Measuring the Financial Exposure from Medical Care Spending Among Households with Employer Sponsored Insurance

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Abstract

We develop an empirical method to assess the degree of financial exposure associated with medical care spending among non-elderly U.S. households with employer-sponsored insurance. A key feature of this method is its simplicity – it only requires data on out-of-pocket (OOP) health care spending and total health care spending and does not require detailed knowledge of health insurance benefit design. We apply our method to assess whether households with a chronically ill member face more financial exposure given their level of total spending relative to households with no chronically ill members. We find that the insured chronically ill face more financial exposure than the insured non-chronically ill. Additional analyses suggest that the reason for this additional financial exposure is not that households with a chronically ill member are in different, less generous plans, on average. Rather, households with a chronically ill member have higher spending on certain types of medical services (e.g., pharmaceuticals) that face higher levels of coinsurance. Given recent work on value-based insurance design and coinsurance as an obstacle to medication adherence, our findings suggest that the current design of health plans could jeopardize both the health and the financial well-being of the chronically ill.
Introduction

The “gold standard” financial protection provided by employer-sponsored health insurance to policyholders and their dependents has eroded somewhat in recent years as employers seek ways to slow dramatic increases in premiums. Many employers have responded to rising costs of insurance by offering plans that include higher cost-sharing requirements in the form of deductibles and coinsurance. In 2006, 10 percent of covered workers had an annual deductible of at least $1,000. By 2011, 31 percent of covered workers did (Kaiser Family Foundation, 2011). Plans have also introduced greater variation in coinsurance and copayments for different services or products. Examples include different cost-sharing for specialist versus generalist visits, or for brand versus generic drugs. These changes are designed in some cases to provide incentives for consumers to choose lower-cost options and, in other cases, simply to shift costs to consumers and thereby lower premiums.

These incremental changes in benefit design are likely to affect particular enrollees differently, not only because of differences in how consumers respond to new incentives but also because individuals with different health care needs may require a different mix of services. For example, greater use of copayments relative to deductibles may shift out-of-pocket (OOP) costs toward patients with recurring services, such as those with chronic conditions, and away from patients with acute conditions, even if total expenditures for the two patients are equal. This change potentially leaves different populations facing differing degrees of financial exposure even if insured by the same health plans and with the same total spending.
Despite its importance, there has been little analysis of the financial exposure faced by different groups of insured households primarily due to the difficulty in measurement. This difficulty in measurement is the result two factors. First, insurance plans are extremely complex and differ in many dimensions, making it difficult to summarize plan features in a way that facilitates comparisons. For example, plans can differ by level of deductible, coinsurance, treatment of generalists versus specialist services, prescription drugs including drug tiers, and out-of-pocket maximums. Plans also differ to the extent that they can negotiate lower prices with specific providers. In order to compare the financial exposure of two different insured populations, it is necessary to know how differences across all these dimensions interact with the health care utilization of the two groups. While it might seem at first glance as if an actuarial value could capture this notion, we discuss in some detail below the difficulties associated with using an actuarial value-based measure to compare the financial exposure faced by different populations. Second, even if we could find such a useful summary measure of plan features, there is a lack of current, nationally representative data that includes detailed information on benefit design features and enrollees’ medical care consumption. It is therefore very useful to develop a measure of financial exposure faced by different populations that does not have such stringent data requirements.

Our objective in this paper is twofold. First, we seek to develop a method to measure the degree of financial exposure due to health care expenditures that can be used to compare different insured populations and over time, and that can be implemented with existing, nationally representative data. Second, we seek to implement this method in a comparison of the financial exposure associated with the health care expenditures of households that do and do not include someone with a chronic condition.
The method we develop for measuring financial exposure associated with health care expenditures achieves these two objectives. Using the nationally representative Medical Expenditure Panel Survey Household Component (MEPS-HC) for 1997-2007, we examine how OOP medical spending varies across the distribution of total medical spending for various populations. By holding constant total spending, we are able to assess whether insurance coverage provides less financial protection on average across various populations, rather than simply capturing differences in the distribution of total spending for these populations. To illustrate the differences, we assess the relationship between OOP and total spending using both non-parametric and parametric methods. Our method approximates a ‘benefit design’ approach that explicitly compares plan features for analyzing financial exposure but with far fewer data requirements. In its simplest form, our method requires only data on total and OOP spending incurred by enrollees.

We apply our approach to compare the degree of financial exposure between the population without chronic illness and the chronically ill. This comparison is particularly salient for several reasons. First, the proportion of the population with a chronic condition has been growing rapidly. In 2005, about 60 percent of the adult U.S. civilian non-institutionalized population had at least one chronic condition. As the population ages, it is expected that chronic condition prevalence will also rise, given the positive association between disease onset and age (Machlin, Cohen, and Beauregard, 2008). Second, on the surface, it appears that some of the more frequent design changes to insurance plans, such as the use of multiple cost-sharing tiers for prescription drugs, may differentially affect those with chronic conditions. And, third, there is evidence from research on value-based design suggesting that treatments for chronic conditions are of particularly high value.
(Fendick et al. 2009, Chernew et al. 2008, Choudhry, et al. 2007). Finally, the Affordable Care Act authorizes the development of an essential benefits package and allows for value-based insurance designs. Policymakers, when choosing the specific features of benefit packages, would find it useful to understand how alternative designs may differentially affect different groups of enrollees, including those with and without chronic illness.

Our results suggest that the chronically ill are less well protected by their insurance coverage on average than the non-chronically ill, controlling for total health care spending. To understand what drives these differences, we supplement our main analysis with an examination of the other characteristics of the health insurance benefits held by these groups. This examination allows us to see whether these differences are due to these two populations being insured by different types of plans. We do not find evidence of this. However, we document significant differences in the type of services used by the chronically ill – most notably, prescription drugs. We also find that the type of services used more frequently by the chronically ill have higher shares of OOP to total spending, on average, than those more frequently used by households without chronic conditions. We conclude with a discussion of the possible implications of benefit designs that create greater financial exposure with respect to the services consumed by the chronically ill.

**Developing a Measure of Financial Exposure**

As discussed above, our first objective is to develop a measure of financial exposure from health care expenditures that can be used to compare across different insured populations and over time. We argue that there are certain properties that any
such a measure should have. First, a measure of the financial exposure from health care spending should not be conflated with overall demand for health care. Because populations that we want to compare may have different levels of demand and different levels of total spending, the measure must not simply pick up differences in demand.

Second, a financial exposure measure should reflect the differential coverage for different types of services. For a given overall level of demand, groups that we want to compare may use a different mix of services. In order to understand the differences in coverage of the two groups, or conversely the relative financial exposure of the groups, our measure must reflect variation in types of services used by each group at a given level of total spending.

Third, a desirable property is that the measure does not require detailed data on coverage provisions of each individual’s plan. Few data sources include such detail and none are both current and nationally representative.

Our Measure: A Hypothetical Example

Our proposed measure is an insurance curve. In its most simplistic form, an insurance curve is a plot of out-of-pocket (OOP) health care spending against total health care spending. We illustrate this concept with a hypothetical example depicted in Figure 1.

We begin by creating bins of total spending and then plotting the median OOP spending within each bin separately for Population A and Population B. For example, in the total spending bin from $2,000 to $2,250 in our hypothetical example, the median OOP for Population A is $780 while the OOP for Population B is $1,050. We can then
test for whether the difference in median values is statistically significant. We extend this idea by moving to a regression-based framework that allows us to create insurance curves adjusted for observable covariates, such as age, race, and household size, etc.

By our definition and in our hypothetical example, Population B everywhere faces greater financial exposure than population A because at all levels of total spending Population A has lower OOP spending. Of course, it could be that the curves do not differ or that they cross, in which case relative exposure changes with total spending.

The insight for insurance curves is straightforward. In order to compare across populations (or time), a measure of financial exposure must account for levels of total spending (unless the different populations have the same spending distribution). Otherwise, the measures will conflate differences in financial exposure with differences in the level of health care spending. Other related measures used in the literature such as “underinsurance,” do not condition on total spending. As a result, they conflate financial exposure and the level of spending and, therefore, do not serve our purposes. We discuss the most closely related measures from the literature in the following section.

Previous Approaches and Comparisons to Insurance Curves

A number of previous studies have examined concepts related to the degree of financial exposure from medical care spending and have proposed a variety of methods to measure these concepts. Our intent is to measure something different than what has been measured in prior work, but it is helpful to define and contrast these related measures. Two common measures related to the concept of financial exposure are a household-level underinsurance threshold measure and a plan’s actuarial value.
The actuarial value (AV) is an insurance industry concept and is measured for specific health plans, not for individual households. The AV of a plan is the average proportion of medical expenditures paid by the insurer for a standard population based on the plan’s cost-sharing provisions (Peterson, 2009). For example, an AV of 0.70 means that 70% of covered health care expenses of the standard population would be paid for by the plan, while 30% would not. This concept has been applied to understand how employer sponsored insurance (ESI) coverage differs across establishments of different types. The key feature of the AV calculation is that each plan’s actuarial value must be calculated for the same standard population. Also, it should be noted that the data requirements for calculating actuarial values are quite high since detailed data on benefit designs and spending among individuals within a population are necessary (McDevitt, 2008). See for example, Gabel et al. (2006), Gabel et al. (2007), Gabel et al. (2012), and McDevitt (2010).

The AV is generally used to compare health plans and not populations. But one might ask whether one could use the AV to compare populations as well. In our hypothetical example from above, imagine taking a representative sample from Population A and a representative sample from Population B and calculating the average proportion of each groups’ health care expenses paid for by the insurer. Would this be analogous to AV but for a population?

The first problem with this approach is that the two groups may have different distributions of total spending. We know the structure of most insurance plans assures that the proportion of expenses paid by insurance generally increases with total spending once the deductible is met or maximum out-of-pocket is reached. Given this,
comparisons of this modified AV across groups with different distributions of total spending would still be conflated with differing levels of demand. Essentially, this approach violates the key assumption of a “standard population” unless the distribution of total spending does not differ between the two groups being compared.

A second problem is that the same modified AV can be produced by different combinations of plan provisions when calculated using a standardized population. For example, a plan with high deductibles coupled with low copayments could effectively yield the same AV as a plan with high copayments on one type of service and low copayments on another service. Such differences in plan provisions may even out in a standardized population, but could easily affect these two populations differently if they use a different mix of services.

Underinsurance is a quite different concept than financial exposure. Being underinsured is often defined in the literature as a household having out-of-pocket medical spending greater than 10% of household income. The summary measure reports the proportion of the population that is underinsured. This measure highlights the financial exposure associated with out-of-pocket spending by controlling for household income. See for example, Short and Banthin (1995), Banthin and Bernard (2006), Banthin et al. (2008), Schoen et al. (2008), Cunningham (2010) and a discussion and critique of this measure in Abraham et al. (2010).

The concept of underinsurance does not capture the notion of financial exposure again because of differences in the spending distribution of the groups being compared. The underinsurance measure can classify a less healthy individual with high demand as underinsured and a healthier individual with low demand as not underinsured. Therefore,
if the distribution of health in the two groups differs, underinsurance will conflate demand with financial exposure. While this feature is intended by the underinsurance literature, which emphasizes the financial burden of health care spending, it does not satisfy our requirements for a measure of financial exposure.

Unlike the AV or underinsurance measures, insurance curves do not conflate exposure with overall demand since they condition on total spending. Moreover, this method can neatly summarize differences in complex sets of benefits for enrollees and provide a way to empirically summarize the average plan characteristics held by a population. This summary is especially useful when detailed plan characteristics are not available and when OOP and total spending are available. For example, in the MEPS-HC, detailed benefit design information is not known but total and OOP spending are available.¹

**Data and Empirical Strategy**

In this section, we describe how we estimate insurance curves for a population. In our application, we estimate curves for two groups, the population with chronic illness and the non-chronically ill, in order to make comparisons in the degree of financial exposure given the insurance coverage of these populations. While the method of comparing insurance curves can distinguish between different degrees of financial exposure from insurance by group, it cannot by itself distinguish between the competing explanations for those differences. One possible explanation for differences is that the two groups are enrolled in different types of plans. This could occur, for example, if firms insuring households with chronic conditions respond to higher associated premiums

¹ The exception to this is the 1996 MEPS-HC when health insurance benefits booklets were abstracted.
by offering plans with more coinsurance to their employees. Another possible explanation for these differences is that the same plans differentially cover services tended to be used more frequently by individuals with chronic illnesses. In order to shed light on what factors may be responsible for differences in the degree of financial exposure associated with insurance that we observe for households with and without chronic conditions, we conduct supplemental analyses to examine additional characteristics of the insurance policies held by these households.

Data:

We use data from the 1997-2007 MEPS-HC which is sponsored by the Agency for Healthcare Research and Quality. The Household Component contains individual and household-level information on demographics, medical conditions, income, and employment. Respondents also provide information regarding health insurance throughout the year, medical care utilization by service type, and expenditures by source of payment. The MEPS-HC includes five rounds of survey interviews and collects information covering a two-year time period.

Our unit of analysis is a household, defined in the MEPS-HC as a Health Insurance Eligibility Unit. An HIEU is a sub-family relationship unit constructed to include adults plus those family members who would typically be eligible for coverage under private family plans, including spouses, unmarried natural or adopted children who are age 18 or under, and children under age 24 who are full-time students. We use the household as the unit of analysis, rather than the individual, since individuals within a household typically share resources to cover expenses associated with medical care and
health insurance, and because employer sponsored insurance can be conferred on all members of a household through taking up family coverage.

Our study population is restricted to households in which all members are under 65 years of age, since almost all individuals who turn 65 become eligible for Medicare. We also restrict the analysis to households in which all members are continuously insured by employer sponsored insurance during the calendar year. When household members experience coverage gaps, they are likely to alter their care-seeking behavior and costs in response. To avoid introducing this source of heterogeneity into our analysis, we exclude any households in which any member had a spell of uninsurance or moved to a public insurance plan during the year. The final sample includes 47,183 households, which represents approximately 51.4 million U.S. households.

Measures:

*Medical Spending*: We use information on two types of medical care spending: total and out-of-pocket. We aggregate individual-level spending across household members to get household-level, out-of-pocket and total medical care spending. We inflate all spending measures to 2009 dollars. In our supplemental analyses, we also use data on households’ total spending and OOP spending by service category, including inpatient hospitalization, office-based provider visits, emergency department visits, outpatient, prescription drugs, dental, vision, and home health services. Descriptive analyses revealed large positive outliers in the data for both total spending and out-of-pocket spending. To address this, we first trimmed the bottom and top one-half percent of observations based on OOP spending values and then removed all observations with total spending in excess of $400,000 or OOP spending greater than $30,000 (n=18).
**Chronic Illness:** Using the MEPS Medical Conditions file, we extracted information on the medical conditions reported by household members. For the purpose of selecting which conditions to include, we reviewed published studies of medical care spending among those with chronic illness (e.g., Bodenheimer et al. 2009; Banthin and Bernard, 2006; Davidoff and Kenney, 2005; Anderson, 2010) to identify prevalent conditions most typically classified as “chronic.” Additionally, we consulted a board-certified physician to verify our selection criteria. Based on this, we classified members as having a chronic condition if they reported having any of the following: cancer, diabetes, heart disease, asthma, and anxiety or depression. We define our chronic household indicator as equal to one if at least one member in a household reported having at least one of these medical conditions.2

**Human Capital and Demographic Measures:** In our multivariate regression model of OOP spending, we include a set of control variables to capture demographic and human capital attributes of policyholder(s) in the household. In households with two policyholders, we use the higher valued measure. We include the age of the policyholder (years); highest education (years); race (white, black, Asian/Pacific islander, other (reference category))3; Hispanic; whether any household members are married; and the number of children in the household who are 17 years of age or younger. We also include a quadratic for household’s annual income ($1,000s), which we inflation-adjusted to $2009. Since there may be geographic differences in insurance benefits, labor market conditions, and provider prices, we also include four region dummies (Northeast,

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2 Households that have health insurance that provides less financial exposure may be more likely to seek medical care in which they will be diagnosed with a chronic condition, a possibility that might lead us to understate the differences in the degree of financial exposure from insurance between chronically ill households and non-chronically ill households.

3 We recoded multi-race households to reflect the less prevalent race in the population.
Midwest, South, West (excluded)) and an indicator for whether the household resides in a metropolitan statistical area (MSA).

Employer and Plan Characteristics: Although the MEPS-HC does not contain a great amount of detail on the specific attributes of the plans held by each household, it is possible to identify some basic information about their coverage in order to test whether any differences that we observe are due to these two populations being insured by different types of plans. First, we constructed a binary measure for whether or not the household had a choice of plans. This could occur in two ways – a worker in the household being offered more than one plan through his or her workplace or a household in which both workers have an offer of ESI. Second, we identified whether a household is enrolled in a plan that restricts coverage only to those providers in the plan’s network (e.g., exclusive provider organization). Third, using the MEPS Person-Round-Plan file, we constructed a measure corresponding to the household’s annual OOP premium for the health insurance held during the year. Table 1 reports the descriptive statistics for our sample of households, reported separately for households with and without a chronically ill member. Non-chronically ill households have, on average, total health care spending of $3,587 compared to $9,300 for chronically ill households. Since the chronically ill spend much more on health care, it is essential to control for differences in the level of spending when assessing the degree of financial exposure associated with insurance.

We also consider a set of characteristics that correspond to the policyholder’s employment that in turn, may be correlated with characteristics of their coverage. To

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4 In the case of the household holding two plans, we sum each plan’s OOP premium to arrive at the household-level measure.
5 A small percentage of households reports having two policyholders. In this case, we defined the variable as equal to one if either of the policyholder’s had the particular attribute (e.g., worked for a small establishment, private organization, or belonged to a union).
control for the policyholder’s establishment size, we use a set of binary indicator
variables corresponding to whether the policyholder is employed at a small establishment
(50 workers) or a private organization (versus a government organization); we also
control for whether the policyholder is a member of a union. We use this information on
plan and employment characteristics in our supplemental analysis of whether there is
evidence that the chronically ill are in different types of plan than others.

Methods:
The first set of insurance curves that we present are the non-parametric and
unadjusted estimates of the aggregate insurance curves for all households with a chronic
illness and all households without a chronic illness depicted graphically. We plot OOP
spending against total spending for households with a chronic illness and for households
without a chronic illness. To construct these curves, we compute median OOP spending
within total spending categories where the bins are defined at intervals of $250 for total
spending between $0 and $5,000; $500 between $5,001 and $10,000; $2,500 between
$10,001 and $25,000; and one bin for $25,001-$50,000. The progressively larger
intervals reflect our desire to keep sample sizes sufficiently large across the spending
distribution.

Our next set of curves is comprised of predictions of OOP spending from
parametric models of OOP spending as a function of total spending, chronic illness, and a
set of controls. We estimate the following parametric model:

\[ \text{OOP}_i = f(T_i, T^*_i \cdot \text{Chronic}; X_i, \text{Year}; B) + \varepsilon_i \]

where OOP is annual out-of-pocket spending, T is a quadratic in annual total spending,
Chronic is a dummy variable indicating the presence of a chronic illness (defined above),
X is a set of human capital and demographic variables (defined above), and Year, which is a set of year indicator dummy variables (1997 as reference category). B represents our parameters to be estimated. We estimate this equation using median regression. All analyses are weighted to adjust for the complex design of the MEPS.\(^6\)

**Results**

**Insurance Curves: Households With and Without Chronic Conditions**

We present unadjusted insurance curves for chronically ill and non-chronically ill households in Figure 2. Each point on the curve represents the median OOP spending level for households within that total spending bin.

Median OOP spending is roughly the same for chronically ill households and for non-chronically ill households up to about $8,000 of total spending. After this level of total spending,\(^7\) OOP spending is noticeably higher among chronically-ill households, suggesting that chronically-ill households have less generous insurance against high levels of expenditure than do households without a chronically ill member. Using a non-parametric test of the equality of medians for each bin of total spending, we assessed whether observed differences were statistically significant. At levels above $8,000, median spending for chronic and non-chronic households are significantly different for nine out of the eleven bins.

\(^6\) Survey commands in STATA do not allow for explicit clustering to account for repeated observations on households, which is present given the overlapping panel design. When we re-estimated the model without explicit survey commands but utilized analytic weights and allowed for clustering, the standard errors are almost identical. Median regression is not supported by the survey commands. In this case, we used analytic weights with clustering. For robustness, we also considered alternative specifications including OLS regression and a square-root transformation. These results produced qualitatively similar patterns of results and are available from the corresponding author by request.

\(^7\) Approximately 18% of households in the sample have annual total spending in excess of $8,000 per year.
Our estimates of equation (1) using median regression show a similar story. Using an F-test, we reject the hypothesis that the parameters on the interaction terms of chronic with total spending and chronic with total spending squared are jointly equal to zero \((p<.001)\), demonstrating that the estimated insurance curves for the chronically ill differ from those for the non-chronically ill. Figure 3 plots the predicted insurance curves (OOP spending against total spending) to illustrate these differences graphically.\(^8\)

As the figure shows, adjusted OOP spending of those households with chronic conditions is higher than for other households, with the difference widening at higher levels of total medical spending. Using the simple measure of insurance curves developed here, we conclude that insured households with chronic conditions appear to face more financial exposure than other insured households.\(^9\)

As noted above, while our method of comparing insurance curves can distinguish between different degrees of financial exposure by group, it cannot by itself distinguish between the competing explanations for those differences. Below, we summarize results from supplemental analyses to investigate further these competing explanations.

Are the Chronically Ill Enrolled in Different, Less Generous Plans?

One possible explanation for the differences that we observe is that the two groups are enrolled in different types of plans. To investigate the hypothesis that individuals with and without chronic conditions are in different types of plans, we first look at characteristics of the health plan menu offered and the health plans held by the

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\(^8\) A full set of model results is available from the corresponding author by request.

\(^9\) The reader should keep in mind that there is substantial heterogeneity in the plans held within the two groups. Our method aggregates across these plans and cannot speak to the frequency in which the individual plans held by the chronically ill are less generous, only to the average difference.
household’s policyholder(s). First, given issues related to adverse selection, we would expect households with a chronically ill member to choose, if anything, plans that offer less financial exposure. We observe whether the household has a choice of plans (which is likely to be positively associated with generosity), whether or not the plan held is an exclusive provider organization (HMO), and the out-of-pocket premium paid by the household. We regressed each of these variables on the policyholder’s age, education, race and ethnicity, marital status and number of children in the household, household income, an MSA dummy, region dummies, as well as the chronic condition indicator. A summary of unadjusted and adjusted values is provided in Table 2. These model results suggest that households with a chronically ill member are 1.5 percentage points more likely to have a choice of plans relative to other households. This difference is small, given that 64 percent of households in the sample have a choice of plans. We observe no statistically significant differences with respect to enrollment in an exclusive provider organization or with respect to the annual out-of-pocket premium for family coverage. Thus, our results do not suggest important differences in the types of plans in which the two populations are enrolled.

As a further check on the possibility that households with individuals who have a chronic condition are enrolled in different health plans than other households, we also examine whether there are differences between the policyholders of the two groups in terms of workplace or job characteristics that are known to be correlated with insurance generosity: establishments with 50 or fewer workers, private sector establishments (versus government), and whether the worker is a union member. We do this using multivariate regression that, along with a summary of our results, is reported in Table 2.
Controlling for the same set of explanatory variables as above, we find that households covering at least one member with a chronic condition are 2 percentage points less likely to obtain their coverage through a small establishment. We also observe that households with a chronically ill member are slightly more likely to have a policyholder that is a union member. There is no significant difference by chronic status in the probability of working for a private organization (versus government). While we do not have enough data on plan characteristics to definitively rule out differences in the types of plans in which these two groups are enrolled, our results indicate no evidence to support the claim that households that insure individuals with chronic conditions obtain their coverage from sources that tend to offer health plans of substantially different degrees of financial exposure relative to others. If anything, the estimated relationships for the effect of chronic status on plan choice, establishment size, and union affiliation would seem to suggest that households with a chronically ill member might be covered by plans that provide more coverage (Gabel et al. 2006).

How Different are the Services Used by the Chronically Ill?

The alternative reason we have suggested to explain why the chronically ill insured households face greater financial exposure from medical care spending than other insured household is that benefit designs are structured in ways that favor the types of services consumed episodically as compared to the types of services consumed more persistently. This explanation assumes that there are differences in the types of services consumed by these two groups. To examine this, in Figure 4, we show plots of six types of service-specific spending against total spending.
As expected, we find that service usage differs substantially by chronic illness status. For any given level of total medical spending, households with chronic conditions spend substantially more on prescription drugs than other households and this difference is statistically significant. For example, for households with total spending between $4,750 and $5,000, households covering a chronic condition spend almost 76 percent more on prescription drugs, on average, than other households ($879 versus $1,548). For households spending between $12,500 and $15,000, the difference is even greater ($1,634 versus $3,202). For a given level of total spending, households not covering someone with a chronic condition spend equal or more on other services including office-based visits, outpatient care, inpatient services, emergency room charges, and dental care. While it is not surprising that the services consumed by households with chronic conditions differ from those of other households, such differences in services may, given the structure of insurance policies, produce differences in the overall level of insurance provided to these two populations.  

Do Differences in Services Used Explain Why Insured Chronically Ill Households Face More Financial Exposure?

In Figure 5, we present graphs of the average coinsurance rates for various types of covered services for given levels of total spending. Average coinsurance is calculated for each total spending bin separately for each service category. For example, for office-based visits, we divide OOP spending on office-based visits by total spending on office-based visits.

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10 One might also want to consider longer-term or "lifetime" insurance curves that relate many years or lifetime OOP spending to total spending. The data we use (the MEPS) preclude our constructing these longer-term or lifetime measures. We suspect, however, that there is greater serial correlation in expenditures among the chronically ill than among those with acute conditions (almost by definition). Thus, a longer-term picture using our method would tend to show an even larger difference in the degree of financial security from insurance between the chronically ill and the non-chronically ill.
based visits for each household with positive spending on office-based visits. We then average over all households within a category of overall total spending to generate our estimate. Thus, our estimate of the coinsurance rate is the average of the ratio of category-specific OOP spending to category-specific total spending (as opposed to the ratio of the averages). These coinsurance rates vary with total spending, as one would expect, because they depend upon factors such as whether a household has met its deductible. These calculations also depend on the timing of services. For example, some households may have consumed outpatient services while still subject to a deductible while others have already met the deductible or did not have a deductible as part of their policy. We expect such differences to average out over the population and expect that differences in the average coinsurance rate for each service may provide a strong indication of the reason that we find that insured chronically ill households face more financial exposure than other insured households.

We see from Figure 5 that in most cases average coinsurance rates do not differ substantially within service category for households with a chronically ill member as compared to others. The only noticeable difference in average coinsurance for the two groups occurs for prescription drugs. Average prescription drug coinsurance is higher for the non-chronic households than for those covering a chronically ill member. This lends support to our earlier conclusion that differences in plans cannot explain differences in financial exposure since the only real difference in coinsurance rates favors the chronically ill.

Looking across the panels of Figure 5, it is apparent that average coinsurance rates for prescription drugs are high relative to other health care services. Figure 6
presents coinsurance rates for each service type for three levels of overall total spending, $1,750-$2,000, $9,500-$10,000, and $15,000-$17,500. The differences between prescription drug coinsurance and coinsurance for other types of services is striking. For example, for households with total spending between $1,750 and $2,000, average coinsurance for prescription drugs is approximately 46 percent. In contrast, the average coinsurance for outpatient services is approximately 17 percent, emergency room 18-21 percent, office-based services 27 percent, and dental care 34-37 percent. With the exception of a higher coinsurance rate for dental care, the pattern is the same when we look at total spending levels of $9,500-$10,000 in panel B of Figure 6 and at spending levels of $15,000-$17,500 in panel C.

The patterns documented in Figures 5 and 6 explain how it is that chronically ill households have a higher degree of financial exposure despite our finding no evidence that they are in different, less generous health plans than households not covering a person with a chronic condition. For a given level of total spending, the chronically ill consume a much higher proportion of prescription drugs than do other households. Prescription drugs are insured substantially less generously than other health care services. The prevalence of insurance designs with higher coinsurance for prescription drugs results in less financial security for the chronically ill as compared to others with the same level of total health care spending.

Conclusions

In this study, we have developed a method to measure the degree of financial exposure from health care spending that can be used to compare across different insured populations and over time. A key distinction between insurance curves and measures of
underinsurance and actuarial value is that our method is able to measure financial exposure without conflating exposure with the overall demand for health care.

While the method of insurance curves has appeal given its properties and ease of which it can be implemented with nationally representative data, it does have some limitations. Notably, there may be other dimensions of health insurance that affect financial exposure but are not captured with this measure. Examples might include the composition of a plans’ provider network as well as coverage for experimental treatments.

Our empirical findings suggest that households with a chronically ill member have greater financial exposure than other households. In particular, both our raw unadjusted and parametric estimates of the insurance curves for chronically ill households and for non-chronically ill households show that OOP spending is greater among chronically ill households at higher levels of total spending than among non-chronically ill households.

Households with a chronically ill member may have greater financial exposure either because they are enrolled in plans that are less generous overall or because they tend to have benefit designs that include higher coinsurance or less coverage for specific types of services that are used more frequently by the chronically ill. Lack of detailed information on health plans means we cannot definitively rule out differences in plans in which the two populations are enrolled. However, our analyses of plan choice, plan type, and employer source through which individuals obtain their insurance suggest few differences between households with and without a chronically ill member. Rather, our analysis suggests that it is benefit design that explains the difference we observe.
Specifically, we find that it is greater coinsurance for prescription drugs, controlling for total health care spending that appears to be responsible for the less generous coverage of the chronically ill. That is, the specific services used most by the chronically ill – prescription drugs – are, by design, reimbursed at a lower rate.

Our findings have important policy and health implications. Insurance designs favoring acute care over chronic care may be based on the fact that chronic needs such as prescription drugs are more predictable and therefore the coverage of such expenses does not serve as pure insurance. However, there are good reasons to question such a justification. Insurance design given a chronic condition ignores the insurance problem associated with provision of insurance against developing a chronic condition. Even ignoring that thorny problem, policymakers concerned about health outcomes as well as cost control may look to recent evidence on coinsurance as an obstacle to medication adherence and question whether it is desirable to deter those with chronic conditions from taking needed medications. There is ample evidence that higher cost-sharing on prescription drugs lowers the probability of adherence to treatment (Leibowitz et al. 1985, Karaca-Mandic et al. 2011; Joyce et al. 2002; Goldman et al. 2004; Goldman et al. 2006). There is also a growing body of literature suggesting that any health care cost savings generated by lower medication adherence may be offset, and in some cases even more than offset, by higher spending on other services such as inpatient and outpatient care (Chandra et al. 2010, Gaynor et al. 2007, Goldman et al. 2006).

The weight of the evidence suggests that the current standard in insurance design of higher coinsurance for prescription drugs is worth reassessing. In this study, we raise questions about differential financial exposure for households with and without a chronic
condition. However, whether or not chronic conditions should, in fact, be covered to a lesser degree than acute illnesses requires a much more fundamental discussion about the purpose of insurance.
References


Figure 1: Hypothetical Illustration of Insurance Curves

Hypothetical Insurance Curves

Out-of-Pocket Spending vs. Total Spending for Populations A and B.
<table>
<thead>
<tr>
<th>Household characteristics</th>
<th>Non-chronically III Households</th>
<th>Mean</th>
<th>Linearized SE</th>
<th>Chronically III Households</th>
<th>Mean</th>
<th>Linearized SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household OOP spending ($2009)</td>
<td>815</td>
<td>9</td>
<td></td>
<td>1719</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Household total spending ($2009)</td>
<td>3587</td>
<td>48</td>
<td></td>
<td>9300</td>
<td>161</td>
<td></td>
</tr>
<tr>
<td>Age of policyholder (years)</td>
<td>39.769</td>
<td>0.100</td>
<td></td>
<td>44.972</td>
<td>0.112</td>
<td></td>
</tr>
<tr>
<td>Education of policyholder (years)</td>
<td>14.052</td>
<td>0.025</td>
<td></td>
<td>14.054</td>
<td>0.030</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>0.809</td>
<td>0.005</td>
<td></td>
<td>0.872</td>
<td>0.005</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>0.126</td>
<td>0.005</td>
<td></td>
<td>0.085</td>
<td>0.004</td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>0.053</td>
<td>0.002</td>
<td></td>
<td>0.027</td>
<td>0.002</td>
<td></td>
</tr>
<tr>
<td>Other race</td>
<td>0.013</td>
<td>0.001</td>
<td></td>
<td>0.016</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.089</td>
<td>0.003</td>
<td></td>
<td>0.072</td>
<td>0.003</td>
<td></td>
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<tr>
<td>Married</td>
<td>0.449</td>
<td>0.004</td>
<td></td>
<td>0.650</td>
<td>0.006</td>
<td></td>
</tr>
<tr>
<td>Number of children</td>
<td>0.580</td>
<td>0.008</td>
<td></td>
<td>0.744</td>
<td>0.012</td>
<td></td>
</tr>
<tr>
<td>Household total income (1000s; $2009)</td>
<td>77.652</td>
<td>0.552</td>
<td></td>
<td>86.524</td>
<td>0.743</td>
<td></td>
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<tr>
<td>Metropolitan statistical area</td>
<td>0.852</td>
<td>0.007</td>
<td></td>
<td>0.838</td>
<td>0.009</td>
<td></td>
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<tr>
<td>Northeast</td>
<td>0.213</td>
<td>0.011</td>
<td></td>
<td>0.200</td>
<td>0.013</td>
<td></td>
</tr>
<tr>
<td>Midwest</td>
<td>0.248</td>
<td>0.010</td>
<td></td>
<td>0.254</td>
<td>0.011</td>
<td></td>
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<tr>
<td>South</td>
<td>0.332</td>
<td>0.012</td>
<td></td>
<td>0.327</td>
<td>0.012</td>
<td></td>
</tr>
<tr>
<td>Plan Selection and Access Variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small establishment (&lt; 50 employees)</td>
<td>0.380</td>
<td>0.004</td>
<td></td>
<td>0.364</td>
<td>0.005</td>
<td></td>
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<tr>
<td>Private organization</td>
<td>0.761</td>
<td>0.004</td>
<td></td>
<td>0.734</td>
<td>0.005</td>
<td></td>
</tr>
<tr>
<td>Union member</td>
<td>0.203</td>
<td>0.004</td>
<td></td>
<td>0.236</td>
<td>0.005</td>
<td></td>
</tr>
<tr>
<td>Household has a choice of plans</td>
<td>0.622</td>
<td>0.005</td>
<td></td>
<td>0.669</td>
<td>0.005</td>
<td></td>
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<tr>
<td>Household enrolled in an exclusive provider organization</td>
<td>0.194</td>
<td>0.005</td>
<td></td>
<td>0.212</td>
<td>0.006</td>
<td></td>
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<tr>
<td>OOP premium (singles; $2009)</td>
<td>502</td>
<td>15</td>
<td></td>
<td>478</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>OOP premium (family; $2009)</td>
<td>1222</td>
<td>24</td>
<td></td>
<td>1230</td>
<td>27</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
- OOP premium information only available from 2001-2007
- Year indicators also included in analysis
Table 2: Plan Access and Selection Outcomes

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Non-chronically ill households</th>
<th>Chronically ill households</th>
<th>Unadjusted difference</th>
<th>Adjusted Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of Households with a choice of plans</td>
<td>0.621</td>
<td>0.669</td>
<td>0.048**</td>
<td>0.0152*</td>
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<tr>
<td>Proportion of Households holding an EPO</td>
<td>0.194</td>
<td>0.212</td>
<td>0.018**</td>
<td>0.0041</td>
</tr>
<tr>
<td>Average Annual OOP Premium (Single person household)</td>
<td>$502</td>
<td>$478</td>
<td>-24</td>
<td>-54*</td>
</tr>
<tr>
<td>Average Annual OOP Premium (Multi-person household)</td>
<td>$1222</td>
<td>$1230</td>
<td>8</td>
<td>-$25</td>
</tr>
<tr>
<td>Proportion of Households in which policyholder employed at small establishment</td>
<td>0.38</td>
<td>0.364</td>
<td>-0.016**</td>
<td>-0.0214**</td>
</tr>
<tr>
<td>Proportion of Households in which policyholder employed at private organization</td>
<td>0.761</td>
<td>0.734</td>
<td>-0.027**</td>
<td>-0.0033</td>
</tr>
<tr>
<td>Proportion of Households in which policyholder is a union member</td>
<td>0.203</td>
<td>0.236</td>
<td>0.033**</td>
<td>0.01*</td>
</tr>
</tbody>
</table>

Notes: Adjusted estimates generated from multivariate regression model estimates of each outcome on a chronic household indicator, household demographics, geographic region, MSA, and year indicators. Statistically significant difference in means or proportions denoted by **p<.01, *p<.05
Figure 2: Median Out-of-Pocket Spending across the Total Spending Distribution, Unadjusted Estimates

**Out-of-Pocket versus Total Spending**

- Non-chronic
- Chronic
Figure 3: Predicted Out-of-Pocket Spending across the Total Spending Distribution, Adjusted Estimates
Figure 4: Average Service-Specific Total Spending by Overall Total Spending ($1000s)
Figure 5: Average Service-Specific Coinsurance Rate by Overall Total Spending ($1000s), Conditional on Having Positive Service-Specific Spending

- **Office-based**
- **Outpatient**
- **Emergency Room**
- **Inpatient**
- **Dental**
- **Prescription Drugs**
Figure 6: Average Coinsurance across Service-Specific Categories for Three Total Spending Levels

### Average coinsurance by service type
(Total spending of $1750-$2000)

- **Office-based**
- **Outpatient**
- **ER**
- **Inpatient**
- **RX**
- **Dental**

### Average coinsurance by service type
(Total spending of $9,500-$10,000)

- **Office-based**
- **Outpatient**
- **ER**
- **Inpatient**
- **RX**
- **Dental**

### Average coinsurance by service type
(Total spending $15,000-$17,500)

- **Office-based**
- **Outpatient**
- **ER**
- **Inpatient**
- **RX**
- **Dental**