HEALTH CARE REFORM

Cognition and Take-up of Subsidized Drug Benefits by Medicare Beneficiaries

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Importance: Take-up of the Medicare Part D low-income subsidy (LIS) by eligible beneficiaries has been low despite the attractive drug coverage it offers at no cost to beneficiaries and outreach efforts by the Social Security Administration.

Objective: To examine the role of beneficiaries' cognitive abilities in explaining this puzzle.

Design and Setting: Analysis of survey data from the nationally representative Health and Retirement Study.

Participants: Elderly Medicare beneficiaries who were likely eligible for the LIS, excluding Medicaid and Supplemental Security Income recipients who automatically receive the subsidy without applying.

Main Outcomes and Measures: Using survey assessments of overall cognition and numeracy from 2006 to 2010, we examined how cognitive abilities were associated with self-reported Part D enrollment, awareness of the LIS, and application for the LIS. We also compared out-of-pocket drug spending and premium costs between LIS-eligible beneficiaries who did and did not report receipt of the LIS. Analyses were adjusted for sociodemographic characteristics, household income and assets, health status, and presence of chronic conditions.

Results: Compared with LIS-eligible beneficiaries in the top quartile of overall cognition, those in the bottom quartile were significantly less likely to report Part D enrollment (adjusted rate, 63.5% vs 52.0%; $P=.002$), LIS awareness (58.3% vs 33.3%; $P=.001$), and LIS application (25.5% vs 12.7%; $P<.001$). Lower numeracy was also associated with lower rates of Part D enrollment ($P=.03$) and LIS application ($P=.002$). Reported receipt of the LIS was associated with significantly lower annual out-of-pocket drug spending (adjusted mean difference, −$256; $P=.02$) and premium costs (−$273; $P=.02$).

Conclusions and Relevance: Among Medicare beneficiaries likely eligible for the Part D LIS, poorer cognition and numeracy were associated with lower reported take-up. Current educational and outreach efforts encouraging LIS applications may not be sufficient for beneficiaries with limited abilities to process and respond to information. Additional policies may be needed to extend the financial protection conferred by the LIS to all eligible seniors.

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MEDICARE PART D ENrollees with limited income and resources can qualify for a low-income subsidy (LIS) that provides premium and cost-sharing assistance to reduce out-of-pocket costs for prescription drugs. Medicare beneficiaries who also receive Medicaid, Medicare Savings Program, or Supplemental Security Income (SSI) benefits automatically receive the LIS. Others must apply and meet specific income and resource requirements to qualify. Take-up of the subsidy by these eligible beneficiaries has been remarkably low. In 2009, only 40% of this group applied for and received the LIS.[1] This is surprising given the generous drug coverage offered by the LIS program and efforts by the Social Security Administration (SSA) to enroll eligible beneficiaries.[2]

See Invited Commentary at end of article

Previous research suggests enrollment decisions by Medicare beneficiaries are often suboptimal. Elderly adults regularly fail to enroll in Part D, Medicare Advantage (MA), or Medigap plans when they would gain financially from these choices.[3-6] In addition, many Part D enrollees select drug plans that do not offer the best financial terms among available plans.[7,8]

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Seniors with cognitive deficits may be particularly prone to making poor enrollment decisions.[4,6,9] The relationship between cognition and take-up of the LIS, however, has not been directly examined. Two prior studies[3,10] found cognition to be a weak predictor of Part D enrollment, but neither assessed this relationship among beneficiaries eligible for more generous Part D benefits through the LIS. To our knowledge, no prior study has examined determinants of subsidy application by eligible seniors already enrolled in Part D, among whom the lack of LIS take-up is concentrated.[11]

If low take-up of the LIS is related to the cognitive abilities of eligible beneficiaries, outreach and educational efforts may be insufficient to effectively extend the program's benefits to vulnerable subgroups of low-income seniors. To assess the potential need for alternative policy strategies, we used data from the Health and Retirement Study (HRS) to examine determinants of Part D enrollment, awareness of the LIS, and application for the LIS among beneficiaries likely eligible for the subsidy but not automatically receiving it. We also compared out-of-pocket drug spending and premium costs between those receiving and not receiving the subsidy.

METHODS

STUDY POPULATION

We analyzed data from the 2006, 2008, and 2010 waves of the HRS, a nationally representative, longitudinal survey of adults older than 50 years in the continental United States conducted in English or Spanish.[12] Our analyses included elderly participants reporting enrollment in Medicare who were likely eligible for the LIS based on detailed reports of household income and assets and program rules governing eligibility thresholds (eAppendix; http://www.jamainternalmed.com). Our determinations of LIS eligibility produced estimates (28%-29% of all Medicare beneficiaries in the HRS from 2006 to 2010) that closely matched estimates reported by the Centers for Medicare and Medicaid Services (CMS) over these years.[13-15] We focused our analyses on beneficiaries with particularly limited means who were accordingly eligible for a full rather than partial subsidy, as these beneficiaries had the greatest incentive to enroll in Medicare Part D and apply for the LIS. In 2010, for example, beneficiaries were eligible for a full subsidy if their applicable household income was less than 135% of the federal poverty level and their assets were less than $6600 if single or $9910 if married.

For each survey year, we classified participants as qualifying automatically for the LIS if they reported receiving SSI in the prior year or having concurrent Medicaid coverage and excluded these participants from all but descriptive analyses. In addition, we excluded Medicare beneficiaries reporting enrollment in a health maintenance organization plan because they were not consistently asked questions about Part D and the LIS. For analyses of Part D enrollment, we also excluded those reporting employer-sponsored or Veterans Administration health benefits, because Part D and the LIS may not offer significant advantages to some beneficiaries with these sources of supplemental coverage. We conducted a sensitivity analysis excluding all veterans. The Harvard Medical School Committee on Human Studies approved our study protocol.

STUDY VARIABLES

Part D Enrollment and LIS Awareness, Application, and Receipt

We measured enrollment in Medicare Part D, awareness of the LIS, application for the LIS, and receipt of the LIS from self-reports. Specifically, participants reporting enrollment in Part D were asked, "Medicare beneficiaries with limited income and resources may qualify to get extra help paying for their prescription drug coverage. Did you know about this program?" Those who responded affirmatively were asked, "Did you apply for extra help?" Those who reported applying were asked, "Was your application for extra help accepted or denied?" Awareness of the LIS was assessed only in the 2008 and 2010 surveys. We assumed those who were unaware of the subsidy in these years did not apply or receive it. In 2006, LIS application and receipt were assessed for all Part D enrollees in our study sample.

Out-of-pocket Drug Spending and Premium Costs

All Medicare Part D enrollees were asked to report their monthly premiums for prescription drug plans. Part D enrollees who reported regularly taking prescription drugs were also asked to report their monthly out-of-pocket spending on prescription drugs in the prior year. We annualized these monthly estimates.

Cognition and Numeracy

Take-up of the LIS by eligible beneficiaries who must apply requires awareness of the program, understanding of LIS requirements, recognition of the value of subsidies for which they might qualify, and the ability to navigate the application process through the SSA or their state Medicaid office. We used 2 measures to assess participants' cognitive capacities for executing these functions: a measure of overall cognition and a more specific measure of numeracy.[6,9,16,17]

To assess overall cognitive abilities, the HRS uses a validated survey instrument modeled after the Telephone Interview for Cognitive Status, an adaptation of the Mini-Mental State Examination for use over the telephone.[18-20] Participants were asked to complete a series of tasks assessing orientation, attention, memory, word recognition and comprehension, and ability to count and perform simple arithmetic. Summary cognition scores could range from 0 (no tasks completed correctly) to 35 (all tasks completed correctly). Participants were also asked to perform 3 mathematical tasks testing participants' numeracy—the ability to work with numbers and probabilities.[19] The numeracy questions were adapted from an abbreviated 3-item scale that measures global numeracy with similar reliability as an expanded scale with more items.[21] We analyzed numeracy in addition to overall cognition because it measures distinct cognitive skills that independently predict insurance decisions made by Medicare beneficiaries.[6,9,16,17]

Cognition and numeracy could not be measured for participants who required proxy respondents, 72% of whom did not complete surveys because of cognitive impairments. In a supplementary analysis, we examined Part D enrollment, LIS awareness, and LIS application reported by proxy respondents for participants who otherwise met our inclusion criteria.

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Table 1. Inclusion Criteria and Sample Sizes for Each Dependent Variable

Inclusion Criteria and Corresponding Sample Size	Dependent Variable, Person-years of Survey Data		
	Medicare Part D Enrollment (assessed in 2006, 2008, and 2010)	Awareness of the LIS (Assessed in 2008 and 2010 Only)	Application for the LIS (Assessed in 2006, 2008, and 2010)
Medicare beneficiaries ≥65 y residing in the United States	32 036	21 084	32 036
Not in a Medicare HMO	24 722	15 884	24 722
Likely eligible for the full subsidy	5789	3679	5789
Likely eligible for the full subsidy but would have to apply	3136	2000	3136
Not receiving employer- sponsored insurance	2584	CNA	CNA
Not receiving VA health benefits	2466	CNA	CNA
Enrolled in Part D	CNA	996	1580
Participant (not proxy) responded	2215	899	1426
No missing data on analytic variables	2206	845	1350

Abbreviations: CNA, criterion not applied; HMO, health maintenance organization; LIS, low-income subsidy.

Covariates

From survey data, we determined participants' age, sex, race, ethnicity, health status, chronic conditions, depressive symptoms, and difficulties with activities of daily living (ADLs). Participants reported their race and ethnicity based on categories specified by HRS investigators; we included this information in the analysis because LIS application and Part D enrollment differed by race and ethnicity. We classified participants as depressed if they reported depressive symptoms in response to half or more of questions included in an abridged version of the Center for Epidemiologic Studies–Depression questionnaire.[22] The ADLs included walking across a room, getting in and out of bed, dressing, bathing, and eating.

STATISTICAL ANALYSIS

For each dependent variable and corresponding sample (**Table 1**), we estimated logistic regression models predicting Medicare Part D enrollment, awareness of the LIS, and application to the LIS as a function of overall cognition or numeracy and all covariates described herein. We included cognition and numeracy as explanatory variables in separate models to allow generalization of results to settings in which information on only 1 of these related variables is available. We also estimated models that included both overall cognition and numeracy (eAppendix and eTables 1, 2, and 3).

For tests of overall association with dependent variables, we specified cognition (range, 0-35) and numeracy (0-3) scores as continuous variables in models. To facilitate interpretation of results, we also present mean adjusted Part D enrollment, LIS awareness, and application rates by quartile of cognition scores and by the number of correctly completed questions assessing numeracy.

In addition, to assess the benefits of receiving the LIS among eligible Part D enrollees who did not automatically receive it, we compared out-of-pocket drug spending and premium costs between those receiving and those not receiving the LIS. Using linear regression models, we adjusted these comparisons for cognition, numeracy, and covariates.

We used robust design-based variance estimators to account for geographic clustering and repeated measures when estimating 95% confidence intervals and determining statistical significance.[23] We did not use sampling weights in analyses because they were not available for nursing home residents, among whom cognitive impairment is prevalent and prescription drug needs are high. All statistical analyses were conducted with Stata software (version 12; StataCorp).

RESULTS

Sample sizes after exclusions are reported in Table 1. Lack of cognition and numeracy scores for participants with proxy respondents explained most exclusions due to missing data.

DESCRIPTIVE COMPARISONS

Results of unadjusted comparisons of sociodemographic and clinical characteristics are presented in **Table 2**. Among Medicare beneficiaries likely eligible for the LIS but not automatically receiving it (hereafter, the target population), 42.2% were not enrolled in Part D. Those who did not enroll were older, had poorer cognition and numeracy, were less likely to use prescription drugs regularly, were in better health, had fewer chronic conditions, were more likely to be veterans, and were less likely to be depressed and female.

Among Part D enrollees in the target population, many of the same differences were observed between those who reported applying and those who reported not applying for the subsidy, but differences in prescription drug use and health-related variables were smaller and often not statistically significant (Table 2). In addition, Part D enrollees who reported not applying for the LIS were less likely to be white and had fewer years of education.

ENROLLMENT IN MEDICARE PART D AMONG LIS-ELIGIBLE BENEFICIARIES

Among participants in the target population, enrollment in Part D (**Table 3**) was more likely to be reported by those with higher cognition scores (adjusted odds ratio [OR], 1.03 for an additional correctly completed task [95% CI, 1.00-1.05]; $P = .02$) and higher numeracy scores (OR, 1.21 [95% CI, 1.03-1.44]; $P = .03$). As displayed in the **Figure**, adjusted rates of reported Part D enrollment ranged from 52.0% (95% CI, 47.5%-56.4%) for those in the lowest quartile of cognition to 63.5% (95% CI, 58.7%-68.2%) for those in the highest quartile, and from 55.1% (95% CI, 52.4%-57.8%) for those

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Table 2. Sociodemographic and Clinical Characteristics of Comparison Groups[a]

Characteristic	Automatically Qualified for LIS (n = 2653)	Medicare Beneficiaries Eligible for LIS But Must Apply			Part D Enrollees Eligible for LIS But Must Apply		
		Not Enrolled in Part D (n = 931)	Enrolled in Part D (n = 1275)	*P* Value for Test vs Not Enrolled	Did Not Apply (n = 1045)	Applied to LIS (n = 305)	*P* Value for Test vs Did Not Apply
Age, mean, y	76.6	77.4	75.9	.001	76.4	74.1	<.001
Female	70.2	63.1	72.4	<.001	70.2	79.1	.01
Race/ethnicity							
Non-Hispanic white	42.3	53.0	55.0	.77	53.6	63.7	.03
Non-Hispanic black	28.4	28.8	27.5		28.3	24.3	
Hispanic	25.4	15.6	15.3		15.9	10.2	
Other	3.9	2.5	2.1		2.2	1.8	
Educational attainment, mean, y	8.9	10.0	9.8	.10	9.7	10.5	.002
Married	28.0	31.2	31.5	.91	32.1	32.6	.89
Military veteran	10.4	17.9	7.9	<.001	9.4	6.5	.05
Household income and assets, mean[b]							
Countable income, $	12 187.46	11 620.78	12 086.99	.06	12 167.54	12 557.04	.24
Countable assets, $	25 417.73	−2605.94	−3634.58	.20	−2523.47	−6782.73	.16
Cognition score (0, worst, to 35, best), mean	17.1	17.3	18.2	<.001	17.8	19.9	<.001
Quartile of cognition score							
Lowest quartile (0-13)	25.7	24.7	18.9	<.001	21.4	9.5	<.001
Quartile 2 (14-17)	24.0	26.4	23.3		24.4	19.3	
Quartile 3 (18-21)	26.9	25.5	28.7		27.6	32.5	
Highest quartile (22-35)	23.4	23.4	29.1		26.6	38.7	
Numeracy score (0, worst; 3, best), mean	0.5	0.5	0.6	.05	0.6	0.7	.007
Numeracy items completed, No. correctly							
0 of 3	62.3	59.7	54.0	.04	55.9	46.9	.01
1 of 3	28.0	28.5	33.4		33.3	34.7	
2-3 of 3	9.7	11.8	12.6		10.8	18.4	
Regular use of prescription drugs	93.2	80.4	90.9	<.001	89.8	93.2	.14
Depression based on CESD scale[c]	29.1	21.9	26.1	.002	25.5	28.3	.22
Self-reported health (1, excellent; 5, poor), mean	3.7	3.4	3.5	.001	3.5	3.5	.50
Some difficulties on ≥2 ADLs[d]	35.8	20.3	20.1	.93	19.8	17.5	.27
Self-reported chronic conditions							
Hypertension	76.2	66.1	75.6	.001	74.6	79.7	.20
Diabetes mellitus	34.9	24.3	32.1	.002	29.5	35.4	.10
Cancer, except skin cancer	17.0	15.9	16.3	.84	15.7	19.7	.08
COPD	18.8	11.7	16.9	.001	16.0	19.7	.17
Coronary heart disease or other heart problems	39.3	32.9	34.1	.53	34.2	36.6	.33
Stroke	19.2	15.1	13.5	.37	13.8	12.0	.42
Psychiatric problems	34.1	19.2	24.0	.002	23.1	25.8	.26
Arthritis or rheumatism	76.9	68.9	76.4	.002	74.4	83.7	.001
Chronic conditions, mean No.	3.2	2.5	2.9	<.001	2.8	3.1	.002

Abbreviations: ADLs, activities of daily living; CESD, Center for Epidemiological Studies-Depression; COPD, chronic obstructive pulmonary disease; LIS, low-income subsidy.

[a] All estimates are adjusted for the complex design of the survey. χ^2 Tests were used to compare distributions of categorical variables and significance tests for continuous variables were performed with an adjusted Wald test (approximate *F* statistic). Data are given as percentages except where noted. Because of rounding, percentages may not total 100.

[b] Countable income and assets refer to the income and assets that are counted toward the LIS eligibility once all exclusions have been applied.

[c] We considered participants to be depressed if they reported depressive symptoms in response to half or more of questions included in an abridged version of the Center for Epidemiologic Studies–Depression questionnaire.

[d] Activities of daily living include bathing, dressing, eating, getting in and out of bed, and walking across a room.

completing no numeracy tasks correctly to 62.1% (95% CI, 55.1%-69.1%) for those completing 2 to 3 tasks. Additional explanatory variables associated with lower rates of enrollment in Part D included older age, Hispanic ethnicity, veteran status, and not having hypertension (Table 3). In a sensitivity analysis excluding all veterans, estimates for cognition and numeracy were not substantively changed.

AWARENESS OF LIS AMONG ELIGIBLE MEDICARE PART D ENROLLEES

Among Part D enrollees in the target population, awareness of the LIS (Table 3) was more likely to be reported by those with higher cognition scores (OR, 1.06 [95% CI, 1.03-1.09]; $P < .001$) but not those with higher numeracy scores (OR, 1.20 [95% CI, 0.99-1.45]; $P = .06$).

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Table 3. Results of Logistic Regression Models Predicting Medicare Part D enrollment, LIS Awareness, and LIS Application

Variable	Odds Ratio (95% CI)		
	Part D Enrollment Among LIS-Eligible Beneficiaries	LIS Awareness Among Eligible Part D Enrollees	LIS Application Among Eligible Part D Enrollees
Year			
2006	1 [Reference]	NA	1 [Reference]
2008	0.88 (0.71-1.09)	1 [Reference]	1.21 (0.88-1.65)
2010	0.73 (0.54-0.98)[a]	0.92 (0.69-1.22)	1.33 (0.99-1.79)[b]
Age	0.98 (0.97-1.00)[a]	0.97 (0.95-1.00)[a]	0.96 (0.94-0.98)[c]
Female	1.25 (0.97-1.61)[b]	1.77 (1.16-2.71)[c]	1.51 (0.99-2.31)[b]
Race/ethnicity			
Non-Hispanic white	1 [Reference]	1 [Reference]	1 [Reference]
Non-Hispanic black	0.85 (0.62-1.17)	0.62 (0.45-0.86)[c]	0.74 (0.51-1.08)
Hispanic	0.71 (0.53-0.96)[a]	0.48 (0.20-1.12)[b]	0.52 (0.23-1.19)
Other	0.98 (0.48-2.00)	0.85 (0.37-1.92)	1.01 (0.37-2.75)
Educational attainment, years	0.97 (0.94-1.00)[b]	1.03 (0.99-1.07)	1.00 (0.94-1.07)
Married	1.11 (0.81-1.51)	0.98 (0.67-1.42)	1.24 (0.91-1.69)
Military veteran	0.45 (0.31-0.65)[c]	1.06 (0.61-1.86)	0.81 (0.43-1.51)
Household income and assets/ $10 000, mean[d]			
Countable income	1.16 (0.96-1.39)	1.33 (0.97-1.83)[b]	1.00 (0.74-1.35)
Countable assets	0.97 (0.93-1.01)	0.94 (0.82-1.07)	0.83 (0.69-1.00)[a]
Cognition score (0, worst, to 35, best)	1.03 (1.00-1.05)[a]	1.06 (1.03-1.09)[c]	1.05 (1.03-1.08)[c]
Numeracy score (0, worst, to 3, best)[e]	1.21 (1.03-1.44)[a]	1.20 (0.99-1.45)[b]	1.31 (1.09-1.57)[c]
Depressed based on CESD scale[f]	1.12 (0.91-1.38)	1.13 (0.78-1.63)	1.20 (0.90-1.61)
Some difficulties on ≥2 ADLs[g]	1.01 (0.77-1.34)	1.15 (0.75-1.76)	0.87 (0.57-1.31)
Self-reported chronic conditions			
Hypertension	1.59 (1.24-2.03)[c]	0.96 (0.65-1.44)	1.36 (0.82-2.26)
Diabetes mellitus	1.28 (0.99-1.65)[b]	0.98 (0.66-1.44)	1.20 (0.84-1.70)
Any cancer, except skin cancer	1.03 (0.74-1.42)	1.19 (0.79-1.78)	1.43 (0.99-2.05)[b]
COPD	1.27 (0.98-1.65)[b]	0.91 (0.55-1.51)	1.04 (0.68-1.60)
Coronary heart disease or other heart problems	0.94 (0.78-1.14)	1.18 (0.81-1.71)	1.03 (0.78-1.36)
Stroke	0.88 (0.65-1.20)	1.06 (0.63-1.79)	0.89 (0.53-1.49)
Psychiatric problems	1.12 (0.88-1.43)	0.76 (0.53-1.08)	0.89 (0.63-1.26)
Arthritis or rheumatism	1.18 (0.90-1.54)	1.25 (0.83-1.87)	1.61 (1.03-2.50)[b]

Abbreviations: ADLs, activities of daily living; CESD, Center for Epidemiological Studies-Depression; COPD, chronic obstructive pulmonary disease; LIS, low-income subsidy.

[a] $P < .05$.

[b] $P < .10$.

[c] $P < .01$.

[d] Countable income and assets refer to the income and assets that are counted toward the LIS eligibility once all exclusions have been applied (see eAppendix for more details).

[e] Results from a separate regression with the same covariates except cognition.

[f] We considered participants to be depressed if they reported depressive symptoms in response to half or more of questions included in an abridged version of the CESD questionnaire.

[g] Activities of daily living include bathing, dressing, eating, getting in and out of bed, and walking across a room.

Adjusted rates of LIS awareness in this group ranged from 33.3% (95% CI, 23.1%-43.6%) for those in the lowest quartile of cognition to 58.3% (95% CI, 50.2%-66.4%) for those in the highest quartile (Figure). Older age, male sex, and non-Hispanic black race also were associated with significantly lower awareness of the LIS (Table 3).

APPLICATION FOR THE LIS AMONG ELIGIBLE MEDICARE PART D ENROLLEES

Among Part D enrollees in the target population, application for the LIS was more likely to be reported by those with higher cognition scores (OR, 1.05 [95% CI, 1.03-1.08]; $P < .001$) and higher numeracy scores (OR, 1.31 [95% CI, 1.09-1.57]; $P = .002$). Adjusted rates of reported LIS application ranged from 12.7% (95% CI, 8.5%-16.9%) for those in the lowest quartile of cognition to 25.5% (95% CI, 20.0%-31.1%) for those in the highest quartile, and from 19.4% (95% CI, 16.0%-22.7%) for those completing no numeracy tasks correctly to 30.2% (95% CI, 21.4%-39.1%) for those completing 2 to 3 tasks (Figure). In addition, older age, more assets, and absence of arthritis were associated with lower rates of reported LIS application (Table 3).

Among participants with proxy respondents, adjusted rates of Part D enrollment (62.0% [95% CI, 56.5%-67.5%]), LIS awareness (55.4% [95% CI, 42.4%-68.4%]), and LIS application (16.4% [95% CI, 9.4%-23.4%) were imprecisely estimated but generally similar to rates reported by participants in the top 2 or 3 quartiles of cognition scores.

OUT-OF-POCKET COSTS ASSOCIATED WITH LIS RECEIPT

Among Medicare Part D enrollees in the target population, self-reported receipt of the LIS was associated with

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significantly lower annual out-of-pocket drug spending (adjusted mean difference: −$256; $P = .02$) and premium costs (−$273; $P = .02$).

DISCUSSION

In this nationally representative study of low-income Medicare beneficiaries who were likely eligible for the LIS but did not automatically qualify, many reported not enrolling in Part D, and many of those who did enroll in Part D reported that they were unaware of the subsidy or did not apply for it. Older age, poorer cognition, and poorer numeracy strongly and consistently predicted these apparent failures to take up fully subsidized drug benefits. Those who reported receiving the subsidy had substantially lower out-of-pocket drug spending and premium costs, suggesting deleterious financial consequences for seniors who were unable to recognize or apply for these benefits.

These findings are consistent with previous research suggesting that most seniors who would benefit financially from Part D drug coverage enroll in the program, but that a substantial minority do not, particularly those with low incomes and less education.[3,5,10] Our findings are also consistent with those of prior studies demonstrating low awareness and take-up of the LIS among eligible beneficiaries and lower out-of-pocket drug spending among those who receive it.[24,25] Our study further suggests that outreach efforts by the SSA to enroll eligible beneficiaries in the subsidy program have been less effective for beneficiaries with limited cognitive abilities. Thus, alternative strategies may be necessary to extend the financial and potential clinical benefits of the subsidy to eligible seniors who lack the mental capacity necessary to respond to educational materials and apply.

One solution is to change the LIS from an opt-in to an opt-out program for eligible beneficiaries who are not already automatically enrolled.[1,26] The SSA and CMS, however, are not permitted to use tax records from the Internal Revenue Service to reliably identify eligible beneficiaries.[2] Additional legislation would be needed to authorize use of tax information for this purpose. The SSA could automatically enroll beneficiaries who have been deemed potentially eligible for the subsidy from other federal sources of financial data; these potentially eligible beneficiaries already receive subsidy applications from the SSA as part of its outreach efforts. This alternative strategy, however, would substantially expand the population intended to receive the LIS and would therefore require additional financing.

To supplement outreach efforts by the SSA, the CMS could provide incentives to Part D plans to collect the information necessary to determine LIS eligibility for enrollees each year. Medicare Advantage prescription drug (MA-PD) plans may already have an incentive to ensure eligible enrollees are receiving the LIS, as more generous drug coverage may lower nondrug costs for which MA-PD plans bear greater risk.[27-32] Whether plans would be more successful than the SSA in facilitating subsidy applications from cognitively impaired seniors is unclear. Absent a comprehensive solution, provisions in the 2010 Accountable Care Act to close the coverage gap or "doughnut hole" in the standard Part D benefit may help extend some of the LIS benefits to eligible seniors who fail to apply.

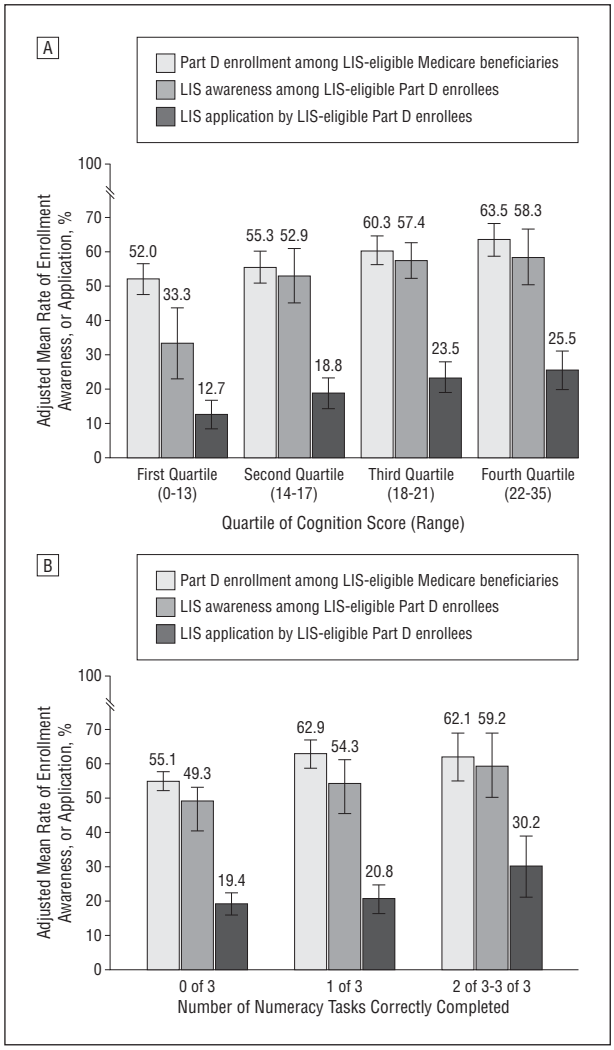

Figure. Adjusted rates of Medicare Part D enrollment, low-income subsidy (LIS) awareness, and LIS application by cognition and numeracy. Adjusted rates of Part D enrollment, LIS awareness, and LIS application are displayed by quartile of cognition score (A) and number of correctly completed numeracy tasks (B) among Medicare beneficiaries likely eligible for the LIS but not automatically receiving it.

More generally, our findings contribute to growing evidence of suboptimal enrollment decisions by elderly Medicare beneficiaries.[3-7,9] This evidence suggests that policies that rely on seniors' choices to support efficient competition among plans may be less effective when not coupled with government efforts to regulate choice sets and guide beneficiaries to the best available options. Even when presented with a single dominant option in the form of free additional drug coverage, many low-income seniors are apparently unable to choose this option.[1] Thus, in concert with previous research, our finding of lower LIS take-up by seniors with impaired abilities to recognize, process, or respond to information suggests that simply providing more information to Medicare beneficiaries about insurance options may not optimize their enrollment decisions.

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Our study had several limitations, the most important of which was our reliance on self-reported data. Rates of LIS application and receipt reported by HRS participants were substantially lower than rates reported by the CMS.[10] Self-reported awareness of the LIS, however, was similar to awareness in another national survey in which a higher percentage of low-income beneficiaries reported receipt of the subsidy, and in which awareness was strongly associated with receipt.[25] In addition, Part D enrollment reported by traditional fee-for-service Medicare beneficiaries in the HRS (42%) approximated national estimates from administrative data, and cognition was consistently associated with self-reported Part D enrollment, LIS awareness, and LIS application.[33] Moreover, the strong association between reported LIS receipt and out-of-pocket drug spending suggests that self-reports reliably predicted LIS application and participation.

In addition, assessments of cognition and numeracy were missing for participants who required proxies to complete surveys on their behalf. Because participants with proxies may have had help in making insurance decisions, our results may overstate the importance of cognitive abilities for LIS take-up by beneficiaries with strong social supports. Finally, we were unable to assess effects of the LIS on clinical outcomes.

Nevertheless, our findings suggest that low-income Medicare beneficiaries with poor cognitive skills are more likely to forgo subsidized drug benefits for which they are eligible and about which they are informed. Additional policies are needed to extend the financial protection afforded by the LIS to vulnerable groups for whom it is intended to help.

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INVITED COMMENTARY

Supporting High-Value Part D Medicare Choices for Low-Income Beneficiaries

The Medicare outpatient prescription drug benefit (Part D), established as a voluntary program by the Medicare Modernization Act of 2003 with coverage starting in 2006, filled an important gap in the affordability of medical care for older Americans. All 49 million elderly and disabled Medicare beneficiaries have access to the drug benefit through private plans approved by the federal government. The standard benefit in 2013 has a $325 deductible and 25% coinsurance up to an initial coverage limit of $2970 in total drug costs. After this limit is reached, enrollees are responsible for a larger share of their drug costs until they reach out-of-pocket costs of $4750. Following this coverage gap, more generous benefits resume. Although the Patient Protection and Affordable Care Act of 2010 (ACA) made some important changes to Part D, in particular phasing out the coverage gap (or "doughnut hole") by 2020, the cost of premiums, deductibles, and coinsurance still are a major obstacle to obtaining medications for many Medicare beneficiaries.

To ease the financial barrier to prescription medication coverage, Medicare beneficiaries with low incomes are eligible for the low-income subsidy (LIS). While those receiving Medicaid and patients with disabilities are automatically subsidized, others must apply and pass a means test. In 2010, of 29.7 million Part D enrollees, 11.3 million (38%) received the subsidy.[1] The Center for Medicare & Medicaid Services (CMS) estimated that, in 2011, the average value of the subsidy was about $4000.[2] However, despite this substantial incentive to apply for a subsidy, the CMS estimates that only 35% to 40% of low-income beneficiaries who are eligible but must apply on their own received the subsidy each year from 2006 to 2009.[3] Millions of eligible seniors have not applied because of lack of awareness of the subsidy (despite the federal government's outreach efforts), uncertainty about how to apply, reluctance to share financial information, a belief that their income or assets are too high, and the complexity of gathering the information for the application. An article in this issue suggests that cognitive impairment and lack of numeracy may also contribute to low subsidy application rates.[4]

Kuye et al[4] analyzed data from the 2006, 2008, and 2010 waves of the Health and Retirement Study (HRS) and used reports of income and assets to identify respondents who were likely eligible for the full subsidy but would not qualify for automatic enrollment. Although they attempted to exclude respondents with other sources of insurance coverage that would make them less likely to need Part D coverage, 42% of their sample reported that they were not enrolled in Part D. Furthermore, 77% reported that they did not apply for the LIS, although over 90% used prescription drugs regularly. Using HRS survey data on measures of cognition and numeracy, the authors found that higher cognition was associated with greater likelihood of Part D enrollment and LIS awareness and application. Better numeracy skills were associated with higher Part D enrollment and LIS application. The study extends previous findings from this same survey showing that lower cognitive function is associated with lower likelihood of choosing a Medicare Advantage plan with more generous benefits over traditional fee-for-service Medicare,[5] purchasing supplemental Medigap insurance,[6] and enrolling in Part D in 2006.[7]

The CMS estimates that 90% of Medicare beneficiaries in 2010 were either enrolled in Part D or had another source of drug coverage with benefits equal to or better than Part D.[1] Thus, it is somewhat surprising given the exclusions that Kuye et al[4] used that 42% of low-income seniors reported not being enrolled in Part D. This could be due to genuinely lower Part D enrollment in this low-income sample, inaccurate self-reports, or missing data on other sources of prescription drug coverage. Their finding that only 23% of those likely to be eligible for the subsidy reported applying is also lower than the CMS's estimate that 40% of the eligible population received the LIS from 2006 to 2009. However, the CMS estimates may lack precision because they are based on US Census Bureau data rather than beneficiary income data. There is little reason to be optimistic that the situation will im-

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