Exploring the Demand for a Voluntary Medicare Prescription Drug Benefit

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ABSTRACT

The purposes of this study were (1) to assess the utility of the economic theory of demand for insurance for modeling voluntary Medicare drug benefit enrollment decisions and (2) to explore the degree of adverse selection and crowd-out that might occur under a voluntary enrollment Medicare prescription benefit. Data were collected using a cross-sectional, mail survey of 2,100 community-dwelling adults aged 65 and older in Wisconsin. Respondents were asked to evaluate their likelihood of enrollment in any of 4 hypothetical drug benefit plans under the assumption that they could enroll in one of the hypothetical plans or maintain their current coverage. Data analyses included bivariate comparisons across enrollment likelihood categories and logit analysis of enrollment likelihood as a function of respondent characteristics. 1041 usable survey forms were returned for an adjusted response rate of 51.5%. Older adults with 4 or more chronic conditions were most likely to report that they were "very likely" to enroll in one of the hypothetical drug plans, as were those with the highest out-of-pocket drug spending in the previous 30 days. Respondents with no or self-purchased drug benefits were more likely than those with employer-based plans to express a higher likelihood of enrollment in one of the hypothetical plans. Adverse selection may be problematic for a voluntary enrollment Medicare drug benefit. Given that high out-of-pocket drug spending (secondary to drug coverage source) was a consistent predictor of enrollment likelihood, demand-side factors affecting the crowding out of employer-based drug coverage sources by a voluntary enrollment drug benefit appear minimal. However, the availability of a Medicare prescription benefit may still lead to crowd-out through employer incentives.

KEYWORDS: prescription drug coverage, Medicare, older adults

INTRODUCTION

The population of older adults (aged 65 and older) in the United States grew by 12.0% from 1990 to 2000 to approximately 35 million people.¹ The proportion reporting their health status as "fair" or "poor" increases dramatically with age in this group, as does the prevalence of a host of chronic diseases.^{2,3} Many of these diseases, such as arthritis, osteoporosis, and Parkinson's disease, increasingly respond to treatment with prescription medications as evidenced by the fact that although Medicare beneficiaries were only 15% of the US population in 1999, they accounted for nearly 40% of drug expenditures.⁴ Together, these facts suggest that ensuring access to prescription medications is important in the maintenance and improvement of the health of older Americans.

Prescription drug insurance is a potent facilitator of access to prescription medicines. For example, a recent survey of older adults in 8 states reported that older adults with no coverage were more likely to forego obtaining prescription medications because of their cost and to skip doses of a medicine to extend the time between refills, while those enrolled in the most generous plans (eg, Medicaid programs) took their medications as prescribed.⁵ Findings such as this also highlight the great variability in the presence and generosity of prescription drug coverage among older adults. For instance, in the fall of 1999 nearly 38% of Medicare beneficiaries reported that they had no drug coverage.⁶ Those receiving coverage from state Medicaid programs (approximately 10% of those 65 and older) typically paid the smallest proportion of drug costs (approximately 19% of total prescription expenses), while those enrolled in supplemental Medicare ("Medigap") policies (approximately 7%), which provided drug coverage, paid the largest (58%).^{6,7} On average, Medicare beneficiaries paid 40% of medication expenses out-of-pocket.⁴

Such findings have led to considerable debate among researchers and policy makers regarding the optimal way to lessen inequities in access to prescription drugs among

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older adults.^{8,9} Several incremental solutions have been discussed. These include state-based pharmaceutical assistance programs and discount card programs.¹¹ More recently, the Bush administration has proposed to overhaul the Medicare program by offering seniors comprehensive drug coverage through private insurers.¹² However, the most generous coverage would only be offered to those beneficiaries agreeing to leave the traditional fee-for-service (FFS) program and join comprehensive managed care plans. Persons remaining in the FFS program would receive a discount card and full protection against catastrophic prescription expenses beyond some yet-to-be-determined amount.

Others have considered extending drug benefits to older adults through a similar radical change for the Medicare program that "carves out" the prescription benefit, leaving the FFS physician and hospital coverage portion of Medicare unchanged.^{13,14} Such a change likely would employ pharmacy benefit managers (PBMs) to administer the benefit, although other details (eg, a standardized benefit or choice among many benefit designs, etc) are largely unresolved. These proposals would make this new benefit voluntary (as Medicare Part B is currently), and not compulsory.¹⁵ These plans have several advantages relative to others for increasing seniors' access to medications. First, Medicare reform proposals would provide uniform access to equivalent coverage for all older adults currently lacking coverage. Second, a voluntary benefit has the potential to prevent the "crowding out" (ie, shifting of coverage provision from one party to another) of other important sources of drug coverage (eg, current and former employers) and the concomitant shifting of these costs to the Medicare program.

One disadvantage of a voluntary benefit is that it may encourage adverse selection.¹⁴ Adverse selection occurs when those with high expected outlays buy more coverage than those with low expected outlays when charged identical premiums.¹⁶ If adverse selection were to become extreme, a voluntary Medicare drug benefit could fail as low-risk individuals (ie, those who use few prescription drugs) may be increasingly less likely to enroll in the plan because of the sharply increasing premiums necessary to fund the high-risk persons likely to find such a program most desirable.¹⁷ It is important to keep in mind that prescription drug insurance may be particularly susceptible to adverse selection because many medications are used to treat chronic diseases, making their costs quite predictable.

Theoretical Framework

We conceptualized older adults' decisions to enroll in a voluntary drug benefit program within the economic theory of demand for health insurance.¹⁸⁻²⁰ In brief, this theory holds that, in general, consumers are risk averse with respect to wealth. Thus, they will find it advantageous to pay an insurance premium (given that it is "fair" in an actuarial sense) that will allow them to maintain a given level of wealth in the event of some costly illness. Further, the theory holds that an individual will only enroll in an insurance program if the expected marginal benefits of the program are equal to or more than its marginal costs. Thus, when other factors are held constant, persons with larger expected expenditures should be more likely to enroll than those with lower expected expenditures. Expected expenditures might be positively correlated with current expenditures or with poor health status. Finally, individual tastes and preference may influence the demand for insurance. Because we do not observe these preferences directly, we attempt to proxy them through the inclusion of demographic characteristics.

Past Studies of Older Adults and Voluntary Enrollment Insurance

No studies known to the authors have evaluated the demand for voluntary enrollment drug benefit programs among older adults. However, several studies of seniors' enrollment decisions in other voluntary enrollment insurance programs (eg, Medigap plans) have been conducted.¹⁹⁻²² Several important conclusions can be drawn from their results. First, the findings support the importance of including demographics (such as education and race) in models of voluntary insurance purchase; these factors are often predictive of Medigap purchases. Second, one of these investigations suggested that prior year expenditures for hospital, physician care, and prescription drugs are predictive of Medigap supplement purchases.²⁰ As theory would predict, this result suggests that older adults are rational and take account of expected health care costs when making insurance purchase decisions, potentially leading to adverse selection. Third, at least one study confirmed (by employing an observable measure of individual preferences, ie, opinions of medical care) that individual preferences are important in Medigap purchase decisions.²² In summary, the results of these studies provide support for several components of the theory of demand for health insurance in the study of voluntary health insurance enrollment decisions.

Table 1. Hypothetical Drug Plan Summary

Plan	Formulary	Mail Order	Copayment Amount	Monthly Premium
Plan A	Yes	Yes	\$5.00	\$45.00
Plan B	Yes	No	\$10.00	\$41.50
Plan C	No	Yes	\$10.00	\$47.00
Plan D	No	No	\$5.00	\$60.00

Study Purposes

A variety of studies have been conducted in the context of voluntary enrollment health insurance programs.¹⁹⁻²² However, voluntary enrollment, stand-alone drug benefits typically are not offered. Thus, there is little information available regarding the manner in which older adults might elect to enroll in a voluntary drug benefit. Moreover, little is known about market phenomena (eg, crowding out and adverse selection) that could impact the feasibility of a voluntary enrollment Medicare drug benefit. We sought to explore these issues among older adults by using a hypothetical choice task. Specifically, the first goal of this study was to assess the utility of the economic theory of demand for health insurance as a model of enrollment decisions in this context. The second goal of this study was to explore the feasibility of using a voluntary enrollment model and private PBMs as a means of administering a Medicare prescription drug benefit.

MATERIALS AND METHODS

Data Collection

We used a cross-sectional, descriptive mail survey design for this study. The sampling frame consisted of a randomly selected list of 2100 names of community-dwelling older adults (1050 females and 1050 males) living in Wisconsin. The list was maintained by KM Lists, Inc. (Little Rock, AK), which compiles a complete listing of names for the United States from publicly available sources, including telephone directories, driver's license databases, and other public records. The list is continually updated and tested for validity.

After both pretesting and pilot-testing the survey instrument, the final survey forms were fielded in January, 2001, using a modification of methods outlined by Dillman.²³ First, each participant was sent a letter explaining the purpose of the study and requesting his or her participation. One week later, a survey packet containing a cover letter, the survey instrument, a postage-paid return envelope, and a \$1 incentive was sent to each poten-

tial participant. Approximately 1 week later, a reminder postcard was sent to each potential respondent. All letters and envelopes used University of Wisconsin-Madison stationery.

The survey form used in this study was 10 pages long and consisted of items divided into 5 sections relevant to this study. The sections included information on the respondent's (1) health status, (2) prescription drug use, (3) demographic characteristics, (4) type of prescription drug insurance, and (5) estimation of their likelihood of enrolling in any of a group of 4 hypothetical prescription drug insurance plans.

Hypothetical Plan Design and Evaluation Task

Each respondent was asked to view a set of 4 hypothetical prescription drug insurance plans. These plans varied with respect to copayment (\$5 or \$10 per prescription), use of a drug formulary (yes or no), required use of a mail-order pharmacy program (yes or no), and monthly premium. Use of drug formularies and mail-order pharmacy programs were chosen as qualitative attributes because they are widely used by PBMs.²⁴ A brief definition of each attribute and its likely impact on prescription drug costs or access preceded the plans. We attempted to set the premium for each hypothetical plan at its roughly actuarially fair level by using data regarding drug utilization and costs in this population as well as the cost savings assumed to accrue from use of any of the first 3 attributes (eg, mail-order pharmacy programs). The federal government was assumed to provide a premium subsidy equal to one-half of the annual premium of the least expensive plan (ie, Plan B, \$497.75). The subsidy was subtracted from each plan's premium, and the result was divided by 12 to arrive at the appropriate monthly premium. Further information regarding calculation of the plan premiums is available from the authors upon request. The 4 hypothetical plans are displayed in **Table 1**.

After inspecting the 4 plans, each individual was asked to select the plan they would most likely select if they had no prescription drug insurance and were required to enroll in the program (ie, if the program was compulsory, not vol-

untary). The results of a study of the impacts of plan attributes and individual characteristics on plan choices in this scenario are presented elsewhere.²⁵ Next, respondents were asked to respond to the following question: "Think for a minute about your current drug insurance situation. If you did not have to select one of the plans listed before (that is, you could keep the same drug plan you have now) about how likely do you think you would be to purchase the plan you selected?" Responses were recorded on a 4-category scale with possible responses of "very likely," "somewhat likely," "not very likely," and "not likely at all."

Independent Variables

Drawing on the theory of demand for health insurance and on past studies, we investigated 3 sets of variables as possible determinants of individuals' estimated likelihood of enrollment in any 1 of the 4 hypothetical drug plans.¹⁸⁻²² First, individual and household demographics were studied. These included age, gender, marital status, annual household income, financial assets, and educational attainment. These variables are of interest because they can provide information on the types of individuals likely to find a voluntary drug benefit program attractive and may reflect variation in preferences for insuring against prescription drug expenses.

The second set of variables studied consisted of indicators of prescription drug use and cost. Data on the respondent's use of prescription drugs in the past 30 days were collected, including the name, strength, and quantity of each drug. We assigned a monetary value to each prescription that the individual reported using and summed these values across prescriptions. The value of the prescriptions was calculated using the average wholesale price for single source drugs and the federal upper limit (FUL) price, where available, for generic drugs; otherwise an average of average wholesale prices (AWP) was used. The survey instrument also contained items pertaining to the source of the respondent's current drug insurance plan. These included no drug insurance, current or former employer-provided insurance, public system (Medicaid or Veterans Administration), Medigap, or other (ie, Medicare HMO or other unidentified source).

Finally, 2 items relating to the individual's health status were studied. The first was the respondent's perceived health status rated on a 5-point scale: excellent, very good, good, fair, or poor. The second was the number (out of a list of 22) of chronic health conditions that the respondent had ever been told that he or she had. This list was adapted from the Medicare Current Beneficiary

Survey (MCBS) and augmented with medical conditions the researchers knew to be common among older adults.

Independent variables with 5% or fewer of the values missing were replaced with the modal value of the variable for categorical variables and with the mean for continuous variables. However, both the income and financial assets variables contained a significant proportion of missing values (14.6% and 20.9%, respectively). Missing values for these variables were replaced using the stochastic regression imputation method.²⁶ This method was implemented by first estimating ordinary least squares regression models with income (8 levels) or assets (5 levels) as the dependent variables and various personal characteristics as predictors on cases in which income or assets were present. These models were then used to predict values for those cases in which income or assets were missing. Next, a random draw from the respective regression model's residuals was added to each predicted value in order to preserve the variance of the dependent variable (ie, this prevents biased standard error estimates in significance tests). To finish, the predicted value was rounded to the nearest integer (1-8 for income or 1-5 for assets).

Data Analysis

Data were analyzed in 2 stages. First, descriptive statistics were calculated for each independent variable after cross-classification by enrollment likelihood. These statistics included counts and proportions for all categorical variables and means and standard deviations for each continuous variable. The bivariate relationship between each variable and enrollment purchase likelihood was assessed using the 1-way analysis of variance for all continuous variables and the chi-square test of association for categorical variables. A 0.05 significance level was employed in the interpretation of these tests.

The second stage of data analysis consisted of multivariate modeling of enrollment likelihood as a function of the 3 sets of independent variables (demographics, prescription drug use and cost, and health status). The ordinal nature of the dependent variable suggested the ordinal logit model as one way in which to model enrollment likelihood.²⁷ However, a likelihood ratio test of model assumptions showed the ordinal logit model to be untenable in the current context ($\chi^2 = 41.93$, 24 df, $P < 0.05$). Thus, the less restrictive multinomial logit model was used for multivariate analyses. The "not likely at all" response category was excluded in order to identify the remaining coefficients in these models. The odds ratio was used to evaluate the strength of the relationship between each independent variable and purchase likelihood response category. The 95% confidence interval was used to test the significance

of these relationships; those intervals not containing "1" were considered significant.

The multivariate analyses proceeded in the following manner. All demographic and health status variables were entered into both regression models because they were considered exogenous and thus valid predictors of enrollment likelihood. The "value of prescription drugs used in past 30 days" was not used in these analyses because those respondents with service benefit drug coverage (ie, first dollar) would be unlikely to be aware of the value of their medications. The "number of prescription drugs used in past 30 days" variable also was excluded because it was highly collinear ($r = 0.60$, $P < 0.01$) with the "number of chronic diseases" variable.

Finally, given that prescription drug insurance (and by extension, out-of-pocket spending related to it) is not randomly assigned, we elected to analyze separately the effects of these variables on enrollment likelihood. Our first regression model uses prescription drug insurance status as a predictor and allows us to make inferences about the respondent's current drug benefit source and likelihood of enrollment in a voluntary Medicare drug benefit. These results can help in gauging the crowding out of employer-based plans. Our second regression model uses out-of-pocket drug spending as a predictor and allows us to make inferences about the association between this amount and the likelihood of enrollment in a voluntary drug benefit plan. These results aid in understanding the importance of a key economic variable in the drug benefit enrollment decision. Together, these tables allow us to address both goals of the study with the caveat that these multivariate analyses should be treated as reduced form, not structural, models of the enrollment decision.

RESULTS

Seventy-seven of the 2100 survey forms mailed were undeliverable. A total of 1194 surveys was returned (59.0%). One thousand forty-one of these forms contained complete data (ie, the respondent answered the plan enrollment likelihood question) yielding an adjusted response rate of 51.5%. **Table 2** displays descriptive statistics for the study sample. Nearly 59% of respondents said that they would be "very likely" or "somewhat likely" to enroll in a voluntary prescription drug benefit of the type presented in this study. More than half of respondents were younger than 75 years old, and the majority was married. Approximately 15% reported having a college degree or higher, and slightly more than half (53.4%) had less than \$25 000 in household income in the previous calendar year.

In order to assess the degree of nonresponse bias in the study sample, we compared selected sample statistics to Wisconsin population parameters using the chi-square goodness-of-fit test.^{28,29} The study sample appeared similar to the population with respect to the gender and age distribution. The proportion of those with higher than a high school education was also similar, as was the proportion reporting their health status as "fair" or "poor." The sample differed significantly from the population with respect to annual income, with a larger proportion of sample households earning more than \$35 000 a year.³⁰

Comparisons of respondents on all independent variables across drug-benefit enrollment likelihood are displayed in **Table 3**. No demographic characteristics examined in this study were associated significantly with the likelihood of enrolling in the type of scheme featured in the hypothetical evaluation task. With respect to measures of health status, the number of chronic diseases reported by respondents was related to enrollment likelihood. Those with the most chronic ailments (4 or more) were least likely to report that they were "not likely at all" to purchase the prescription insurance plan they selected in the choice task and most likely to report that they were "very likely" to purchase the selected plan.

The 4 prescription drug use and cost variables studied were all associated with enrollment likelihood (see **Table 4**). The number of prescriptions used in the previous 30 days increased as the likelihood of benefit enrollment ranged from "not very likely" to "very likely." Those respondents with the largest average prescription drug values (\$143.81) were most likely to report that they were "very likely" to enroll in their chosen plan, although respondents reporting they were "not likely at all" to enroll had similar expenditures (\$133.60). This finding may be due to the fact that respondents in the "not likely at all" category were likely to have generous employer or public system drug benefits that may induce greater prescription drug use through moral hazard. The average amount individuals spent out-of-pocket for prescriptions in the previous 30 days increased steadily from \$37.37 for those in the "not likely at all" category to \$109.53 in the "very likely" to enroll category.

The presence and type of prescription drug insurance among older Wisconsinites also were associated with the likelihood of plan enrollment. Those with no drug insurance were most likely to report being "very likely" to enroll and least likely to report being "not likely at all" to enroll in their chosen plan. The majority of those with Medigap plans (62.9%) noted that they would be "somewhat" or "very likely" to enroll in their chosen plan. Those responding with "other," "employer-based," and "public

Table 2. Descriptive Statistics for Study Sample*

Variable	n (%)	Mean (SD)
Purchase likelihood		
Very likely	316 (30.4)	
Somewhat likely	296 (28.4)	
Not very likely	185 (17.8)	
Not likely at all	244 (23.4)	
Demographics		
Age (years)		
65-74	546 (52.4)	
75-84	429 (41.2)	
85 and above	66 (6.3)	
Male	475 (45.6)	
Female	566 (54.4)	
Currently married	688 (66.1)	
Unmarried	353 (33.9)	
Education		
College degree or higher	155 (14.9)	
Less than college	886 (85.1)	
Annual household income		
\$0-\$24 999	556 (53.4)	
\$25 000-\$49 999	367 (35.3)	
\$50 000 and more	118 (11.3)	
Assets		
\$0-\$30 000	356 (34.2)	
\$30 001-\$100 000	310 (29.8)	
\$100 001 and more	375 (36.0)	
Health status		
Number of chronic diseases		
0 or 1	243 (23.3)	
2 or 3	439 (42.2)	
4 or more	359 (34.5)	
Health is excellent, very good, or good	755 (72.5)	
Health is fair or poor	286 (27.5)	
Prescription drug use and cost		
Number of prescription drugs used in past 30 days		3.49 (2.78)
Value of prescription drugs used in past 30 days		128.22 (144.57)
Amount spent out-of-pocket for prescription drugs in past 30 days		\$77.85 (99.87)
Prescription drug insurance source		
None	422 (40.5)	
Employer	382 (36.7)	
Public system	63 (6.1)	
Medigap	132 (12.7)	
Other	42 (4.0)	

*SD indicates standard deviation; n = 1041.

system" prescription drug insurance appeared to exhibit little pattern in their enrollment likelihood responses.

Similar to the bivariate analysis (**Table 3**), demographic factors were not related to enrollment likelihood among older adults in this study (**Tables 4 and 5**). Health status

showed mixed effects on enrollment likelihood. Consistent with the theory of demand for health insurance, having 4 or more chronic diseases more than doubled the odds of selecting "very likely" vs "not likely at all" in the multinomial logit model featuring prescription drug insurance

Table 3. Comparison of Respondents Across Likelihood of Voluntary Drug-Benefit Enrollment*

Variable	Not Likely at All n (%)	Not Very Likely n (%)	Somewhat Likely n (%)	Very Likely n (%)	P-value
Demographics					
Age (years)					
65-75	141 (25.8)	91 (16.7)	147 (26.9)	167 (30.6)	>0.05 [†]
75-85	92 (21.4)	79 (18.4)	130 (30.3)	128 (29.8)	
85 and above	11 (16.7)	15 (22.7)	19 (28.8)	21 (31.8)	
Female	124 (21.9)	105 (18.6)	168 (29.7)	169 (29.9)	>0.05 [†]
Male	120 (25.3)	80 (16.8)	128 (26.9)	147 (30.9)	
Currently married	174 (25.3)	126 (18.3)	192 (27.9)	196 (28.5)	
Unmarried	70 (19.8)	59 (16.7)	104 (29.5)	120 (34.0)	>0.05 [†]
Education					
College degree or higher	40 (25.8)	33 (21.3)	36 (23.2)	46 (29.7)	
Less than college	204 (23.0)	152 (17.2)	260 (29.3)	270 (30.5)	>0.05 [†]
Annual household income					
\$0-\$24 999	121 (21.8)	96 (17.3)	165 (29.7)	174 (31.3)	
\$25 000-\$49 999	95 (25.9)	64 (17.4)	107 (29.2)	101 (27.5)	>0.05 [†]
\$50 000 and more	28 (23.7)	25 (21.2)	24 (20.3)	41 (34.7)	
Assets					>0.05 [†]
\$0-\$30 000	75 (21.1)	62 (17.4)	110 (30.9)	109 (30.6)	
\$30 001-\$100 000	76 (24.5)	52 (16.8)	94 (30.3)	88 (28.4)	
\$100 001 and more	93 (24.8)	71 (18.9)	92 (24.5)	119 (31.7)	
Health status					
Number of chronic diseases					
0 or 1	60 (24.7)	55 (22.6)	69 (28.4)	59 (24.3)	<0.01 [†]
2 or 3	105 (23.9)	83 (18.9)	127 (28.9)	124 (28.2)	
4 or more	79 (22.0)	47 (13.1)	100 (27.9)	133 (37.0)	>0.05 [†]
Health is excellent, very good, or good	175 (23.2)	144 (19.1)	209 (27.7)	227 (30.1)	
Health is fair or poor	69 (24.1)	41 (14.3)	87 (30.4)	89 (31.1)	
Prescription drug use and cost					
Number of prescription [§] used in past 30 days	3.26 (2.87)	3.10 (2.65)	3.44 (2.80)	3.93 (2.72)	<0.01 [‡]
Value of prescription drugs [§] used in past 30 days	\$133.60 (189.23)	\$114.31 (121.46)	\$115.85 (123.23)	\$143.81 (134.23)	<0.05 [‡]
Amount spent out-of-pocket [§] for prescription drugs in past 30 days	\$37.37 (54.60)	\$65.66 (84.57)	\$85.02 (90.77)	\$109.53 (127.76)	<0.01 [‡]
Prescription drug insurance source					
None	54 (12.8)	71 (16.8)	146 (34.6)	151 (35.8)	<0.01 [†]
Employer	132 (34.6)	74 (19.4)	76 (19.9)	100 (26.2)	
Public system	17 (27.0)	10 (15.9)	19 (30.2)	17 (27.0)	
Medigap	28 (21.2)	21 (15.9)	45 (34.1)	38 (28.8)	
Other	13 (31.0)	9 (21.4)	10 (23.8)	10 (23.8)	

*n = 1041. All percentages are row percentages.

[†] = chi-square test of association

[‡] = one-way analysis of variance

[§] = mean (standard deviation)

Table 4. Multinomial Logit Model Predicting Purchase Likelihood for Voluntary Drug Benefit (Drug Insurance as Predictor)*

Variable	Odds Ratio (95% Confidence Interval)		
	Not Very Likely vs Not Likely at All	Somewhat Likely vs Not Likely at All	Very Likely vs Not Likely at All
Demographics			
Age (years)			
65-74	excluded	excluded	excluded
75-84	1.45 (0.95-2.21)	1.28 (0.87-1.87)	1.06 (0.73-1.55)
85 and above	2.13 (0.89-5.09)	1.20 (0.53-2.74)	1.08 (0.48-2.44)
Female	excluded	excluded	excluded
Male	0.85 (0.56-1.27)	0.93 (0.64-1.35)	1.10 (0.77-1.59)
Currently Married	1.04 (0.65-1.66)	0.88 (0.58-1.35)	0.68 (0.45-1.02)
Unmarried	excluded	excluded	excluded
Education			
College degree or higher	1.08 (0.60-1.94)	0.86 (0.45-1.51)	0.82 (0.47-1.41)
Less than college	excluded	excluded	excluded
Annual household income			
\$0-\$24 999	excluded	excluded	excluded
\$25 000-\$49 999	1.00 (0.62-1.62)	1.25 (0.81-1.93)	1.05 (0.68-1.63)
\$50 000 and more	1.39 (0.62-2.90)	1.18 (0.56-2.50)	1.63 (0.81-3.28)
Assets			
\$0-\$30 000	excluded	excluded	excluded
\$30 001-\$100 000	0.82 (0.49-1.36)	0.82 (0.52-1.29)	0.79 (0.50-1.24)
\$100 001 and more	0.87 (0.50-1.51)	0.63 (0.38-1.03)	0.83 (0.50-1.36)
Health status			
Number of chronic diseases			
0 or 1	excluded	excluded	excluded
2 or 3	0.93 (0.58-1.50)	1.15 (0.73-1.81)	1.38 (0.87-2.20)
4 or more	0.76 (0.43-1.35)	1.31 (0.78-2.21)	2.36 (1.41-3.95)
Health is excellent, very good, or good	excluded	excluded	excluded
Health is fair or poor	0.73 (0.44-1.21)	0.92 (0.60-1.42)	0.74 (0.48-1.14)
Prescription drug use and cost			
Prescription drug insurance source			
None	2.24 (1.40-3.58)	4.92 (3.19-7.59)	3.97 (2.61-6.04)
Employer	excluded	excluded	excluded
Public system	1.18 (0.50-2.78)	1.86 (0.89-3.89)	1.15 (0.55-2.44)
Medigap	1.32 (0.70-2.51)	2.91 (1.67-5.08)	1.81 (1.03-3.18)
Other	1.34 (0.53-3.37)	1.49 (0.61-3.65)	1.22 (0.50-2.97)

*n = 1041; Model $\chi^2 = 117.54$; $P < 0.05$; $\sim R^2 = 0.04$; boldface type indicates significance of at least $P < 0.05$.

source as a predictor (**Table 4**). However, in the model featuring out-of-pocket medication spending (**Table 5**), those with 4 or more chronic diseases were 51% less likely to select the "not very likely" response compared with the "not likely at all" response, while respondents with fair or poor health were 43% less likely to select the "very likely" response compared with the "not likely at all" response.

In our investigation of the potential impact of current prescription drug benefits on the crowd-out of employer-based plans, benefit source was associated with enrollment likelihood (**Table 4**). When compared with individuals having employer-based plans, individuals with no drug insurance were more likely to select any response category other than "not likely at all," although the odds ratios varied with each response. Compared with those enrolled in employer-based drug insurance plans, persons with Medi-

Table 5. Multinomial Logit Model Predicting Purchase Likelihood for Voluntary Drug Benefit (Out-of-Pocket Drug Spending as Predictor)*

Variable	Odds Ratio (95% Confidence Interval)		
	Not Very Likely vs Not Likely at All	Somewhat Likely vs Not Likely at All	Very Likely vs Not Likely at All
Demographics			
Age (years)			
65-74	excluded	excluded	excluded
75-84	1.41 (0.92-2.14)	1.24 (0.85-1.81)	1.03 (0.71-1.51)
85 and above	2.14 (0.89-5.13)	1.24 (0.54-2.84)	1.00 (0.43-2.31)
Female	excluded	excluded	excluded
Male	0.88 (0.58-1.32)	0.96 (0.66-1.39)	1.17 (0.81-1.70)
Currently Married	0.97 (0.60-1.54)	0.79 (0.52-1.19)	0.59 (0.39-0.89)
Unmarried	excluded	excluded	excluded
Education			
College degree or higher	1.14 (0.63-2.04)	0.87 (0.50-1.51)	0.87 (0.51-1.51)
Less than college	excluded	excluded	excluded
Annual household income			
\$0-\$24 999	excluded	excluded	excluded
\$25 000-\$49 999	0.90 (0.55-1.46)	1.01 (0.66-1.54)	0.87 (0.56-1.36)
\$50 000 and more	1.18 (0.55-2.55)	0.93 (0.44-1.94)	1.32 (0.65-2.67)
Assets			
\$0-\$30 000	excluded	excluded	excluded
\$30 001-\$100 000	0.85 (0.51-1.41)	0.88 (0.56-1.37)	0.85 (0.54-1.34)
\$100 001 and more	0.93 (0.53-1.61)	0.74 (0.45-1.22)	0.93 (0.56-1.54)
Health status			
Number of chronic diseases			
0 or 1	excluded	excluded	excluded
2 or 3	0.70 (0.43-1.14)	0.79 (0.50-1.19)	0.84 (0.53-1.34)
4 or more	0.49 (0.28-0.87)	0.69 (0.41-1.15)	1.06 (0.63-1.79)
Health is excellent, very good, or good	excluded	excluded	excluded
Health is fair or poor	0.65 (0.39-1.08)	0.77 (0.50-1.19)	0.57 (0.37-0.89)
Prescription drug use, cost, and coverage			
Amount spent out-of-pocket for prescription drugs in past 30 days	1.01 (1.005-1.01)	1.01 (1.007-1.013)	1.01 (1.009-1.015)

*n = 1041; Model $\chi^2 = 140.09$; $P < 0.05$; $\sim R^2 = 0.05$; Boldface type indicates significance of at least $P < 0.05$

gap plans were more likely to select "somewhat likely" and "very likely" compared with the "not likely at all" response. In our multivariate test of the importance of out-of-pocket spending on voluntary drug plan enrollment, this variable was positively associated with the odds of selecting a response besides "not likely at all" (**Table 5**). For example, a 1.0 standard deviation increase in the average amount spent out-of-pocket in the previous 30 days would increase uniformly the odds of selecting "not very likely," "somewhat likely," or "very likely" relative to "not likely at all" by 2.70.

DISCUSSION

One goal of this study was to investigate the utility of the theory of demand for health insurance as a model of enrollment decisions in a voluntary Medicare drug benefit. A key tenet of this theory is that consumers take account of their expected financial outlays and the benefits likely to accrue from an insurance program when deciding to enroll. Our results with respect to out-of-pocket spending on medications exhibit a relationship that is in accordance with this theory.¹⁸ The more the respondent pays out-of-pocket, the stronger the respondent's likelihood of enrollment in the benefit, suggesting that older adults are likely

to act in a rational manner when making these decisions. This finding persists when annual income and assets are held constant (**Table 5**).

Out-of-pocket spending on prescription medications is associated significantly with prescription drug insurance type. Thus, it is not surprising that insurance type was associated with likelihood of enrollment in the manner one would hypothesize: respondents with no coverage were significantly more likely to report that they were "somewhat" or "very" likely to enroll in the benefit program presented in the survey compared with those with employer-based insurance, as were those with individually purchased Medigap coverage (**Tables 3** and **4**). Medigap drug coverage is poor compared with most employer-provided coverage in that it requires a deductible of \$250, 50% coinsurance, and is capped at either \$1250 (plans H and I) or \$3000 (plan J).³¹ Our results suggest that many older adults with no or Medigap drug coverage would enroll in drug benefit plans similar to those presented in this study.

The theory of demand for health insurance also suggests that there should be an association between older adults' health status and their likelihood of enrollment in a voluntary drug-benefit plan. The likelihood of selecting "somewhat likely" or "very likely" relative to "not likely at all" or "not very likely" increases as the number of chronic diseases respondents reported increased in both our bivariate analysis (**Table 3**) and first multivariate analysis (**Table 4**). This result is consistent with studies using the Medicare Current Beneficiary Survey (MCBS) sample, showing that chronic disease burden (and its associated impacts on health status) are predictive of high medication expenditures.³² Our second logit specification (**Table 5**) would suggest the opposite result (ie, that poor health is associated with a somewhat lower likelihood of enrollment). However, these results occur in an inconsistent manner and thus may be due to chance alone. Alternately, some sort of omitted variable bias may be responsible for these results.

We attempted to proxy for older adults' tastes and preferences using demographic characteristics. Past studies of Medigap enrollment have shown that these variables are often predictive of purchase decisions among older adults.¹⁹⁻²² However, these factors did not vary across reported likelihood of enrollment in this study (**Tables 3, 4, 5**). One explanation for this is that Medigap premiums typically are not subsidized, while the premiums of the drug-benefit plans featured in this study were. This premium subsidy may have obviated the role of preferences, while emphasizing those of out-of-pocket spending and health status in this study.

The finding that demographics were not related to enrollment likelihood could also be explained by reference to past studies of older adults using the MCBS, which suggest that income and gender are not related to high medication out-of-pocket spending (and thus the need for drug coverage).³² Other studies using the MCBS show that the need for prescription drug assistance may be related to a variety of criteria not necessarily linked to demographics, including the lack of stable drug coverage, high out-of-pocket drug costs, and a heavy burden of chronic diseases.³³ One implication of this finding is that the demand for such a benefit is not limited to an easily definable group of older adults. Thus, drug-benefit programs that would require income-based means testing (ie, proof that one's income is below a given amount) for enrollment are likely to be inadequate for those age 65 and older.

A second goal of this study was to explore the practicability of a voluntary enrollment model using private PBMs for the administration of a Medicare drug benefit. The feasibility of the voluntary enrollment model was examined specifically with regard to 2 insurance market phenomena. First, adverse selection may be a significant problem when a voluntary enrollment insurance program is offered.^{17,20} The results of this study suggest that selection problems may become problematic in a voluntary enrollment Medicare drug-benefit program. For example, those respondents with higher numbers of chronic diseases who used, on average, more prescription drugs in the previous 30 days indicated that they would be more likely to enroll in the group of plans offered here, all else being equal.

However, this problem may not be so severe that it leads to a failure of the benefit. The average value of the medications used in the previous 30 days was only slightly higher among those who would be "very likely" to purchase one of the plans presented here (\$143.81) relative to those reporting their enrollment likelihood as "not likely at all" (\$133.60). Moreover, the proportions reporting their health as "fair" or "poor" and "excellent," "very good," or "good" were statistically similar across the likelihood of enrollment response categories.

A second potential problem we explored was the crowding out of currently available drug insurance sources by a government program. Given our findings regarding the relationship between the presence and source of prescription drug coverage and enrollment likelihood, it appears that the crowding out of alternative sources of drug coverage (eg, employer-sponsored) may not be as problematic as some have suggested it could be.³⁴ Our results show the strongest and most consistent predictors of enrollment likelihood are prescription coverage source and the out-of-pocket costs related to that coverage (**Tables 3, 4, 5**).

However, even if demand-side factors do not lead to crowd-out, supply-side factors may. For example, employers may perceive the availability of a federally sponsored drug benefit as an incentive to discontinue offering their own drug insurance, leading to crowd-out. McClellan and colleagues have noted that one manner in which to minimize any crowding out that may occur is to allow employers to buy into the government plan by paying a per-retiree premium priced somewhat higher than that charged to individuals.³⁵

Limitations

The results presented herein should be interpreted with respect to the limitations of the current investigation. First, data were collected in only 1 state (Wisconsin). It is unknown whether data collected from older adults living in other regions of the country (eg, the Southeast) would yield similar results. Second, the 4 drug-benefit plans presented in this study varied with respect to only 4 dimensions (copayment, formulary use, mail-order pharmacy use, and premium). The final form that a Medicare prescription drug benefit might take is yet unknown and could likely incorporate other features, such as deductibles and caps. Third, the survey employed in this study collected data on the source of respondents' drug insurance plans but did not collect information on other aspects of these plans (eg, coinsurance rates, deductibles) that may have impacted their likelihood of enrollment in the hypothetical plans offered. Finally, survey nonresponse may have biased the results. For example, Grotzinger et al found that older adults who were most ill were among the least likely to respond to a survey concerning medication use and coverage.³⁶

Future Research

One venue that future researchers in this area might pursue is investigating whether drug-benefit plans structured in alternative ways would be more or less likely to attract subscribers. The plans featured in this study were all service-benefit plans that featured no deductibles and no benefit caps. Future studies could feature indemnity drug-benefit plans with some combination of these features. A second area worthy of inquiry is that of variation in premium subsidies and its impact on the numbers and types of older adults who express an interest in enrolling in a voluntary drug-benefit plan. This is an important area of study because higher premium subsidies induce more individuals to enroll (limiting adverse selection) but at the same time increase the crowding out of alternative, private sources of drug coverage. Future

research could attempt to determine the subsidy amount best balancing these 2 effects.

CONCLUSION

The first goal of this study was to assess the applicability of the economic theory of demand for insurance to the context of a voluntary Medicare drug benefit. The theory seems to provide a reasonable explanation of the relationships among the variables. There was a strong relationship between source of prescription drug coverage and out-of-pocket prescription costs; respondents with no coverage or with Medigap drug coverage were most likely to report the greatest likelihood of enrollment, as were those with the highest out-of-pocket costs. Those with higher numbers of chronic diseases were more likely to express a greater likelihood of enrolling in one of the plans presented in this study. Demographics did not vary with respect to enrollment likelihood, suggesting that they serve as poor substitutes for true measures of tastes and preferences in this context.

The second goal of this study was to assess the feasibility of a voluntary enrollment drug-insurance program for administering a Medicare drug benefit. With regard to adverse selection, our data provide some evidence that those with the greatest numbers of chronic conditions are most likely to find such a program attractive. However, an examination of drug expenditures suggests that those most likely to enroll may not differ substantially from those who are least likely. Given our finding that those with no drug coverage or independently purchased Medigap benefits (and subsequent high out-of-pocket drug spending) reported the highest likelihood of enrollment, it would appear that demand-side factors affecting the crowding out of private, employer-provided plans can be kept to a minimum. However, supply-side factors (ie, incentives affecting employers' offers of drug benefits) may still lead to crowd-out in this market. Future research is necessary to elucidate drug-plan designs and offerings most likely to minimize selection and insurance-market problems while maximizing uptake and prescription access for older Americans.

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