High deductible health plans: does cost sharing stimulate increased consumer sophistication?

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Accepted for publication

2 November 2012

Keywords: chronic disease management, cost sharing/copayments, high-deductible health plans, insurance type

Abstract

Objective To determine whether increased cost sharing in health insurance plans induces higher levels of consumer sophistication in a non-elderly population.

Study design This analysis is based on the collection of survey and demographic data collected from enrollees in the RAND health insurance experiment (HIE). During the RAND HIE, enrollees were randomly assigned to different levels of cost sharing (0, 25, 50 and 95%).

Methods The study population comprises about 2000 people enrolled in the RAND HIE, between the years 1974 and 1982. Effects on health-care decision making were measured using the results of a standardized questionnaire, administered at the beginning and end of the experiment. Points of enquiry included whether or not enrollees' (i) recognized the need for second opinions (ii) questioned the effectiveness of certain therapies and (iii) researched the background/skill of their medical providers. Consumer sophistication was also measured for regular health-care consumers, as indicated by the presence of a chronic disease.

Principal findings We found no statically significant changes ($P < 0.05$) in the health-care decision-making strategies between individuals randomized to high cost sharing plans and low cost sharing plans. Furthermore, we did not find a stronger effect for patients with a chronic disease.

Conclusions The evidence from the RAND HIE does not support the hypothesis that a higher level of cost sharing incentivizes the development of consumer sophistication. As a result, cost sharing alone will not promote individuals to become more selective in their health-care decision-making.

Introduction

Containing health-care spending without reductions in quality or patient satisfaction presents a key challenge for health systems across the developed world. Significant attention has

focused on encouraging users to become more selective in their consumption of services. Indeed, a growing body of evidence from randomized clinical trials suggests the use of decision aids and patient engagement in health-care delivery encourages individuals to choose

more conservative treatment options or forgo expensive care.¹ The potential savings associated with patient involvement in health-care delivery has encouraged governments in both Europe and North America to promote increased cost consciousness among patients in their health-care systems.

In the United Kingdom, this strategy has underscored the promotion of a 'patient-led' National Health Service (NHS) that seeks patient and public involvement in the provision of health services.² One feature of the 'patient-led' NHS has been the development Web-based patient decision aids to guide individuals considering multiple treatment options. The NHS interest and investment in patient decision aids are derived from the anticipated cost savings of greater utilization of conservative health-care therapies.^{3,4} Nonetheless, there is little evidence to support the positive impact of increased patient involvement on decreasing health-care expenditures within the NHS.⁵ In part, the absence of a clear link might stem from the lack of widespread use of decision aids. Several studies as well as official NHS policy have suggested no clear consensus exists on creating the incentives for widespread adoption and routine use of the tools.^{3,6} Nor is this problem limited to the United Kingdom, as survey data from health-care systems across the developed world suggests health-care systems generally do not encourage patients to take an active role in planning their health care.⁷ In the United States, the desire to contain spending is particularly strong given health-care expenditures that remain the highest as a proportion of the economy in the developed world. Policymakers have been particularly keen on encouraging patients to seek value in their medical care, forgoing health care of marginal or no benefit. As in Europe, American policymakers believe information and incentives can encourage patients to make better health-care decisions.⁸ Nonetheless, it remains unclear if economic incentives can be utilized to induce changes in patients' consumer behaviour.

America's private health insurance market has responded to this challenge with the intro-

duction of high-deductible (HDHP) or consumer-directed health plans (CDHP), insurance options with high minimum deductibles and coverage for catastrophic health events. It is hypothesized these plans encourage patients to be more active consumers of health care because high deductibles cause the beneficiary to become more sensitive to the costs of medical care. Hence, the role of economic incentives assumes central importance in HDHPs, encouraging patients to exhibit a higher degree of consumer sophistication than those enrolled in traditional fee-for-service or managed care plans. This 'consumerist' patient has been defined as one who considers cost and quality when seeking health care.⁹

Employers have been attracted to these plans because they offer lower premiums than more traditional plans, resulting in a steady growth in popularity, and now account for nearly 13% of employer provided plans.¹⁰ In addition, HDHPs have been viewed as an alternative to the unpopular cost containment strategies found in health maintenance organizations (HMOs), including utilization management from physicians or insurance companies.¹¹ However, although HDHPs have become increasingly common, their effects on consumer behaviour and health-care quality remain unclear.

Several studies have found that HDHPs are associated with decreased health expenditures.¹²⁻¹⁵ These results would suggest HDHPs tend to reduce health spending without adverse health outcomes, but few studies have been able to directly address the issue of quality in HDHPs. Assessing quality would require observing the long term effects of reduced health expenditures because the quality effects may take some time to materialize. Cross-sectional assessments of quality differences between HDHP enrollees and members of other health plans is an alternative methodology, but it is difficult to adequately adjust for the tendency healthier individuals to select into HDHPs.^{12,16}

In addition, it remains unclear whether HDHPs would have a positive or negative

impact on quality even if they were to reduce spending. If HDHPs engaged the beneficiary in a higher level of consumerism, patients would forgo medical of the lowest value. Moreover, beneficiaries would be incentivized to utilize preventive health care and would be more likely to hold providers accountable for the quality of care they deliver.¹⁷

Some studies have found indicators of neutral or positive quality effects such as increased prescription drug adherence and better self-management of chronic conditions among HDHP enrollees.^{15,17} Other studies have suggested that HDHPs place greater financial burden on families suffering from a chronic disease.^{18,19} All of these studies have been unable to adequately address the tendency for healthier enrollees to select HDHP plans. Hence, HDHP claims that enrollees will (i) choose more carefully among health providers and (ii) favour preventive expenditures remain important fields of enquiry. Furthermore, the underlying hypothesis that increased cost sharing and subsequently higher levels of consumer sophistication cause these changes remains untested. We sought to test this theory using data from the RAND health insurance experiment (HIE), a study of the effects of cost sharing on health-care utilization conducted in America between 1974 and 1982. In particular, we aimed to determine whether cost sharing induces positive changes in consumer sophistication. Consumerism was measured utilizing three standardized scales, consumer sophistication, satisfaction with the art of medicine and outlook on future health. We hypothesized that enrollees in the highest cost sharing group would exhibit a positive change in all three scales.

Finally, because we would expect changes in consumerism to be greatest among regular users of the health-care system, we also examined if the presence of a chronic disease^{20,21} resulted in significantly higher changes in consumer sophistication. HDHPs claim the increased level of cost sharing is particularly effective in encouraging these patients to manage their condition and become involved in choosing treatment options.^{22,23}

Methods

The RAND health insurance experiment

The RAND health insurance experiment (HIE) was a randomized trial that examined the effects of patient cost sharing on demand for health-care services.²⁴ Between 1974 and 1982 families from six regions of the United States (including: Dayton, Ohio; Seattle, Washington; Fitchburg, Massachusetts; Franklin County, Massachusetts; Charleston, South Carolina and Georgetown County, South Carolina) were enrolled in the experiment.²⁵ Study participants were drawn from a nationally representative sample, with the following exceptions: those with an income in excess of \$25 000 (1973 dollars), those in the military and any individuals eligible for Medicare.²⁶ Medicare enrollees include those individuals who draw insurance through the American public health insurance scheme for retirees, the elderly population over the age of 62. Because participants were required to forgo existing health insurance during the experiment period, all enrollees were offered compensation (paid in instalments every month) to cover any financial loss from less generous coverage. In general, this financial payment prevented selection effects derived from participants declining enrolment in the study.²⁵

Participants were randomly assigned to fee-for-services insurance plans in five different groups. Four of these groups set a maximum deductible determined as percentages of the family or individual participant income. In addition, the four groups varied according to the level of cost sharing (0, 25, 50 and 95%). The fifth group set a flat maximum deductible at \$150 for individuals or \$450 for families and had a cost sharing level of 95%. For this study, the five insurance plans were divided into three groups, Group 1 (low cost sharing), Group 2 (high cost sharing) and Group 3 (flat maximum deductible).

The RAND HIE collected demographic information from participants who were enrolled in study for a period of 3 or 5 years. In our analyses, participants who were missing

key data such as gender, age, education, race, income or results from medical disorders/health attitudes surveys were excluded from the study. Children were also excluded from this study, as their health utilization patterns reflected the decisions of adult parents or guardians. After applying these guidelines, we determined that 2086 individuals were eligible for inclusion in our study (Table 1). The demographic indicators of the study (Table 1) suggest dropping ineligible participants created no significant differences between the insurance groups and the study remained well balanced along key variables of race, gender, education and income.

Consumer sophistication

The focus of our analysis is to assess whether consumer sophistication changes more among participants in the RAND HIE randomly exposed to greater cost sharing. The original design of the RAND HIE included the development of a novel measure of consumers' health-care delivery knowledge and decision-making behaviours, termed the consumer sophistication scale. The rationale for designing the consumer sophistication scale was to gather exploratory data on patients' knowledgeability about the health-care delivery system. At the time of enrolment in the experiment, enrollees were given a questionnaire and asked to rate their agreement on a three point scale ('Agree', 'Disagree', 'Unsure') with eight statements about medical care (Appendix 1). In general, the questionnaire measured two features of consumer sophistication: (i) patients' strategy in choosing providers and (ii) patient's

approach in picking a therapy.²⁷ The results from these questions were summed and then converted into a 100 point scale. Participants who tended to agree with correct statements were given higher scores of consumer sophistication. This scale has been validated²⁷ and used in other studies analysing patient behaviour.^{28,29}

Other measures of consumerism in health care

In addition to the consumer sophistication, other scales were used to measure consumerism among patients including satisfaction with the art of medical care and outlook on future health. The satisfaction with the art of medicine scale was constructed by asking enrollees in each plan to rate their medical providers on a series of measures including (i) whether or not they felt doctors always avoided unnecessary medical procedures, (ii) worked to avoid patient expenses, (iii) fully explained the medical treatments and diagnoses, (iv) worked with patients to know what was important to them and (v) found ways to prevent them from worrying about their health.³⁰ The outlook on future health index was developed in the RAND RIE as a measure of enrollees' expectations regarding their future health status. Both measures, as with consumer sophistication, were based on a standardized scale, with values ranging from 0 to 100.³⁰

Chronic diseases

To examine changes in consumer sophistication among more regular users of health-care,

Table 1 Demographic characteristics of RAND HIE participants

Participants (n)	Cost sharing (%)	Female (%)	Chronic disease (%)	Age (years)	Non-white (%)	Education (years)	Family income (dollars)
724	0	54.3	47.7	37 (11.44)	13.2	12.1 (3.1)	14174 (7918)
277	25	53.8	44.0	37 (11.52)	17.0	12.1 (3.2)	14432 (6919)
222	50	57.0	47.3	36 (11.03)	14.3	12.2 (2.8)	14339 (7490)
336	95	58.2	47.9	36 (11.33)	17.4	12.3 (2.9)	14703 (7128)
527	MID	53.8	48.0	36 (11.25)	15.0	12.2 (2.8)	13910 (7542)
Total/Mean: 2086	—	55.0	47.3	37 (11.4)	14.8	12.2 (3.0)	14293 (7490)

Standard deviations are given in parentheses.

RAND HIE enrollees with chronic diseases were identified. In this study, chronic diseases were classified as one of the following conditions: hypercholesterolaemia, angina pectoris, chronic obstructive airway disease, congestive heart failure, diabetes (type I or II), hypertension, chronic joint disorders and dyspepsia. Identification of chronic disease patients occurred at the enrolment of the RAND HIE, through the use of a medical history of questionnaire and screening exam.³¹ These conditions account for the most common chronic diseases in the United States and are equally represented across insurance groups in the study population (Table 1).

Statistical analysis

To characterize changes in consumer sophistication, satisfaction with the art of medicine and the outlook on future health, we utilized multiple regression models. Change in consumer sophistication, change in satisfaction with the art of medicine and change in future health outlooks were the dependent variables in these regression models. Each dependent variable was measured as the difference between these scores at enrolment and exit. Explanatory variables included insurance plan group, income (adjusted for family size), gender, age and educational attainment. Dummy variables represented the three different cost sharing groups were examined. Finally, an indicator variable for chronic diseases was constructed to test the interaction between chronic diseases and each cost sharing group. In all analyses, statistical significance was defined as a *P*-value of 0.05.

Results

The baseline scale values for group were largely similar. For consumer sophistication, the mean value was 61.2, for future health outlook it was 67.7 and for satisfaction with the art of medicine it was 54.0. The changes in consumer sophistication ranged from 2.4 to 3.1 across groups. This represents a 3–5% increase.

The change in satisfaction with the art of medicine was very small: 0–3% and the change in the future health outlook showed marginal declines of about 3%.

When regression models examined changes in the consumerism scales according to the five levels of cost sharing, no significant differences were found between the groups. The main effect of cost sharing was then examined by grouping insurance plans into 'low' and 'high' cost sharing groups (Table 2). The results from this model did not broadly change the main findings. A negative association was found between changes in consumer sophistication and the highest level of cost sharing but was not significant (Table 3; *P* = 0.759). The directions of changes in the satisfaction with the art of medicine and future health outlooks were also negative. Changes in satisfaction with the art of medicine and future health outlooks were not statistically significant (*P* = 0.414 and *P* = 0.956, respectively) (Table 3). We concluded enrollees' health-care decision-making processes were not significantly influenced by the levels of cost sharing.

Nor were the interactions between the presence of a chronic disease and level of cost sharing statistically significant. Indication of a chronic disease in the highest levels of cost sharing were negatively associated with changes in consumer sophistication and future health outlook but not statistically significant (*P* = 0.759 and *P* = 0.956) (Table 4). Change in the satisfaction with the art of medicine was positively associated with higher levels of cost sharing but not statistically significant (*P* = 0.25). Hence, we did not find that consumerism increased more with greater consumer engagement in the consumption of medical care as identified by presence of a chronic disease.

Discussion

Our results suggest that we could not find evidence that cost sharing induces changes in patients' approaches in purchasing health care. In particular, we found that enrollees in plans

Table 2 Unadjusted means for changes in consumerism scales

	Plan (%)	Enrollees (n)	Change in consumer sophistication	Change in satisfaction with the art of medicine	Change in future health outlook	Baseline consumer sophistication	Baseline satisfaction with the art of medicine	Baseline future health outlook
Group1	0	724	3.04 (20.3)	0.15 (14.8)	−2.25 (16.2)	61.2 (21.4)	54.0 (15.4)	66.8 (16.9)
	25	277	2.21 (19.0)	−0.92 (14.1)	−2.90 (16.6)	60.2 (22.2)	54.8 (14.8)	69.2 (17.4)
Group 2	50	222	3.10 (21.4)	−0.05 (14.6)	0.15 (14.3)	59.9 (21.0)	55.0 (14.5)	66.1 (15.4)
	95	336	2.4 (19.3)	−1.23 (15.8)	−3.80 (16.8)	61.4 (20.7)	55.2 (15.7)	68.9 (16.9)
Group 3	IMD	527	3.1 (19.6)	0.29 (15.0)	−2.78 (16.9)	62.0 (21.4)	52.5 (16.3)	68.2 (17.4)

Standard deviations are given in parentheses.

Table 3 Regression model for the main effect of cost sharing on medical consumerism

Independent variables	Change in consumer sophistication	P-value	Change in satisfaction with the art of medicine	P-value	Change in future health outlook	P-value
Gender	−0.465 (0.53)	−0.598	0.665 (1.00)	0.316	−0.794 (1.10)	0.273
Age	−0.168 (3.96)	<0.001	−0.034 (1.08)	0.28	−0.094 (2.72)	0.007
Race	−1.041 (0.79)	0.43	3.259 (3.29)	0.001	3.9 (3.61)	<0.001
Educational attainment	0.136 (0.86)	0.391	−0.121 (1.01)	0.312	0.29 (−2.22)	0.026
Income	−0.934 (1.09)	0.275	0.971 (1.51)	0.13	−0.024 (−0.03)	0.972
Chronic Disease	−1.279 (1.43)	0.153	0.578 (0.86)	0.389	1.85 (2.52)	0.012
Group 2	−0.322 (0.31)	0.759	−0.643 (0.82)	0.414	−0.047 (0.05)	0.956
Group 3	0.087 (0.08)	0.935	0.359 (0.45)	0.655	−0.537 (0.61)	0.54
Constant	15.867 (2.12)	0.034	−7.489 (1.33)	0.182	−3.247 (0.53)	0.596
Observations	2086		2086		2086	
R-squared	0.01		0.01		0.02	

Absolute value of t-statistics given in parentheses.

Table 4 Regression model for the interaction between the presence of a chronic disease and changes in consumerism

Independent Variable	Change in Consumer Sophistication	P-value	Change in Satisfaction with the Art of Medicine	P-value	Change in Future Health Outlook	P-value
Gender	−0.49 (0.55)	0.579	0.684 (1.03)	0.302	−0.804 (1.11)	0.267
Age	−0.17 (4.00)	<0.001	−0.033 (1.03)	0.302	−0.095 (2.73)	0.006
Race	−1.042 (0.79)	0.430	3.263 (3.30)	0.001	3.885 (3.59)	<0.001
Educational Attainment	0.124 (0.78)	0.438	−0.112 (0.94)	0.349	0.289 (2.22)	0.027
Income	−0.901 (1.05)	0.292	0.95 (1.48)	0.139	−0.029 (0.04)	0.967
Chronic Disease	2.412 (1.89)	0.058	−0.123 (0.13)	0.898	1.645 (1.58)	0.115
Group 2	0.766 (0.53)	0.596	−1.496 (1.38)	0.168	0.382 (0.32)	0.747
Group 3	1.052 (0.71)	0.476	−0.046 (0.04)	0.967	−1.382 (1.14)	0.253
Interaction						
Group 2	−2.306 (1.10)	0.273	1.804 (1.14)	0.253	−0.897 (0.52)	0.603
Group 3	−2.045 (0.96)	0.339	0.866 (0.54)	0.59	1.766 (1.01)	0.314
Constant	15.269 (2.04)	0.042	−7.137 (1.27)	0.205	−3.076 (0.50)	0.617
Observations	2086		2086		2086	
R-squared	0.01		0.01		0.02	

Absolute values of t-statistic given in parentheses.

with the highest levels of cost sharing were not more likely to engage in behaviours that suggest more sophistication in how they chose providers or therapy as provided by the consumer sophistication scale. Furthermore, we did not find any greater effect among more regular users of health care (i.e., those with chronic conditions), suggesting that a greater exposure to the health-care system within any cost sharing group did not induce a greater effect on our outcomes of interest.

A possible limitation of this study is the sample size necessary to test equivalence. However, we do have 90% power for detecting a difference of 4 points between Group 1 (low cost sharing) and Group 2 (high cost sharing). Such an effect would correlate with about 25% of participants in Group 2 moving up for one question on the consumerism scales or a change of 4 percentage points or around 7% for each of the consumerism scales.

Another possible limitation in this study is the age of the data, collected between 1974 and 1982. Since the study was conducted, the American health-care system has increasingly recognized the need for an intermediary organization (insurance company or primary care physician) to coordinate some aspects of the health-care delivery. Even HDHPs have embraced some of the tools of managed care organizations, including utilization management for the most expensive therapies and care coordination for patients with chronic disease patients. The adoption of these tools has suggested HDHPs increasingly utilize a form of 'managed' consumerism absent in the RAND HIE.⁹ Nonetheless, cost sharing remains the central economic incentive found in HDHPs to encourage selective use of health-care services.¹¹ In this regard, the RAND HIE remains uniquely suited to address the claim by HDHPs to induce changes in consumer behaviour through increasing levels of cost sharing.^{32,33} The experimental design of the study allows examination of this key claim without cofounders (selection bias) found in other studies.

If the goal is to encourage cost consciousness among health-care consumers, this study does

not provide evidence that increasing cost sharing is a useful mechanism. Other mechanisms should be considered as different health-care systems consider policies to try to better engage health-care consumers in their health-care decisions. For example, it is possible that sufficiently accessible and interpretable information for health-care consumers is a necessary step.³² Previous studies have shown that the majority of health insurance plans in the United States do not provide enrollees with such information. HDHPs have also been poorly rated for the information they provide enrollees.^{34–36} Although provisions for increased cost sharing methods have been introduced in state Medicaid programs, even these programs lack changes for helping enrollees make better health decisions.³⁷ In addition, there is significant evidence that plan enrollees are not fully aware of the extent and nature of their plan's health benefits.^{38,39} Future research is needed to examine the effects of providing more information and decision-making aids to enrollees, particularly those in HDHPs.⁴⁰ It has long been recognized the patients, including those enrolled in HDHPs, do not assess information regarding the costs and quality of their medical care.⁴⁴ Indeed, our results suggest cost sharing alone cannot be expected to realize the full potential of consumer-directed health care.

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Appendix 1

Consumer sophistication questionnaire

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- A. Some operations done by surgeons are not really necessary
  - B. If you have doubts about your doctor's advice, it is a good idea to get another doctor's opinion
  - C. Stomach aches and headaches are hardly ever caused by your emotions
  - D. A medicine prescribed by a doctor can have very different prices, depending on whether or not it has a brand name
  - E. If you have to go into the hospital, your doctor can get you admitted to any hospital you prefer
  - F. You may be able to tell how good a doctor is by finding out if he is certified by a special board
  - G. If you have a particular medical problem, there is usually a doctor specially trained to handle it
  - H. Doctors are checked every few years, before their licences are renewed
  - I. For many illnesses, doctors just do not have any cure
  - J. Two doctors who are equally good at their job may still suggest very different ways of treating the same illness
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A, B, D, F, G, I, J ('Agree' was marked as correct, 'Disagree'/'Don't Know' was marked as incorrect).

C, E, H ('Disagree' was marked as correct, 'Agree'/'Don't Know' was marked as incorrect).

Correct responses were given a score of 2 and incorrect responses a score of 1.

The scores were summed and a 100-point scale was calculated as follows:

CSOPH (consumer sophistication) = ((Summed score - min)/(max - min))*100

where max = 16, min = 8.