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Nearly Half of Families In High-Deductible Health Plans Whose Members Have Chronic Conditions Face Substantial Financial Burden

Alison A. Galbraith¹, Dennis Ross-Degnan¹, Stephen B. Soumerai¹, Meredith B. Rosenthal², Charlene Gay¹, and Tracy A. Lieu¹

¹Center for Child Health Care Studies, Department of Population Medicine, Harvard Pilgrim Health Care Institute and Harvard Medical School, Boston, MA

²Department of Health Policy and Management, Harvard School of Public Health, Boston, MA

Abstract

High-deductible health plans – typically with deductibles of at least \$1,000 per individual and \$2,000 per family -- require greater enrollee cost sharing than traditional plans. But they also may provide more affordable premiums and may be the lowest-cost, or only, coverage option for many families with members who are chronically ill. We surveyed families with chronic conditions in high-deductible plans and families in traditional plans to compare health care-related financial burden – such as experiencing difficulty paying medical or basic bills or having to set up payment plans. Almost half (48 percent) of the families with chronic conditions in high-deductible plans reported health care-related financial burden, compared to a fifth of families (21 percent) in traditional plans. Almost twice as many lower-income families in high-deductible plans spent more than 3 percent of income on health care expenses as lower-income families in traditional plans (53 percent versus 29 percent). As health reform efforts advance, policy makers must consider how to modify high-deductible plans to reduce the financial burden for families with chronic conditions.

Escalating health care costs have led to increasing requirements that families share costs through health insurance premiums, deductibles, and copayments. (1) The financial burden on families, due to out-of-pocket health care expenses and premiums, has become more prevalent. (2, 3) Vulnerable groups such as those with chronic conditions or low incomes may be at particular risk. (4–7)

Enrollee cost-sharing is especially pronounced in high-deductible health plans, which typically have annual deductibles of at least \$1,000 per individual and \$2,000 per family. Such plans are often called consumer-directed health plans and may include health savings accounts or health reimbursement arrangements, which are tax-exempt accounts used to pay

Corresponding Author: Alison Galbraith, MD, MPH, Department of Population Medicine, 133 Brookline Avenue, 6th Floor, Boston, MA 02215-5301, Phone: 617-509-9893, Fax: 617-859-9853, Alison_galbraith@harvardpilgrim.org.

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for out-of-pocket health care expenses. Although many high-deductible plans allow these accounts, the majority of high-deductible plan enrollees report not offering one. (8)

Enrollment in high-deductible plans has been increasing. In 2008, 8 percent of covered workers were in consumer-directed health plans with savings options and 10 percent were in high-deductible plans without savings options. (9) By 2010, 13 percent of covered workers were in consumer-directed health plans with savings options. (10) Policy makers and employers have turned to high-deductible plans because they provide health insurance coverage with lower premiums. (11)

Early data on individual adults in high-deductible plans suggest that financial burden may be more prevalent in these plans compared to traditional plans without deductibles. (12–14) There is a paucity of information on financial burden experienced by families with children and those with chronic health conditions who participate in high-deductible plans. Approximately half of high-deductible plan enrollees nationally have a chronic condition and one-third have family coverage. (15, 16) Among families in high-deductible plans, one-third have a child with a chronic condition. (17)

Our objective in this study was to compare financial burden experienced by families with chronic conditions in high-deductible plans compared to traditional plans.

DATA AND METHODS

Design and Study Population

We conducted a cross-sectional survey and analysis of health plan claims data that compared families with chronic conditions in high-deductible plans with those in traditional plans. The study population was drawn from enrollees of Harvard Pilgrim Health Care, a large nonprofit New England health plan. We selected families with at least one child age eighteen or younger. These families were continuously enrolled for at least the past twelve months in employer-sponsored plans in Massachusetts.

To identify families with chronic conditions, we used claims data to make an initial selection of families who had at least one member with a diagnosis of a chronic condition. (18) We then used survey questions, described below, to assess whether an adult or child in the family had a chronic condition. We selected all eligible high-deductible plan families and a random sample of twice as many traditional plan families in order to have greater statistical power.

Health plan structure—For this study, we defined high-deductible health plans as plans with annual family deductibles of at least \$1,000, with or without a savings option. The Harvard Pilgrim high-deductible plans studied had family deductibles up to \$6,000 per year. Services subject to the deductible included emergency department visits, diagnostic tests, hospitalizations, and therapeutic procedures, such as physical therapy.

In most plans, office visits were subject to a \$20 copayment and were excluded from the deductible. Prescription drugs were also exempt from the deductible and subject to copayments. In high-deductible plans eligible for health savings accounts, nonpreventive

office visits and prescription drugs were subject to the deductible. Preventive services were covered at no cost.

The maximum amount enrollees were required to pay out-of-pocket for health care ranged from \$4,000 to \$10,000. Health reimbursement arrangements or health savings accounts were available but not offered by all employers.

The traditional plan group consisted of plans that did not have a deductible. These plans had office visit copayments ranging from \$5 to \$25, emergency department visit copayments ranging from \$0 to \$100, full coverage for preventive care and diagnostic tests, and limited cost-sharing for hospitalizations. Most had out-of-pocket maximums of \$4,000.

Data Collection

Parents from eligible families were surveyed by phone or mail between April and December 2008. To identify family members with chronic conditions, we asked whether any adults in the family “had a health condition that has lasted or is expected to last a year or longer, may limit what one can do, and may require ongoing care, such as diabetes, high cholesterol, or asthma.”(19) For children, we used the Children with Special Health Care Needs Screener. (20)

The survey included questions about sociodemographics; whether respondents had a choice of more than one plan when they enrolled in their current plan; (21) and whether they had an account to pay for health care expenses such as an health savings account, health reimbursement arrangement, flexible savings account, or medical savings account. We used claims data to obtain family out-of-pocket expenditures, which were linked to survey data.

We used Harvard Pilgrim data to obtain enrollment information, including whether the family’s plan was obtained through an association, an independent broker or trade organization that negotiates contracts with health insurers for employers with fewer than ten employees. The study was approved by the Harvard Pilgrim Health Care Institutional Review Board.

Measures—The primary outcome variable was report of any financial burden, measured by affirmative response to any of the following questions about the family’s experiences in the prior twelve months: whether there were times when they had problems paying or were unable to pay for medical bills for themselves or a family member; whether they had to set up a payment plan with their hospital or doctor’s office; or whether they had trouble paying for other basic bills like food, heat, or rent because of medical costs.

The secondary outcome variable was spending more than 3 percent of income on out-of-pocket health care expenses. To measure this, we first calculated the sum of copayments, deductibles, and coinsurance paid for health services, including prescription drugs, for all family members for the twelve- month period prior to survey completion; premium expenses were not included. We calculated the percent of family income that is spent on these out-of-pocket expenses, excluding 138 families with incomes greater than \$100,000 for whom an accurate denominator value was not available.

To determine a threshold of out-of-pocket expenses that best distinguished between families who did and did not report financial burden, we tested several thresholds for the percent of income spent on out-of-pocket health care expenses, ranging from 2 percent to 10 percent (4, 22–25). We chose a 3 percent threshold because more than half of the families that reported financial burden had spent at least this much. Above the 3 percent threshold, almost half of the families reported financial burden. In addition, three-quarters of families without reported burden had spent less than the 3 percent threshold.

Analytic approach—For all analyses, we included only families with chronic conditions identified in the survey. We also excluded families without drug coverage from Harvard Pilgrim for whom we did not have data on prescription drug expenses. All analyses were done at the family level.

We conducted unadjusted analyses comparing families with high-deductible plans to those with traditional plans with respect to family and plan characteristics, and outcomes related to financial burden and out-of-pocket health care expenses. Analyses examining out-of-pocket health care expenses as a percent of income were limited to families with incomes less than 400 percent of the federal poverty level because we lacked detailed income data for families with incomes greater than \$100,000. Unadjusted analyses were done using chi square, Wilcoxon rank-sum, and t tests.

To control for other factors that might be associated with financial burden, we conducted adjusted analyses using multivariate logistic regression to determine the odds (and the predicted probability) of reporting any financial burden for families in high-deductible plans relative to those in traditional plans. We also tested this model with the addition of an interaction term between plan type and income to see if the relationship between high-deductible plan enrollment and financial burden was different for families with higher and lower incomes.

We used a similar logistic regression model to determine the odds (and the predicted probability) of having out-of-pocket health care expenses greater than 3 percent of family income. Income was not included in this model because it was part of the outcome variable. A value of $p < 0.05$ was considered statistically significant for all analyses.

Study Limitations

Because health plan enrollment is not random, our findings must be interpreted in light of potential selection effects. Families with limited financial resources or existing financial problems may have been more likely to enroll in high-deductible plans because they could not afford the higher premiums of traditional plans, or because no other plan was available. (21, 26)

Our study was able to control for important potentially confounding factors. However, other unmeasured factors may have influenced families' enrollment in high-deductible plans. Observed relationships between high-deductible plan enrollment and financial burden should be interpreted as associations rather than causal relationships. Our study is not able to answer the question of how high-deductible plan families would have fared if they were

placed in traditional plans or were uninsured, which presumably would have been associated with even higher levels of financial burden. (4, 7, 24, 27)

Our findings about out-of-pocket expenses for families with chronic conditions may not generalize to families outside the employer-sponsored insurance market. These results could have underestimated burden associated with high-deductible health plans nationally for three reasons.

First, more than 90 percent of families in our study sample had incomes above 200 percent of the federal poverty level, and financial burden could be even more pronounced among lower-income families.

Second, only 14 percent of high-deductible plan families in the study were in plans that offered a health savings account. Because such plans are required to subject all but preventive services to the deductible, the burden associated with these could be higher.

Third, it is likely that our analyses underestimate differences in financial burden that stem from out-of-pocket drug costs, (5, 28) because we excluded families without drug coverage, who were more likely to be in high-deductible plans.

Conversely, these results may overestimate financial burden in high-deductible plans relative to traditional plans because our traditional plan group had no deductible. Financial burden in high-deductible plans may not be as pronounced compared to plans with smaller deductibles, which have become highly prevalent among enrollees with preferred provider organization and point-of-service plans, although not health maintenance organization plans. (10)

Our findings could also overestimate financial burden in high-deductible plans because only 27 percent of high-deductible plan families in our study reported having any kind of account to help pay for health care expenses. This is at the low end of the range of 22 percent to 44 percent of covered workers in high-deductible plans nationally who have a health savings account or health reimbursement arrangement, (8, 9) which can mitigate the burden of out-of-pocket costs. (29)

Our results should also be interpreted in light of Massachusetts state policies that were in place at the time of our study, such as an individual mandate requiring health insurance coverage, a requirement that employers offer coverage, and small-group insurance market policies such as modified community rating and a prohibition on pre-existing condition exclusions. Although currently unique to Massachusetts, similar policies are due to take effect nationally in 2014 as part of federal health reform legislation, (30, 31) making our findings more broadly informative.

Because reliable premium data were not available for all families, our study is not able to assess whether lower premium costs in high-deductible plans might reduce differences in out-of-pocket spending by plan type. Nonresponse is a factor in the interpretation of all surveys; our response rate is in the range of recent surveys on similar topics, and nonresponders were similar to responders. (24, 32)

RESULTS

Of those approached, 820 families completed surveys (response rate 46 percent). Of these, we excluded 17 percent for not having drug coverage from Harvard Pilgrim, and 29 percent for not having a family member with a chronic condition or special health care need. The final study sample included 496 families, of which 151 were in high-deductible plans and 345 were in traditional plans.

Families that did and did not complete surveys were not significantly different in family size, subscriber and child age, presence of chronic conditions in claims data, or emergency department and hospital use in the prior year. Families that did not complete the survey were significantly more likely to be in traditional plans and to have male subscribers.

Descriptive statistics—Exhibit 1 shows characteristics in our study sample of families in high-deductible plans and families in traditional plans. Those in high-deductible plans were not significantly different from those in traditional plans in most family characteristics although they had significantly older subscribers and older children, and were significantly more likely to have had no choice of other plans and to have been enrolled through an association.

Of the high-deductible plan families, the annual family deductible was \$2000 for 48 percent, \$1000 for 21 percent, \$3000 for 11 percent, \$4000 for 20 percent, and \$6000 for less than 1 percent. Fourteen percent of high-deductible plan families were in health savings account-eligible plans.

Unadjusted Analyses—Families in high-deductible plans were significantly more likely than families in traditional plans to report experiencing each of the measures of financial burden (Exhibit 2). Overall, 48 percent of families in high-deductible plans reported any of these measures of financial burden, compared to only 21 percent of families in traditional plans. ($p < 0.001$). Median out-of-pocket expenses for health services were more than double for families in high-deductible plans compared to those in traditional plans.

Among lower-income families (less than 400 percent of the federal poverty level), the prevalence of financial burden was significantly higher for high-deductible plan families than for traditional plan families. In lower-income families, median out-of-pocket health care expenses were also significantly higher for families in high-deductible plans compared to families in traditional plans, as was the percentage of families spending more than 3 percent of income and more than 5 percent of income on out-of-pocket health care expenses.

Adjusted Analyses

Report of any financial burden—Families enrolled in high-deductible plans were significantly more likely than those enrolled in traditional plans to report financial burden, after adjusting for individual, family, and employer-level characteristics ($p < 0.001$) (Exhibit 3). Family income less than 400 percent of the federal poverty level was itself significantly associated with financial burden ($p < 0.001$), although the relative difference in financial burden between families in high-deductible and traditional plans was not significantly

greater for families with lower incomes). Having no choice of health plans was also significantly associated with financial burden (odds ratio: 2.06; 95% confidence interval: 1.12, 3.79), while having an account for health care expenses was negatively associated with financial burden (odds ratio: 0.42; 95% confidence interval: 0.22, 0.81).

Out-Of-Pocket Health Care Expenses Greater Than 3 Percent Of Income—

Among families with incomes less than 400 percent of the federal poverty level, those in high-deductible plans were significantly more likely to have out-of-pocket health care expenses that were greater than 3 percent of income compared to families in traditional plans, with predicted probabilities of 53 percent versus 29 percent, respectively ($p = 0.006$) (Exhibit 3). Other factors significantly associated with having out-of-pocket expenses greater than 3 percent of income among lower-income families were having a parent without a college degree (odds ratio: 2.33, 95% confidence interval: 1.03, 5.28) and obtaining coverage through an association (odds ratio: 2.55; 95% confidence interval: 1.11, 5.86).

DISCUSSION

Our study found that almost half of the families with chronic conditions in high-deductible plans reported health care-related financial burden. Families in high-deductible plans were significantly more likely than those in traditional plans to report financial burden, including problems paying medical bills, having to set up a payment plan with a hospital or doctor's office, or having trouble paying for other basic bills because of health care costs. Families in high-deductible plans had significantly higher out-of-pocket expenses for health services compared with traditionally insured families, and lower-income families with chronic conditions in high-deductible plans were significantly more likely than those in traditional plans to spend more than 3 percent of income on out-of-pocket health care expenses.

The levels of financial burden in our study suggest that the combination of chronic conditions and high-deductible plan enrollment may make health care difficult to afford for families. The prevalence of financial burden in our study was higher than in other studies of high-deductible plan enrollees or of enrollees with chronic conditions in private insurance plans. (7, 13) Our study's unique family-level focus may also capture burden due to out-of-pocket expenses for multiple family members, especially when a family member has a chronic condition.

As expected, lower income was significantly associated with greater financial burden. The majority of families with incomes less than 400 percent of the federal poverty level in high-deductible plans reported financial burden and spent more than 3 percent of income on out-of-pocket health care expenses. However, even in traditional plans, about one-third of lower-income families with chronic conditions experienced substantial financial burden and spent more than 3 percent of income on health care expenses.

Financial burden due to health care costs is concerning because of its association with delayed or forgone health care, trouble paying other bills, accrual of debt, bankruptcy, and stress for families. (27, 32) It is unclear whether the increased financial burden in high-deductible plans stems from out-of-pocket expenses for necessary care or more discretionary

care. Health outcomes could be adversely affected if financial burden prevents seeking care for needed health services. Better information and tools may be needed to promote greater discussion and informed decision making by patients and providers related to the costs and necessity of health care services in order to reduce burdensome out-of-pocket expenses associated with high-deductible plans while preserving appropriate use of health care. (15, 33–35)

Policy Implications

Many policy makers and payers look to high-deductible plans as a means of providing coverage with affordable premiums, especially to those currently uninsured. Our findings suggest that high-deductible plans may be more financially burdensome than traditional plans, however, particularly for families with chronic conditions. Employers and individuals will have to carefully weigh the lower premium costs of high-deductible plans against the potential for high out-of-pocket expenses for health services. National health reform policies mandate that individuals obtain insurance and prohibit against denying coverage based on pre-existing conditions. As a result, many previously uninsured individuals with chronic conditions will gain coverage, but may face substantial out-of-pocket expenses in high-deductible plans.

The role of high-deductible plans in national health reform remains to be seen. The health insurance exchange proposed in the Affordable Care Act would probably include high-deductible plans in the bronze plan category (the lowest of the four plan benefit categories in the exchanges), although deductible amounts may be limited. (30)

In Massachusetts' insurance exchange, the Commonwealth Connector, high-deductible plans are included in the bronze and silver plan categories of unsubsidized plans offered to individuals with incomes greater than 300 percent of the federal poverty level. Among these plans, the largest enrollment has been in the bronze high-deductible plans, (36) but few data exist on enrollee experiences related to the cost burdens associated with these plans. Notably, the Commonwealth Connector has excluded high-deductible plans from subsidized plan offerings for individuals with incomes less than 300 percent of the federal poverty level.

To offset out-of-pocket costs for people with incomes less than 400 percent of the federal poverty level, national health reform insurance exchange policies include cost-sharing subsidies, and income-based limits on annual out-of-pocket costs of one-third to two-thirds of the out-of-pocket maximum for health savings account-eligible plans (e.g., a limit of \$3,967 to \$7,973 per family based on 2010 rules). (30) Such policies will be important to protect low-income families who do not have the assets to deal with large out-of-pocket expenses potentially incurred in plans with high deductibles. (37) Whether this will be enough to prevent burdensome health care costs for families remains an important question.

Among high-deductible plan families with incomes less than 400 percent of the federal poverty level in our study, only one family exceeded the proposed national health reform out-of-pocket limit for lower-income families, yet a large proportion reported experiencing financial burden. Even among high-deductible plan families with incomes equal to or greater

than 400 percent of the federal poverty level in our study, an estimated 34 percent reported financial burden although none had out-of-pocket costs above the proposed upper limit. It will be important to monitor the adequacy of cost-sharing limits and subsidies in preventing burdensome out-of-pocket costs as health reform efforts move forward, particularly if substantial numbers of lower-income families with chronic conditions enroll in bronze high-deductible plans.

Conclusions

Our findings suggest that health care-related financial burden is common among families with chronic conditions, and is greater for families in high-deductible plans compared to those in traditional plans. Although high-deductible plans may provide health insurance coverage with affordable premiums and limit exposure to catastrophic costs, some families in high-deductible plans may remain effectively underinsured, limiting the effectiveness of these plans in reducing financial barriers to health care access. As health reform efforts advance, policy makers must consider how to best modify high-deductible plans and other plans in order to mitigate financial burden while maintaining quality of care and containing costs, particularly for families with chronic conditions.

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NOTES

1. Claxton G, DiJulio B, Whitmore H, Pickreign J, McHugh M, Finder B, et al. Job-based health insurance: costs climb at a moderate pace. *Health Aff (Millwood)*. 2009; 28(6):w1002–12.10.1377/hlthaff.28.6.w1002 [PubMed: 19755489]
2. Cunningham PJ. The growing financial burden of health care: national and state trends, 2001–2006. *Health Aff (Millwood)*. 2010; 29(5):1037–44. [PubMed: 20338908]
3. Collins, SR.; Kriss, JL.; Doty, MM.; Rustgi, SD. Findings from the Commonwealth Fund biennial health insurance surveys, 2001–2007. New York (NY): Commonwealth Fund; 2008 Aug. Losing ground: how the loss of adequate health insurance is burdening working families.
4. Hwang W, Weller W, Ireys H, Anderson G. Out-of-pocket medical spending for care of chronic conditions. *Health Aff (Millwood)*. 2001; 20(6):267–78. [PubMed: 11816667]
5. Cunningham, PJ. Chronic burdens: the persistently high out-of-pocket health care expenses faced by many americans with chronic conditions. New York (NY): Commonwealth Fund; 2009 Jul.
6. Merlis, M. Family out-of-pocket spending for health services: a continuing source of financial insecurity. New York (NY): Commonwealth Fund; 2002 Jun.
7. Tu, HT.; Cohen, G. Financial and health burdens of chronic conditions grow. Washington (DC): Center for Studying Health System Change; 2009 Apr. Tracking Report No. 24

8. Cohen, R.; Martinez, M. Consumer-directed health care for persons under 65 years of age with private health insurance: United States, 2007. Hyattsville (MD): National Center for Health Statistics; 2009. NCHS data brief; no 15
9. Altman, D. Survey of employer health benefits 2008. Menlo Park (CA): Kaiser Family Foundation; 2008 Sep 24. The Kaiser Family Foundation and Health Research and Educational Trust. [cited 2010 Dec 6]. Available from: http://ehbs.kff.org/images/abstract/EHBS_08_Release_Adds.pdf
10. The Kaiser Family Foundation and Health Research and Educational Trust. Employer health benefits 2010 annual survey [Internet]. Menlo Park (CA): Kaiser Family Foundation; 2010. [cited 2010 Dec 30]. Available from: <http://ehbs.kff.org/>
11. Montgomery, L.; Murray, S. Washington Post. 2010 Mar 3. As Democrats seek to push through health bill, Obama reaches out to Republicans.
12. Davis, K.; Doty, M.; Ho, A. Implications of high-deductible health plans. New York (NY): Commonwealth Fund; 2005 Apr. How high is too high?.
13. Collins, S.; Kriss, J.; Davis, K.; Doty, M.; Holmgren, A. Squeezed: why rising exposure to health care costs threatens the health and financial well-being of American families. New York (NY): Commonwealth Fund; 2006 Sep.
14. Fronstin, P.; Collins, SR. The 2nd annual EBRI/Commonwealth Fund Consumerism in Health Care Survey, 2006: Early experience with high-deductible and consumer-driven health plans. Washington (DC): Employee Benefit Research Institute; 2006 Dec. Issue Brief No. 300
15. Fronstin, P.; Collins, SR. Findings from the 2007 EBRI/Commonwealth Fund Consumerism in Health Survey. Washington (DC) and New York (NY): Employee Benefit Research Institute and Commonwealth Fund; 2008 Mar.
16. Galbraith AA, Ross-Degnan D, Soumerai SB, Miroshnik I, Wharam JF, Kleinman K, et al. High-deductible health plans: are vulnerable families enrolled? *Pediatrics*. 2009; 123(4):e589–94. [PubMed: 19336350]
17. Employee Benefits Research Institute and the Commonwealth Fund. The 2007 EBRI/Commonwealth Fund Consumerism in Health Care Survey topline results [Internet]. Washington (DC) and New York (NY): EBRI and Commonwealth Fund; 2008 Mar. [cited 2008 Sep 8]. Available from: http://www.commonwealthfund.org/usr_doc/CHCS_2007_Toplines_11-7-07.pdf?section=4056
18. Dunbar, L. Alternative methods of identifying children with special health care needs: implications for Medicaid programs [dissertation]. Baltimore (MD): University of Maryland; 2005.
19. Anderson GF. Physician, public, and policymaker perspectives on chronic conditions. *Arch Intern Med*. 2003; 163(4):437–42. [PubMed: 12588202]
20. Bethell C, Read D, Stein R, Blumberg S, Wells N, Newacheck P. Identifying children with special health care needs: development and evaluation of a short screening instrument. *Ambul Pediatr*. 2002; 2(1):38–48. [PubMed: 11888437]
21. Gawande AA, Blendon R, Brodie M, Benson JM, Levitt L, Hugick L. Does dissatisfaction with health plans stem from having no choices? *Health Aff (Millwood)*. 1998; 17(5):184–94. [PubMed: 9769582]
22. Short PF, Banthin JS. New estimates of the underinsured younger than 65 years. *JAMA*. 1995; 274(16):1302–6. [PubMed: 7563537]
23. Galbraith AA, Wong ST, Kim SE, Newacheck PW. Out-of-pocket financial burden for low-income families with children: socioeconomic disparities and effects of insurance. *Health Serv Res*. 2005; 40(6 pt 1):1722–36. [PubMed: 16336545]
24. Schoen C, Collins SR, Kriss JL, Doty MM. How many are underinsured? Trends among US adults, 2003 and 2007. *Health Aff (Millwood)*. 2008; 27(4):w298–309.10.1377/hlthaff.27.4.w298 [PubMed: 18544591]
25. Doty, MM.; Collins, SR.; Rustgi, SD.; Nicholson, JL. Out of options: why so many workers in small businesses lack affordable health insurance, and how health care reform can help. New York (NY): Commonwealth Fund; 2009 Sep.
26. Bundorf MK. Employee demand for health insurance and employer health plan choices. *J Health Econ*. 2002; 21(1):65–88. [PubMed: 11845926]

27. Merlis, M.; Gould, D.; Mahato, B. Rising out-of-pocket spending for medical care: a growing strain on family budgets. New York (NY): Commonwealth Fund; 2006 Feb.
28. Schoen, C.; Doty, MM.; Collins, SR.; Holmgren, AL. Health Aff (Millwood). 2005. Insured but not protected: how many adults are underinsured?; p. w5-289-302.
29. Cohen, R. Impact of type of insurance plan on access and utilization of health care services for adults aged 18–64 years with private health insurance: United States, 2007–2008. Hyattsville (MD): National Center for Health Statistics; 2010. NCHS Data Brief No. 28
30. Kaiser Family Foundation. Focus on health reform: summary of new health reform law [Internet]. Menlo Park (CA): Kaiser Family Foundation; 2010. Pub. No. 8061[last modified 2010 Mar 26; cited 2010 Nov 19]; Available from: <http://www.kff.org/healthreform/upload/8061.pdf>
31. Perry, M.; Lyons, B.; Tolbert, J. Focus on health reform: in pursuit of affordable health care: on the ground lessons from families in Massachusetts [Internet]. Menlo Park (CA): The Kaiser Family Foundation; 2009 Sep. Pub no. 7975[cited 2010 Dec 30]. Available from: <http://www.kff.org/healthreform/upload/7975.pdf>
32. Cunningham, PJ.; Miller, C.; Cassil, A. Living on the edge: health care expenses strain family budgets. Washington (DC): Center for Studying Health System Change; 2008 Dec. Research Brief No. 10
33. Rosenthal M, Hsuan C, Milstein A. A report card on the freshman class of consumer-directed health plans. Health Aff (Millwood). 2005; 24(6):1592–600. [PubMed: 16284033]
34. Mallya G, Pollack C, Polsky D. Are primary care physicians ready to practice in a consumer-driven environment? Am J Manag Care. 2008; 14(10):661–8. [PubMed: 18837644]
35. Lieu T, Solomon J, Sabin J, Kullgren J, Hinrichsen V, Galbraith A. Consumer awareness and strategies among families with high-deductible health plans. J Gen Intern Med. 2010; 25(3):249–54. [PubMed: 20033623]
36. McDonough JE, Rosman B, Butt M, Tucker L, Howe LK. Massachusetts health reform implementation: major progress and future challenges. Health Aff (Millwood). 2008; 27(4):w285–97.10.1377/hlthaff.27.4.w285 [PubMed: 18522949]
37. Jacobs PD, Claxton G. Comparing the assets of uninsured households to cost sharing under high-deductible health plans. Health Aff (Millwood). 2008; 27(3):w214–21.10.1377/hlthaff.27.3.w214 [PubMed: 18413333]

Exhibit 1**Characteristics Of Study Families With Chronic Conditions In High-Deductible Health Plans Compared to Traditional Plans**

	High-deductible plan	Traditional plan
N	151	345
Family characteristics		
Number of family members		
2	3%	4%
3	15%	19%
4	50%	44%
5+	32%	34%
Mean subscriber age (years)	46	43 ***
Mean age of children in the family (years)	11	10 **
Male subscriber	73%	65%
Income (% FPL)	8%	10%
<200200-299300-399 400	21%	13%
	21%	18%
	51%	59%
White, non-Hispanic parent	93%	88%
Parent without college degree	36%	32%
Child with special health care need	72%	66%
Adult with chronic condition	69%	73%
No choice of plans	33%	20% ***
Mean number of months enrolled	40	43
Coverage through an association	54%	38% ***
Has account for health care expenses	27%	35%

SOURCE Authors' calculations using survey and claims data for Harvard Pilgrim members.

NOTES FPL is federal poverty level.

p < 0.01 for comparison with high-deductible plan families.

**
p < 0.05 for comparison between high-deductible and traditional plan families.

Exhibit 2**Unadjusted Analyses Of Financial Burden And Out-of-Pocket Expenses For Families With Chronic Conditions In High-Deductible Plans Compared To Traditional Plans**

	High-deductible plan	Traditional plan
For all families		
Financial burden		
N	151	345
Had problems paying medical bills	40% ***	16%
Had to set up payment plan	31% ***	10%
Had trouble paying for other basic bills because of medical costs	25% ***	11%
Any financial burden	48% ***	21%
Out-of-pocket health care expenses		
N	137	283
Median (interquartile range)	\$2,329 (\$1,411–3,414)*	\$1,097 (\$619–1,735)
For families with incomes < 400% FPL		
Financial burden		
N	69	123
Had problems paying medical bills	59% ***	26%
Had to set up payment plan	44% ***	19%
Had trouble paying for other basic bills because of medical costs	42% ***	20%
Any financial burden	67% ***	36%
Out-of-pocket health care expenses		
N	61	103
Median (interquartile range)	\$2,210 (\$1,164–3,039) ***	\$1,114 (\$568–1,865)
>3% of family income	59% ***	30%
>5% of family income	26% **	13%
>10% of family income	3.3%	1.9%

SOURCE Authors' calculations using survey and claims data for Harvard Pilgrim members.

NOTES FPL is federal poverty level.

p < 0.01 for comparison between high-deductible and traditional plan families;

**
p < 0.05 for comparison between high-deductible and traditional plan families.

Exhibit 3

Predicted Probabilities Of Financial Burden And Having Out-of-Pocket Expenses Greater Than 3 Percent Of Income For Families With Chronic Conditions In High-Deductible Plans Compared To Traditional Plans

	High-deductible plan	Traditional plan
Any financial burden		
< 400% FPL	60% ***	33%
400% FPL	34%	14%
Out-of-pocket health care expenses >3% of income^a		
< 400% FPL	53% ***	29%

SOURCE Authors' calculations using survey and claims data for Harvard Pilgrim members.

NOTES FPL is federal poverty level. Financial burden was defined as having one or more of the following because of medical costs: problems paying medical bills, having to set up a payment plan, or difficulty paying for other basic bills like food or rent. Predicted probabilities are based on separate logistic regression models for each independent variable (financial burden and out-of-pocket health care expenses greater than 3 percent of income). Models also controlled for number of family members; subscriber age, gender, race/ethnicity, and education level; presence of a child in the family with a special health care need; presence of an adult in the family with a chronic condition; lack of choice of other plans at enrollment; enrollment through an association; having an account for health care expenses; and number of months enrolled. Models for financial burden also included income as a covariate. Predicted probabilities were calculated separately for family incomes less than 400 percent of the federal poverty level and greater than or equal to 400 percent of the federal poverty level, other covariates were set to their mean or modal values.

^aDoes not include out-of-pocket premium costs. Only families with incomes less than 400 percent of the federal poverty level were included because exact income data were not available for families with incomes \$100,000 or greater.

p < 0.01 for comparison between high-deductible and traditional plan families.