse selection in the smaller MCBS data set.

The high consistency of results across both data sets reinforces our confidence in the results.

Data and Descriptive Statistics: Medstat Under-65 data

We followed the Medstat claims and benefits expenditure experience of those persons who retained coverage over the entire period. (We also looked at those who were in the database for shorter periods of time, but their experience is not described here.) We do not know the details of each person's coverage, but the plans are known to be similar in terms of coverage. Our results could be biased if people who remained with these plans over a five-year period were those with unusually high drug expenses. However, because the coverage for this population is employment-based and is chosen by and for a group of workers, not an individual worker, and because, as noted, stand-alone drug coverage is not generally available in groups, we think the bias should be small. We did not include data on people who died. But the data still provide valid measures from the viewpoint of the surviving population who might purchase insurance.

Following Eichner et al. (1998), we first describe persistence by asking what happened over time to the (relative) expenditure levels for various categories of expenditures of those who had unusually high expenses in the first period (1994). We characterize high spenders in 1994 in two ways—as being in the top quintile of 1994 expenses and as spending more than $5,000. (Those with zero expenditures are included in the population.)

There were 140,981 persons between the ages of 22 and 64 in 1998 who had continuous medical and pharmacy coverage for the period 1994–1998.[1] As shown in table 2.1, of those in the top quintile of total spending in 1994, only 46 percent remained in that quintile by 1998. The largest decline occurred in the first year, with a more gradual erosion later.

Table 2.1
Percentage of those initially in the highest quintile who remained in the highest quintile after 1994[a]

	1995	1996	1997	1998
Inpatient, outpatient, and drug expenditures	54	50	48	46
Inpatient and outpatient expenditures	47	43	42	40
Drug expenditure only	76	69	63	60

[a]*N* = 28,146 (in highest quintile); 100% of sample in highest quintile in 1994.

Table 2.1 also shows the percentages remaining in the top quintile for drug expenditures only and for total expenditures minus drug expenditures. By this measure, persistence is definitely higher for drug expenditures; 60 percent remained in the top drug-spending quintile in 1998, while only 40 percent remained in the top quintile for expenditures other than drugs.

Table 2.2 shows the percentage of those with expenses above $5,000 who also had expenses above that level in the next year, a measure used by Eichner et al. (1998). Persistence tends to rise with age, and our figures are very close to those in the Eichner study.

Next we calculated, for each of the expenditure categories, the ratio of the average expenditure in each year of those who were in the top quintile in 1994 to the average expenditure for the entire population in that year. The higher this number, the more likely is adverse selection. As shown in table 2.3, the ratio between the average or expected expenses of high spenders and the community (average) rate is almost identical in the initial year (1994) for the two categories of spending, but in all subsequent years, it is considerably higher for drug spending only than it is for total spending. This indicates that, in any single time period, drug expenditures display about the same amount of skewedness as other medical expenditures. The major difference is that, in subsequent periods, those with unusually high drug expenses

Table 2.2
Percentage spending more than $5,000 in second year, by age: comparison of results

Age	Our data	Eichner et al. (1998)
0–17	20.59	19.21
18–35	19.46	20.79
36–45	24.14	25.07
46–55	25.78	28.6
56–65	29.64	26.6

Table 2.3
Ratio of top quintile average spending to overall average spending[a]

	1994	1995	1996	1997	1998
Total spending	3.9	2.5	2.3	2.2	2.2
Drug spending	3.9	3.5	3.2	3.0	2.8

[a] N = 140,981 (for overall spending); N = 28,146 (for highest quintile).

are much more likely to repeat that high spending than are those initially with high spending in other categories. The level of expected drug expenses is much more predictable for an individual than is the level of other expenses.

Potential Adverse Selection in the Medstat Data

To determine the potential seriousness of adverse selection for different types or combinations of types and to determine whether it might be serious enough to cause a death spiral, we used a simulation model. Under the assumption that the person must either buy the indicated coverage or none at all, we assume various levels of risk aversion and estimate what proportion of consumers will continue to buy coverage and what will be the average expense of those willing to buy. For the present, we also ignore moral hazard and assume that the level of expense that insurance will cover is the same as the expense the person who declines coverage would pay out-of-pocket.

We approach this problem in two ways, which we label statistical and economic. In both cases we focus on predicting 1998 expenses. The methods differ in the technique used to estimate the expected expense for each person. In the statistical (or actuarial) approach, people are classified into cells based on age, gender, and prior spending. The cell mean expense in 1997 is used as an estimate of expected expense in 1998; this approach explores persistence only over a two-year period. In the economic approach, in contrast, a regression relating expenses in 1998 to age, gender, and expense in the previous four years is used to generate expected expense in the last year both for drug spending and for spending on other types of inpatient and outpatient medical care.[2]

This expected expense (estimated under either method) compared to actual expense generates an estimate of the variance of expenses, which is combined with an assumed uniform risk-aversion coefficient to generate a value for the risk premium (Phelps 2003). The same approach to estimating the risk premium is used in both the statistical and economics methods; the methods differ in how they generate estimates of the variance in spending for individuals. Note that the more predictable the expense, the lower the variance and therefore the lower the buyer risk premium (and the more likely is adverse selection, other factors being equal). Adding the risk premium to the expected expense yields a reservation price for full insurance coverage for a given type of expense for each person. If the reservation price for a person at a given risk level is less than the insurance premium that would be charged, we assume that the person declines coverage. Allowing the risk-aversion coefficient to vary across individuals for a given value of the variance of spending would not alter the results as long as it is not correlated with expected expense or variance.

The key step then is to determine for a given policy (described by full coverage of the batch of covered expenses: all expenses; all expenses less drug spending; drug spending only) whether there is a stable equilibrium or whether there is a spiral that drives some or all potential insured persons at a given risk level out of the market. That is, we ask what proportion of the initial population would be willing to pay the premium that a hypothetical actuarially fair insurer would have to charge to cover the insurer's own expenses.[3]

We consider full coverage insurance without patient cost sharing and initially ignore moral hazard. We also ignore insurer administrative costs and initially assume that the insurance premium must be strictly community rated but sufficient to cover benefits costs so that the premium charged for a policy offered to a given set of people is the average expected expense for the people in that set. Offering that policy at that premium is then a potential equilibrium if each person in the set has a reservation price for insurance that equals or exceeds the insurance premium. For example, one could begin considering whether the community rated premium is below the reservation price of the people in the lowest percentile of expected expenses in the set. If the reservation price falls short of the premium for some of the lower-risk percentiles, we then delete those persons from the data set, compute the breakeven premium again, and check to see if it is below the reservation price of the lowest risk percentile remaining. Finally, as mentioned above, we assume pure community rating unless explicitly noted otherwise.

A Simple Statistical Model

We wish to illustrate how adverse selection is related to the degree of persistence of spending over time and the relative importance of that influence on expected expense. We begin with a simple benchmark model that gives maximum influence to previous-period spending.

We first classify the 141,000 observations on adults by age and gender into eighteen cells and, within each age-gender cell, by deciles of 1997 spending. Using the population represented by all of the observations that fell in a decile in 1997, we calculate the mean 1998 expense for that population. We then assume, for each decile age-gender cell, that this quantity is the estimate of expected expense for everyone in the cell.[4] (We have also estimated models with disaggregation into unit percentiles with similar results.) That is, we assume that consumers used this realized mean as their estimate of expenses that they expect in 1998. (To the extent that individual consumers use more information than we have assumed, adverse selection will be even worse.) We also assume that the variance of within-cell spending about the cell mean provides an estimate (used by consumers in that cell) of the expected variance of spending for individuals in each cell.

To calculate the risk premium, we must make an assumption about risk aversion. We use various assumed values for the "coefficient of risk aversion" (Phelps 2003). If we use a coefficient of risk aversion of 0.0002, for example, we calculate the risk premium *RP* according to the formula:

$RP = 0.5\ (0.0002)(\text{variance of spending})$

We then define the reservation price *P* by:[5]

$P = RP + (\text{expected expenses})$

If all persons were expected to purchase insurance, the 1998 competitive (breakeven) community-rated premium would be the mean of 1998 benefits *B*. (Other administrative costs and insurer profit are ignored here.) That premium would be a competitive equilibrium price only if every person had a higher reservation price than the premium. If that were the case, all would buy insurance, and average expenses for insured persons would turn out to be just covered by the insurer's premium, which equals the population's average expense.

Suppose, however, that *P* for the lowest risk decile is less than *B*. All the persons with risk in that decile will decline coverage, and an insurer would anticipate incurring expenses that are the mean of expenses for persons in the other nine deciles, an amount larger than *B*. We then determine whether *P* for the second lowest decile is higher or lower than this new mean. If it is not, the premium will have to increase further, and the process continues until we reach a decile at which the value of *P* for that decile is greater than the mean expense or premium for the remaining population of purchasers. If the only group for which this is true is the highest decile of 1997 expenses, we can say that there has been a death spiral in which all people but those with the highest risks have been driven from the market.

Table 2.4 shows the simulation results from this process. (Note that, because the table shows the result of a simulation, not an estimation, there are no goodness of fit or other statistical measures.) The numbers in the table indicate the decile of spending above which insurance would be purchased in equilibrium for a range of plausible values for risk aversion.[6] For example, if $r = 0.0002$, the equilibrium for total spending occurs in the seventh decile, which means that somewhat more than half of the population (those in deciles 1 to 6) would not buy insurance to cover all medical costs because the premium exceeds their reservation prices, but a sizable minority would be willing to purchase. In contrast, according to this method, the equilibrium premium for drug-only coverage occurs in the tenth (highest) decile, which means that only the people with the very highest risks (if anyone) would buy drug coverage. Altering the assumed degree of risk aversion affects the proportion of the population who would buy comprehensive coverage, but there is no plausible level of risk aversion at which most people buy stand-alone drug coverage.

An Economic Model

The alternative estimation approach begins with a regression of 1998 expenses on a constant term and expenses in the previous four years, controlling (with binary variables) for age and gender. The regression equation is:

$$\text{DRUGEXP}_{it} = \sum_{k=1}^{4} \alpha_{ik}\, \text{DRUGEXP}_{t-k} + \sum_{j}^{n} \text{AGEGENDERDUM}_j$$

where DRUGEXP_{it} is the drug expense of a person i in period t, and AGEGENDERDUM_j is a binary variable for whether the person is in the jth of n different age-gender cells.

We used a linear functional form based on previous work (Pauly and Herring 1999) that showed a linear form to be a good predictor of expected expenses and preliminary analysis of the data that confirmed

Table 2.4

Statistical demand simulation with community rating: lowest decile at which insurance is purchased, by type of coverage and coefficient of risk aversion (CRA)

	CRA = .0001	CRA = .0002	CRA = .0003	CRA = .0009
Total	9th decile	7th decile	5th decile	1st decile
Total – drug	9th decile	5th decile	5th decile	1st decile
Drug only	10th decile	10th decile	10th decile	10th decile

this result for this data. Table 2.5 presents the variables used and some statistics from these regressions. As expected, the adjusted R squared is much higher for the drug-only regression (0.6) compared to the other two regressions (0.19 and 0.13); drug expenses are much more predictable. (Coefficients for the seventeen binary age-gender variables are not shown.) Also, the coefficients on previous-period spending are larger and more precisely estimated for drug-only spending than for the other two measures of spending. While current-period drug spending is largely determined by drug spending in the immediate past period, current-period spending on other types of medical care depends strongly on spending over several years in the recent past.

We next calculate the standard error of the prediction from the regression and use this result as an estimate of the variance of expenses for each individual. For various values of risk aversion, we then calculate the (proportional) risk premium. For example, for total expenses and r = 0.0001, the proportional risk premium is 0.745. This result implies that, rather than go without insurance, the person would be willing to pay a premium 1.745 times as high as expected expense (equivalent to a maximum loading as a percentage of premium of

Table 2.5
Regression coefficients and t statistics (dependent variable: spending in 1998)[a]

Adjusted R-squared		Coefficient	t
.6081	Drug 1997	.7788105	252.104
	Drug 1996	.1420874	30.871
	Drug 1995	.0477469	9.038
	Drug 1994	.05911	14.364
.1887	Total 1997	.3428897	116.631
	Total 1996	.134076	40.740
	Total 1995	.1210086	32.510
	Total 1994	.0962468	30.061
.1316	Inpatient and outpatient expenditures 1997	.3010067	102.155
	Inpatient and outpatient expenditures 1996	.111741	34.359
	Inpatient and outpatient expenditures 1995	.0954854	26.032
	Inpatient and outpatient expenditures 1994	.082087	26.149

[a] N = 140,981; prob > F = .0000 for all three regressions.

43 percent). In contrast, the proportional risk premium for drug-only coverage is much lower, at 0.054. Severe adverse selection occurs in drug-only coverage because of the combination of high predictability of drug spending and consequent low willingness to pay much more than expected expenses.

We apply the same proportional risk premium to each person's expected expenses to generate an estimate of the reservation price. We then arrange individuals in order based on expected expenses and follow the same procedure as in the previous case.

Table 2.6 shows the results in terms of the percentile of the distribution of expected expenses at which people buy coverage under the assumption of pure community rating. The results are striking: despite some adverse selection, comprehensive total coverage can be sold to much of the population if people are moderately risk averse; there will not be a serious spiral. But even at the highest level of risk aversion, very few buy stand-alone drug coverage. With the lowest value of risk aversion (r = 0.0001) there is also a fairly severe problem of adverse selection even with more comprehensive coverage. With higher levels of risk aversion, however, spirals do not occur for more comprehensive coverage, and 70 to 99 percent or more of the population would choose in equilibrium to obtain this insurance rather than go without. The proportion of lower risk persons who drop out is, of course, higher if drug expenses are included in the comprehensive coverage than if they are left uncovered.

We investigated what would happen if, instead of pure community rating, insurers were able or were permitted to use a modified system of community rating in which premiums varied by purchaser age and gender (which are easy to determine) but not by prior-period medical-care spending. We assume that premiums are set equal to average benefits in gender–five-year age cells. (Even our large data set does not allow precise estimates of spending for single-year age cells.) Table 2.7

Table 2.6
Economic demand simulation with pure community rating: lowest percentile at which insurance is purchased, by types of coverage and coefficient of risk aversion (CRA)

	CRA = .0001	CRA = .0002	CRA = .0003	CRA = .0009
Total	95th percentile	27th percentile	12th percentile	3rd percentile
Total – drug	83rd percentile	15th percentile	6th percentile	1st percentile
Drug only	99th percentile	99th percentile	99th percentile	98th percentile

Table 2.7
Economic demand simulation with modified community rating: lowest percentile at which insurance is purchased, by type of coverage and coefficient of risk aversion (CRA)

	CRA = .0001	CRA = .0002	CRA = .0003	CRA = .0009
Total	92nd percentile	7th percentile	3rd percentile	1st percentile
Total – drug	55th percentile	4th percentile	1st percentile	1st percentile
Drug only	99th percentile	99th percentile	99th percentile	98th percentile

shows that permitting some risk rating reduces the predicted amount of adverse selection and leads to a larger proportion of the population buying coverage, as one would expect. (In this model, high-risk people never find premiums to be unaffordable because there is no moral hazard and no income effects on the risk premium.) Even with modified community rating, however, stand-alone drug coverage cannot be profitably marketed; there are still spirals under all assumptions about risk aversion.

What happens to these estimates if we add the possibility that the expenses that consumers will pay without insurance may be less than those they pay when they have coverage? That is, what happens if we account for moral hazard, which seems to characterize outpatient drug spending (Newhouse et al. 1993, Hillman et al. 1999)? If some of the expenses paid by insured persons are caused by moral hazard and therefore have values to consumers that are less than their costs, comprehensive insurance coverage will be less attractive than in the no-moral-hazard case (Pauly 1971). More people will decline coverage, and adverse selection will be worse.

We simulate the effect of moral hazard by assuming that 20 percent of insured drug spending is attributable to moral hazard.[7] Under conventional economic assumptions, the value of this additional spending will be half of its cost.[8] The effect of moral hazard therefore is to reduce the total value of drug insurance by 10 percent. As would be expected, the combination of moral hazard and adverse selection reduces the proportion of people estimated to buy comprehensive coverage even further, by about 10 percent. As before, almost no one buys stand-alone drug insurance.

Finally, we specifically examine the Medstat experience of the age group closest to Medicare: those age 55 to 59 in 1994 (who were 60 to 64 at the end of the period). As already noted in table 2.3, the year-to-year correlation of spending is highest in the oldest age group. (The expense prediction regression for this subgroup, which is not shown, is estimated from data for this subgroup only.) Table 2.8 shows that, as before, adverse selection prevents the purchase in market equilibrium of drug-only coverage. Compared to table 2.6, the market share of coverage that bundles drug spending with other medical expenses (total expenses) is smaller for this age group than for the overall population at low values of risk aversion but is higher at higher values of risk aversion.

These simulation-based estimates of the proportion of the population remaining in the market are obviously not definitive, but they do strongly suggest that, for reasonable assumptions about parameter values, it would be very difficult for a market to offer unsubsidized stand-alone drug coverage, even in the under-65 market. Of course, a substantial tax subsidy coupled with the offer of group insurance coverage may make such a policy feasible in the employment-based group insurance market. Even here, problems are likely if stand-alone insurance were offered in a multiple-choice setting. What is most important in this analysis, however, is the comparison of market equilibria between all-inclusive coverage and drug-only coverage. Drug-only coverage causes much more severe adverse selection even if it does not go into a death spiral. Based on these findings, it should then be unsurprising that drug-only coverage is rare among the non-elderly. And in multiple-choice employment settings, it appears to be relatively rare for an employer to offer a choice among plans that do and do not offer drug coverage. While offerings vary in other dimensions, employers tend to choose either all plans with drug benefits, or no plans with drug benefits.

Medicare Drug Spending

We assembled a three-year panel (1997–1999) of Medicare beneficiaries from the MCBS. Persons with incomes so low they were on or were

Table 2.8
Economic demand simulation for persons age 60–64 with no moral hazard and pure community rating: lowest percentile at which insurance is purchased, by type of coverage and coefficient of risk aversion[a] (CRA)

	CRA = .0001	CRA = .0002	CRA = .0003	CRA = .0009
Total	99th percentile	70th percentile	1st percentile	1st percentile
Total – drug	99th percentile	1st percentile	1st percentile	1st percentile
Drug only	99th percentile	99th percentile	99th percentile	98th percentile

[a]N = 14,478.

eligible for Medicaid were excluded; the Medicare population we study is the one that might be expected to be potential purchasers of voluntary insurance. The number of observations is 2,945 in each year. We regressed 1999 spending for each person on spending in the prior two years along with additional binary variables (age and gender). (Regression results are available from the authors.) As before, the explanatory power of spending in prior periods is much greater for drug spending than for total spending ($\bar{R}^2 = 0.34$ for drug spending and 0.18 for total spending), and there is a statistically significant effect of spending in prior years on total spending.

We then used the coefficients and statistics from this regression to determine the probable extent of adverse selection. Using the same methods as we did earlier, we show in table 2.9 that stand-alone drug spending is generally not feasible for the Medicare population, even at breakeven premiums. Bundled coverage could induce voluntary purchasing, however, if risk aversion is moderate.

Needed Medicare Subsidy

Ignoring moral hazard and the possibility of risk rating, we estimated the subsidy to stand-alone drug coverage that would be needed to get 80 percent of the Medicare population to buy such coverage voluntarily if their only other alternative was no coverage. (This calculation does not account for the availability of coverage through Medicaid or employer programs; it is intended to be illustrative of the orders of magnitude involved.) We do this by setting the subsidy equal to the difference between the willingness to pay of the group at the 80th percentile and the breakeven premium for the 80 percent of the population with the highest risk. Table 2.10 shows that the estimated subsidy is large as a percentage of the premium for this group. Adding the administrative loading costs would doubtless raise the absolute and relative subsidies needed.

Table 2.9
Economic demand simulation with pure community rating for the medicare population: lowest percentile at which insurance is purchased by type of coverage and coefficient of risk aversion (CRA)

	CRA = .0001	CRA = .0002	CRA = .0003	CRA = .0009
Total	89th percentile	1st percentile	1st percentile	1st percentile
Drug only	99th percentile	99th percentile	99th percentile	64th percentile

Table 2.10
Estimated subsidy necessary to induce 80 percent of the Medicare sample to purchase comprehensive stand-alone prescription drug coverage, by coefficient of risk aversion (CRA)

	Subsidy for 80% purchase	
CRA	Dollar amount	Percentage of premium
.0001	908	91
.0002	883	89
.0003	857	86
.0009	704	71

IV. Conclusion

This analysis leads us to suspect strongly that drug-only coverage cannot be sold in competitive insurance markets at premiums that cover its cost. Even for middle-class people, its sale would require a substantial subsidy.

These results are also germane to discussions of publicly funded reinsurance of large medical expenses that provoke adverse selection (and intrusive underwriting screening to avoid adverse selection) in private insurance (Swartz 2002). The results imply that this problem is likely to be especially severe for drug expenses, even more so than for larger expenses associated with other types of medical care that display less persistence over time. One might therefore conclude that reinsurance that would provide the most appropriate incentives and relief to insurers would take into account *both* the amount and the persistence of large claims.

Another main result is that all-inclusive insurance policies will be less subject to adverse selection than drug-only coverage for the same population. Having said this, however, we cannot conclude that unregulated competitive markets will necessarily be able to furnish such coverage. People in the lowest ranks of expected drug spending could have higher expected utility from coverage that excludes drugs than from coverage that includes it. That is, coverage that excludes drugs may drive out all-inclusive coverage (that, of course, includes drugs). As long as it is permitted to sell such coverage, and ignoring other economies or jointness advantages of comprehensive coverage, we conclude that coverage excluding drugs would tend to drive out coverage that includes drugs. It is instructive, however, that even in unregulated under-65 markets, the phenomenon of coverage excluding drugs is now rather rare. In any case, unsubsidized drug-only coverage that would supplement a policy that covers other expenses would barely survive, even if cost offsets are assumed to be zero.

Can insurers incorporate devices into their policies to mitigate the effects of adverse selection? One simple solution would be to limit the frequency with which people are permitted to change coverage, but it is difficult to lock people at low risk into policies with such provisions. Another, more useful method is to incorporate guaranteed renewability at nondiscriminatory premiums as a required policy provision. This device, if properly used, can retain the people with low risk in the pool and greatly diminish the opportunities for adverse selection (Pauly 2003, Herring and Pauly 2003).

Current discussions of drug coverage for the Medicare population often envision stand-alone but fairly generously subsidized community-rated coverage for much of the population. The adverse selection we have identified will be a challenge that must be taken into account, but one that those subsidies (in the short run) and integrated coverage (in the long run) may help to overcome.[9] Our results suggest, however, that the subsidy will need to be generous indeed. One long-term policy choice is between generous subsidies to stand-alone coverage and less heavily subsidized but more carefully designed comprehensive insurance. Another policy choice (for a given public budget) is between a heavily subsidized policy with high deductibles and low adverse selection and more generous coverage with more beneficiary payment of premiums but more adverse selection. How much subsidy is needed and how much redesign would help are issues that should definitely be investigated further.

Notes

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1. Since the youngest members of this cohort were 18 in 1994, the total number of persons represents all adult workers and dependents who remained under age 65 in the period.

2. The statistical approach takes into account any differences across cells in the extent to which persistence might itself vary with age or gender. The simple regression model in the economic approach does not allow for such interaction effects, based on preliminary

analysis that found them to be small. Note that this approach assumes that people use only their prior spending to predict their expenses in the next period. If they have additional information (e.g., "I know that this will be the year I plan to get my sore knee fixed but insurers do not"), adverse selection will be worse than what is estimated here.

3. We therefore use only the Medstat claims data and estimate breakeven premiums based on the claims data. We do not use direct measures of premiums actually paid for coverage of those claims.

4. We assume that both insurers and people who are insured have the same average estimate. Some cells are small so that the observed sample mean might not be a precise estimate of the population mean for people with those characteristics, but that imprecision will apply only to a small fraction of the total population.

5. For an explanation of this method, see Phelps (2003), Chapter 10 and especially Appendix A.

6. Phelps (2003) labels 0.0003 a moderately high value of risk aversion, but Pauly and Herring (2000) found it necessary to use a higher level (0.00095) to generate realistic results in a simulation of adverse selection for comprehensive group insurance. A level of 0.0003 would imply that a person in Phelps's example would be willing to buy insurance as long as a premium were no more than 26 percent greater than expected benefits.

7. This value is chosen to be consistent with the –0.2 demand elasticity reported by the RAND Health Insurance Experiment. See Keeler et al. (1988).

8. The assumptions here are that the demand curve is approximately linear over the relevant range and that there are no important income effects on the demand for medical care.

9. One offset is that the greater predictability of drug spending should make it easier in principle to risk-adjust payments to insurers. The insurer used by someone with high current-period expenses will receive a larger payment than the insurer used by someone with low current-period incentives. This diminishes insurer incentives to cream skim, but it does not diminish the incentive to the high spender to choose the more generous plan.

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