HEALTH CARE REFORM

Health Care Use and Decision Making Among Lower-Income Families in High-Deductible Health Plans

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Background: Lower-income families may face unique challenges in high-deductible health plans (HDHPs).

Methods: We administered a cross-sectional survey to a stratified random sample of families in a New England health plan's HDHP with at least $500 in annualized out-of-pocket expenditures. Lower-income families were defined as having incomes that were less than 300% of the federal poverty level. Primary outcomes were cost-related delayed or foregone care, difficulty understanding plans, unexpected costs, information-seeking, and likelihood of families asking their physician about hypothetical recommended services subject to the plan deductible. Multivariate logistic regression was used to control for potential confounders of associations between income group and primary outcomes.

Results: Lower-income families (n=141) were more likely than higher-income families (n=273) to report cost-related delayed or foregone care (57% vs 42%; adjusted odds ratio [AOR], 1.81; 95% confidence interval [CI], 1.15-2.83]). There were no differences in plan understanding, unexpected costs, or information-seeking by income. Lower-income families were more likely than others to say they would ask their physician about a $100 blood test (79% vs 63%; AOR, 1.97; 95% CI, 1.18-3.28) or a $1000 screening colonoscopy (89% vs 80%; AOR, 2.04; 95% CI, 1.06-3.93) subject to the plan deductible.

Conclusions: Lower-income families with out-of-pocket expenditures in an HDHP were more likely than higher-income families to report cost-related delayed or foregone care but did not report more difficulty understanding or using their plans, and might be more likely to question services requiring out-of-pocket expenditures. Policymakers and physicians should consider focused monitoring and benefit design modifications to support lower-income families in HDHPs.

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IN THE MIDST OF THE CURRENT economic downturn, many Americans are paying more for their health care.[1] One way in which a growing number of families are facing higher levels of cost-sharing for health care is enrollment in high-deductible health plans (HDHPs).[2] These plans, which feature annual deductibles of at least $1000 per individual and at least $2000 per family before most services are covered, seek to encourage patients to become more cost-effective consumers of health care and frequently offer lower premiums than other types of health insurance.[1] In early 2009, 23% of all nonelderly adults with private insurance, and nearly 50% of adults who purchased coverage through the nongroup market, were enrolled in an HDHP.[2] Because of their relatively low premiums, HDHPs are also playing a prominent role in expanding insurance coverage. For example, most individuals who have purchased unsubsidized plans through the Commonwealth Connector, the new health insurance exchange in Massachusetts, have selected products like HDHPs that offer low premiums with high levels of cost-sharing.[3]

See Invited Commentary at end of article

Early enrollees in HDHPs tended to have higher incomes than enrollees in plans with low levels of cost-sharing.[4-6] Currently, however, lower-income individuals with private health insurance coverage are as likely to be enrolled in an HDHP as higher-income individuals.[7] As enrollment in HDHPs has grown, many analysts have voiced concerns about the impact these plans may have on low-income families.[8-11] Decades of health services research have demonstrated that higher levels of cost-sharing reduce health care utilization, some-

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times with greater adverse consequences for low-income patients.[12-15] Ideally, HDHPs could stimulate patients to become more sophisticated consumers, but people with low incomes have not demonstrated the same levels of engagement in managing their health care as those with higher incomes.[16] By requiring patients to pay for selected services, HDHPs could stimulate more physician-patient communication about the value of recommended health care, but low-income patients are less likely to report that their health care providers always explain things in a way they can understand.[17]

Despite these concerns, little is known about how the experiences of lower-income families in HDHPs compare with those of higher-income families. The impact of household income on health care use and decision making may be particularly important for families who face out-of-pocket expenditures for care. In this study, we hypothesized that lower-income families with out-of-pocket expenditures in HDHPs would be more likely than higher-income families to delay or forego health care due to cost, report difficulties understanding their plans, exhibit low levels of information-seeking about plan coverage and service costs, and avoid talking with their physicians about services requiring out-of-pocket expenditures.

METHODS

The study population was drawn from enrollees in HDHPs of Harvard Pilgrim Health Care, a New England–based nonprofit health insurer. In 2002, Harvard Pilgrim began offering health plans with annual deductibles of at least $1000 for individuals and $2000 for families, the standard definition of an HDHP.[1] In these HDHPs, most preventive services, including routine check-ups, immunizations, and selected screening tests, were exempt from the deductible (ie, enrollees paid either a copayment or nothing for these services, whether or not they had met the deductible amount). In contrast, most diagnostic laboratory and imaging tests were not covered until the deductible had been met.

STUDY POPULATION

Our target population was families in HDHPs who had engaged with their health plans as evidenced by accrual of out-of-pocket health care expenditures during a defined time period. Accordingly, we specified the sample frame as adults 18 years or older who, as of November 2008, were subscribers enrolled in a Harvard Pilgrim Health Care HDHP with an individual deductible of at least $1000 and a family deductible of at least $2000 and had (1) continuous enrollment in an HDHP for at least the previous 6 months, (2) at least 1 child younger than 18 years also enrolled in the plan, and (3) annualized family out-of-pocket costs (defined as outpatient visit and prescription drug copays) of at least $500 in an HDHP. For families enrolled in an HDHP for the previous 12 months, annualized out-of-pocket expenditures constituted their full observed out-of-pocket expenditures over this time period. For families enrolled in an HDHP for 6 to 12 months, annualized out-of-pocket expenditures were calculated by doubling their last 6 months of observed out-of-pocket expenditures. This threshold of annualized out-of-pocket expenses included 54% of all families who met other inclusion criteria.

We oversampled households living in low-income areas by stratifying families that met our inclusion criteria into 2 groups based on address information from health plan records: (1) residence in a US Census Bureau block group with a median household income in the 0% to 25% quartile of the sample frame and (2) residence in a US census block group with a median household income in the upper 3 quartiles of the sample frame.[18,19] Random sampling was performed in each stratum until surveys from approximately 200 families in each group were completed.

SURVEY ADMINISTRATION

Surveys were mailed from January through March 2009. The cover letter asked the adult in the family who was responsible for the family's health care decisions to complete the survey. We sent 2 mail waves followed by attempts at telephone administration.

SURVEY DESIGN

The survey consisted of 22 items that collected data on health plan characteristics, attitudes toward health care utilization, unexpected costs, information-seeking behaviors, cost-related delayed or foregone care, and demographic characteristics. Survey domains and questions were developed based on a previous focus group study in this population[20] and were in some cases drawn from existing national surveys. The draft survey underwent cognitive pretesting and piloting with a total of 60 respondents. The study was approved by the Harvard Pilgrim Health Care institutional review board.

PRIMARY OUTCOME VARIABLES

The primary outcome variables related to health care access were whether care was delayed or foregone owing to the cost for children, adults, or any family member in the previous 6 months. Primary outcome variables related to plan understanding and decision making included finding one's HDHP difficult to understand; feeling not well protected from out-of-pocket expenses; and encountering unexpected health care costs, ever trying to find out whether a service would be covered, or ever trying to find out how much one would have to pay for a service since joining the HDHP.

To gauge respondents' willingness to discuss health care services with their physicians, we presented 3 hypothetical scenarios that described a recommended service and stated that the service would not be covered by their insurance plan. The services were (1) a $100 blood test ordered as part of a routine check-up, (2) a $1000 colonoscopy to screen for colon cancer, and (3) a $2000 magnetic resonance imaging scan for minor back pain symptoms. In each case, the primary outcome variable was whether respondents said they would be likely to ask their doctor to delay the test or make a different plan, owing to the cost. Questions were worded to focus on whether cost, rather than other concerns, would prompt a discussion with the physician.

SECONDARY OUTCOME VARIABLES

Respondents from families with any delayed or foregone care in the previous 6 months were asked what types of services were delayed or foregone. In addition, these respondents were asked whether the delayed or foregone care caused a loss of time at work, school, or other important life activities; a serious increase in the patient's or family's level of stress; a temporary disability that included a significant amount of pain and suffering; or a long-term disability.

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CLASSIFICATION OF INCOME GROUPS

Self-reported household income data were combined with health plan data on household size to calculate a percentage of the federal poverty level (FPL) for each family. A dichotomous variable was constructed in which *lower-income* was defined as less than 300% of the FPL and *higher-income* was defined as greater than or equal to 300% of the FPL. This break point between lower and higher incomes was chosen because of the policy relevance of this division as the threshold at which subsidies start for purchase of health plans through the Massachusetts Commonwealth Connector, and the distribution of percentage of FPL in the sample.

COVARIATES

Data on race; respondent education; chronic illness; plan choice; presence of a health savings account (HSA), health reimbursement account (HRA), flexible spending account (FSA), or medical savings account (MSA); and employer reimbursement for out-of-pocket costs outside of a special savings account were obtained from the survey. Race and education data were collected using categories similar to those used by the US Census Bureau. Race was defined as a dichotomous variable where self-identification as any race other than white was considered to be minority status. Education was defined as a dichotomous variable based on whether the survey respondent reported having a college degree. Plan choice was defined as the respondent's report of having a choice of more than 1 health plan through his or her employer, spouse, or partner. Chronic illness was defined as a condition that had lasted or was expected to last a year or longer, may limit what one can do, and may require ongoing care. Data on household size, child age, adult age, and individual and family deductible amounts were obtained from health plan records. Out-of-pocket costs were obtained from health plan data and represent the sum of progress toward the deductible, copayments, and coinsurance charges in the last 6 months.

STATISTICAL ANALYSIS

All primary and secondary outcome variables were specified a priori. We compared the characteristics and survey responses of families in the 2 income groups using continuity-adjusted χ^2 tests and the Wilcoxon rank-sum test with a prespecified $\alpha = .05$. For primary outcomes that were associated with income group in bivariate analyses, we estimated logistic regression models to control for potential confounders. Model covariates were selected based on an a priori set of predisposing, enabling, and need factors related to health care utilization.[21] We evaluated model covariates for pairwise interactions and found none to be statistically significant. All analyses were performed using SAS statistical software (version 9.1; SAS Institute Inc, Cary, North Carolina).

RESULTS

Surveys were mailed to 750 of 2635 eligible families, and 434 surveys were completed by either mail or telephone. The response rate was 55% in the lower US Census Bureau block group median household income stratum and 61% in the higher US Census Bureau block group median household income stratum. There were no statistically significant differences between respondents and nonrespondents in block group median household income stratum, health plan characteristics, mean out-of-pocket costs, mean household size, or the family's mean adult or child age.

Twenty families had missing household income data and were excluded from analyses. There were no statistically significant differences in household size, adult or child age, race/ethnicity, educational level, prevalence of chronic illness, health plan characteristics, or mean out-of-pocket costs between families who reported household income and families with missing income data.

DEMOGRAPHIC CHARACTERISTICS

Compared with higher-income families, families with lower incomes were more likely to live in a low-income US Census Bureau block group (61.0% vs 41.8%; $P < .001$) and be minorities (8.5% vs 2.9%; $P = .02$), were larger (4.2 vs 3.9 individuals; $P = .006$), and were less likely to have an adult survey respondent with a college degree (26.2% vs 56.0%; $P < .001$) (**Table 1**). Approximately 80% of families in each income group had at least 1 family member with a chronic condition. Seventy-two percent of families were from New Hampshire, and 28% were from Massachusetts.

HEALTH PLAN CHARACTERISTICS

Most of the families (93%) were enrolled in a health maintenance organization HDHP (ie, a plan that became a health maintenance organization after the deductible was exceeded). There were no statistically significant differences between the 2 income groups in mean individual deductible, mean family deductible, or mean out-of-pocket costs in the previous 6 months. Most families (56%) reported that their family did not have a choice of more than 1 health insurance plan, and there were no statistically significant differences in degree of plan choice by income group. Only 32% of families reported having a special account for health care expenses such as an HSA, HRA, FSA, or MSA, and there were no statistically significant differences in the proportion of families in each income group who reported having such an account (Table 1). However, significantly more respondents in the higher-income group (16.7% vs 7.1%; $P = .01$) reported that their employer provided reimbursement (outside of a special account) for some out-of-pocket health care expenses. Overall, higher-income families were more likely to have either a special account or employer reimbursement for out-of-pocket expenses (44.7% vs 30.2%; $P = .006$).

DELAYED OR FOREGONE CARE DUE TO COST

Lower-income families were significantly more likely than higher-income families to report having cost-related delayed or foregone care for any adult (51.1% vs 34.8%; $P = .002$) or child (24.1% vs 13.9%; $P = .01$) in the previous 6 months (**Table 2**). Controlling for covariates (**Table 3**), lower-income families had nearly twice the odds of any cost-related delayed or foregone care in the last 6 months (AOR, 1.81; 95% CI, 1.15-2.83). Other factors significantly associated with having cost-related delayed or foregone care were having a family member with a chronic illness (AOR, 1.79; 95% CI, 1.05-3.06) and hav-

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Table 1. Characteristics of Participant Families by Household Income

Characteristic	Families With FPL < 300%[a] (n=141)	Families With FPL ≥ 300% (n=273)	*P* Value
Demographic characteristics			
Residence in low-income census block group, %[b]	61.0	41.8	<.001
Household size, mean, No.	4.2	3.9	.006
Child age, mean, y	9.9	9.8	.93
Adult age, mean, y	37.5	40.2	<.001
Minority, %[c]	8.5	2.9	.02
Annual income, mean, $	44 734	86 603	<.001
Respondent with college degree, %	26.2	56.0	<.001
Any chronic illness in family, %[d]	82.9	79.1	.44
Health plan characteristics			
Family had a choice of other health plans, %[e]	42.6	44.6	.76
Annual individual deductible, mean, $	1291	1288	.59
Annual family deductible, mean, $	3443	3489	.90
HSA, HRA, FSA, or MSA, %	26.6	34.8	.12
Employer reimburses OOP costs, %[f]	7.1	16.7	.01
Annual employer OOP cost reimbursement, mean, $[g]	1250	1066	.37
Any OOP cost reimbursement mechanism, %[h]	30.2	44.7	.006
OOP costs in last 6 mo, mean, $[i]	1253	1218	.79

Abbreviations: FPL, federal poverty level; FSA, flexible spending account; HRA, health reimbursement account; HSA, health savings account; MSA, medical savings account; OOP, out-of-pocket.

[a] The FPL was calculated using 2008 Department of Health and Human Services Poverty Guidelines.[22]

[b] US Census Bureau block group with a median household income in the lowest quartile in the initial sample frame.

[c] Self-identification as any race other than white.

[d] Any condition that has lasted or is expected to last a year or longer, may limit what one can do, and may require ongoing care.

[e] Choice of more than 1 health benefit plan through the respondent's employer, spouse, or partner.

[f] Any employer reimbursement for OOP costs outside of an HSA, HRA, FSA, or MSA.

[g] Among families with employer reimbursement for OOP costs outside of an HSA, HRA, FSA, or MSA.

[h] Any HSA, HRA, FSA, MSA, or other employer reimbursement.

[i] Health plan data on progress toward deductible, copayments, and coinsurance charges.

Table 2. Delayed or Foregone Care Due to Cost in Previous 6 Months by Household Income

Outcome	Families With FPL < 300% (n=141)	Families With FPL ≥ 300% (n=273)	*P* Value
Delayed or foregone care in last 6 mo, %			
Any delayed or foregone pediatric care	24.1	13.9	.01
Any delayed or foregone adult care	51.1	34.8	.002
Any delayed or foregone care in family	57.4	42.5	.005
Types of delayed or foregone care, %[a]			
Emergency department visit	60.5	54.3	.47
Preventive care[b]	32.1	19.8	.07
Imaging test	24.7	23.3	.95
Prescription medication	21.0	16.4	.52
Specialist visit	22.2	13.8	.18
Laboratory test	14.8	9.5	.36
Operation or procedure	19.8	6.0	.003
Physical therapy	13.6	11.2	.78
Consequences of delayed or foregone care, %[c]			
Caused significant long-term disability	3.7	0.9	.38
Caused significant temporary disability	21.0	14.7	.33
Caused significant loss of time at work or school	18.5	10.3	.15
Caused serious increase in stress	34.6	31.0	.71

Abbreviation: FPL, federal poverty level.

[a] Among families with any cost-related delayed or foregone care in the previous 6 months. Services listed were the most common delayed or foregone services in this sample.

[b] Screening test (eg, mammography or colonoscopy), immunization, or outpatient visit for a "routine check-up."

[c] Among families with any cost-related delayed or foregone care in the previous 6 months. The denominators were 81 among families with FPL less than 300% and 116 among families with FPL 300% or greater.

ing had a choice of health plans (AOR, 1.57; 95% CI, 1.04-2.35).

Compared with higher-income families, lower-income families were significantly more likely to report having delayed or foregone operations or procedures owing to cost (19.8% vs 6.0%; *P* = .003). Respondents from lower-income families, compared with respondents from higher-income families, reported higher rates of in-

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Table 3. Factors Predicting Family Delayed or Foregone Care Due to Cost in Previous 6 Months

Predictor	AOR (95% CI)[a]
FPL <300%	1.81 (1.15-2.83)
No college degree[b]	1.30 (0.84-2.00)
Chronic illness[c]	1.79 (1.05-3.06)
Choice of health plans[d]	1.57 (1.04-2.35)
Out-of-pocket cost reimbursement[e]	1.17 (0.76-1.79)

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; FPL, federal poverty level.

[a] Adjusted for adult age, child age, household size, individual deductible, and family deductible.

[b] Respondent with less than a college education.

[c] Any adult or child chronic illness in family.

[d] Choice of more than 1 health benefit plan through the respondent's employer, spouse, or partner.

[e] Health savings account, health reimbursement account, flexible spending account, medical savings account, or employer out-of-pocket cost reimbursement.

creased stress, loss of time at work or school, temporary disability, and long-term disability as a consequence of cost-related delayed or foregone care, but these differences were not statistically significant.

PLAN USE AND INFORMATION-SEEKING

Respondents from lower-income families were no more likely than those from higher-income families to find their health plan difficult to understand, or feel their family was not well protected from out-of-pocket health care expenses (**Table 4**). In addition, respondents from lower-income families were no less likely than respondents from higher-income families to report having tried to find out in advance whether they would have to pay for a specific service before meeting their deductible limit, or how much they would have to pay for a service since joining their health plan.

ENGAGING PHYSICIANS IN CONVERSATIONS ABOUT HEALTH CARE SERVICES

Most respondents in each income group reported they would be likely to talk with their physicians about delaying, or making a different plan for, each of the 3 hypothetical services owing to cost (Table 4). After controlling for covariates (**Table 5**), lower-income families had approximately twice the odds of being likely to discuss a hypothetical $100 blood test (AOR, 1.97; 95% CI, 1.18-3.28) or a $1000 screening colonoscopy (AOR, 2.04; 95% CI, 1.06-3.93) subject to the plan deductible.

COMMENT

We found that lower-income families with at least $500 in annualized out-of-pocket expenditures in an HDHP were more likely than higher-income families to delay or forego health care services owing to cost. However, respondents from lower-income families were no more likely to report difficulty understanding and using their health plans, and might be more likely to question the value of services requiring out-of-pocket expenditures. While a variety of studies have examined the effects of cost-sharing on low-income individuals in private and public health insurance plans,[12] this is one of the few studies to examine the relationship between self-reported income and experiences in a high-deductible health plan.

Overall, we observed relatively high rates of delayed or foregone care in both income groups, with nearly half of all families having either delayed or foregone care in the last 6 months owing to the cost. These rates were substantially higher than the 20% of the US population reporting either unmet need or delayed care in the previous 12 months in the 2007 Heath Tracking Household Survey.[23] It is unclear whether this difference primarily reflects the impact of higher cost-sharing levels on our sample population or our inclusion of only families that had accumulated at least $500 in annualized out-of-pocket expenditures.

Respondents in both groups felt they had a good understanding of how their HDHP worked, although they reported low levels of information-seeking about their benefits and out-of-pocket costs for services. It is important to note that we did not detect any differences in information-seeking between lower- and higher-income families. The low overall rate of information-seeking was somewhat surprising considering that this group of families had both a high level of need for care, as manifested by a high burden of chronic illness, and evidence of health care utilization, as manifested by at least $500 in annualized out-of-pocket expenditures. It is possible that many of these families had become so familiar with their plans from having had high out-of-pocket costs that they felt little need to gather additional information. The fact that many families reported delaying or foregoing preventive care, however, suggests there could have been some confusion at least about deductible exemptions, because most preventive services were exempt from most families' deductibles.

Most respondents indicated that they would be likely to ask their physician about delaying a hypothetical service not covered by their health plan or making a different plan owing to the cost. Contrary to our initial hypothesis, respondents from lower-income families voiced an even greater desire than those from higher-income families to talk with their physicians about 2 of 3 hypothetical services. These findings suggest that physicians have a central role to play in helping their patients navigate the challenges of decision making in HDHPs. Physician guidance around decision making could be particularly helpful for lower-income families in HDHPs who may be more likely to delay or go without care because of cost. The capacity of physicians to assume this role, however, is currently limited by time[24] and lack of knowledge about both HDHPs[25] and the costs of services.[26] These barriers could potentially be surmounted through electronic medical record tools that could provide physicians with brief, actionable information to encourage shared decision-making processes that consider out-of-pocket costs.

Beyond the implications for clinicians, our findings have important implications for federal health reform. Reform legislation that establishes an individual health

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Table 4. Health Care Decision-Making Attitudes and Behaviors by Household Income

Outcome	Families With FPL < 300% (n=141)	Families With FPL ≥ 300% (n=273)	*P* Value
Plan use and information-seeking, %			
Feels unprotected from OOP expenses[a]	54.3	44.1	.06
Finds current health plan difficult to understand[b]	24.8	26.2	.85
Ever encountered unexpected costs in current plan	46.4	40.7	.32
Ever tried to find out whether would have to pay for a service before meeting deductible in current plan	50.7	52.4	.83
Ever tried to find out how much would need to pay for a service in current plan	39.3	40.9	.84
Discussing hypothetical recommended services not covered by HDHP, %[c]			
Likely to discuss $100 routine blood test	79.4	63.1	.001
Likely to discuss $1000 screening colonoscopy	89.4	80.2	.02
Likely to discuss $2000 MRI for low back pain	94.3	90.4	.24

Abbreviations: FPL, federal poverty level; HDHP, high-deductible health plan; MRI, magnetic resonance imaging; OOP, out-of-pocket.
[a] Respondent feels self and family are "not very well" or "not at all" protected from OOP expenses.
[b] Respondent finds current health insurance plan "somewhat difficult" or "very difficult" to understand.
[c] Respondents were asked how likely they would be to ask their physician whether they could delay or modify, due to cost, 3 hypothetically recommended services they knew would not be covered by their health insurance: (1) $100 routine blood test, (2) $1000 screening colonoscopy, and (3) $2000 MRI for minor back pain symptoms.

Table 5. Factors Predicting Likelihood of Discussing Hypothetical Recommended Services Subject to Plan Deductible

	AOR (95% CI)[a]		
Predictor	Blood Test, $100	Colonoscopy, $1000	MRI, $2000
FPL < 300%	1.97 (1.18-3.28)	2.04 (1.06-3.93)	1.98 (0.82-4.78)
No college degree[b]	1.35 (0.85-2.14)	1.95 (1.09-3.48)	1.02 (0.46-2.26)
Chronic illness[c]	1.08 (0.62-1.89)	0.72 (0.35-1.48)	0.96 (0.36-2.53)
Choice of health plans[d]	1.09 (0.70-1.69)	1.22 (0.71-2.10)	3.26 (1.37-7.74)
OOP cost reimbursement[e]	0.81 (0.52-1.27)	1.55 (0.88-2.73)	1.14 (0.53-2.44)

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; FPL, federal poverty level; MRI, magnetic resonance imaging; OOP, out-of-pocket.
[a] Adjusted for child average age, adult average age, household size, individual deductible, and family deductible.
[b] Respondent with less than a college education.
[c] Any adult or child chronic illness in family.
[d] Choice of more than 1 health benefit plan through the respondent's employer, spouse, or partner.
[e] Health savings account, health reimbursement account, flexible spending account, medical savings account, or employer OOP cost reimbursement.

insurance mandate could lead more families to enroll in plans with high levels of cost-sharing, as has been seen following the implementation of coverage mandates in Massachusetts.[3] If more families do enroll in HDHPs, policymakers should consider strategies to support patients facing high levels of cost sharing. Based on our finding that lower-income families enrolled in HDHPs were more likely than higher-income families to delay or forego health care owing to cost, policymakers could consider reducing deductibles for lower-income families, limiting deductibles to a proportion of a family's income, or providing income-based cost-sharing subsidies.[27] Given that so many respondents in our sample would ask their physician about delaying a hypothetical service not covered by their plan, both physicians and patients need more reliable information on the price and value of services in order to fully engage in shared decision making about costly medical care. Finally, our finding that many families had delayed or gone without screening tests, immunizations, or outpatient health maintenance visits owing to cost suggests that benefits need to be both effectively designed and conveyed to encourage use of clinical preventive services.[28]

Our study has several limitations. First, these are self-reported, cross-sectional data subject to recall bias. If families with lower incomes had more memorable experiences with cost-related delayed or foregone care, for example, they could potentially better recall delayed or foregone care than higher-income families. Second, these data may not be representative of all other HDHP populations. Our sample was limited to enrollees in 1 New England health plan, included families with relatively high burdens of chronic illnesses, and contained few racial and ethnic minorities. Furthermore, our inclusion criterion of at least $500 in annualized outpatient visit and prescription drug copayments may have excluded families who faced access barriers so significant that they never reached this level of spending and makes our findings less generalizable to families with lower levels of out-of-pocket expenses. Third, as in other studies of HDHPs, families who choose these plans may differ in important and often unobservable ways from those who do not, although most families in our sample reported having no choice of another health plan. Fourth, our measures gauging respondents' willingness to discuss hypothetical recommended services may not be completely predictive of their actual

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behavior. Finally, the lack of a non-HDHP comparison group limits the degree to which our observed income group differences and similarities can be contrasted with health plans that have small or no deductibles.

Our study adds new findings on the experiences of lower-income families enrolled in HDHPs. We found that among HDHP enrollees with out-of-pocket expenditures, lower-income families were more likely than higher-income families to delay or forego health care services owing to cost. However, they were no more likely to report difficulty understanding and using their health plans and might be more likely to question the value of services requiring out-of-pocket expenditures. More research is needed to further describe the effects of HDHPs on low-income families, as well as to evaluate how benefit design modifications and targeted decision tools can overcome challenges faced by patients in these plans.

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INVITED COMMENTARY

High-Deductible Plans

What If You Can't Afford Your Share?

High-deductible health plans have captured a growing share of the health care market in the United States, especially in states such as Massachusetts, which developed a program to expand health care insurance to cover all its citizens. According to the National Health Interview Survey in 2009,[1] nearly one-fourth of US adults with private coverage, and 50% of those who purchased insurance out of group, did so through cost-sharing plans similar to Massachusetts'. Because consumers are expected to pay more of their bills, high-deductible health plans have lower premiums, an attractive feature for many people given the high cost of health insurance. In addition, it has been argued that the use of such plans would control overall health care expenditures because consumers would be more careful shoppers, shunning unnecessary care if they had to pay a bigger part of the bill.

In this issue of the *Archives*, Kullgren et al shine a light on the darker side of high-deductible plans. Based on data from patients from Harvard Pilgrim Health Care, the investigators find that lower-income families are more likely to delay or indefinitely postpone medical procedures than those with higher incomes.

Kullgren et al are not the first to demonstrate that high-deductible plans may result in patients forgoing needed care. For example, doubling copayments from $10 to $20 per prescription for cholesterol-lowering medicine may cause one-fifth of patients to stop taking it altogether.[2] Similar decreases in the use of diabetic and hypertensive medicines with higher copayments have been found in other studies as well.[3] Of note, the classic RAND Health Insurance Experiment,[4] conducted in the 1970s to determine the effect of different insurance payment methods on utilization of services, found that higher copayments were associated with patients foregoing both needed and unnecessary care. The study found no association between higher copayments and better health outcomes, a result interpreted by the investigators as the result of patients equally limiting harmful and helpful care.

We can define appropriate care as care known to offer a benefit that is greater than any potential harm. However, studies have shown that consumers cannot easily distinguish appropriate from inappropriate care in their purchasing, at least not based on the information currently available in the marketplace.[5] Value-based insurance design may be a better model. In this design, copayments are minimized for those interventions of high clinical value, while high copayments are required for those interventions of low value.[3] This could potentially decrease health insurance premiums and overall health care costs without resulting in people forgoing those treatments that would actually benefit them.[6] As we experiment with ways to increase value in health care, we must favor models that decrease incentives for use of inappropriate care and promote use of appropriate care.

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