Child Health

Out-of-Pocket Financial Burden for Low-Income Families with Children: Socioeconomic Disparities and Effects of Insurance

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Objective. To determine whether socioeconomic disparities exist in the financial burden of out-of-pocket (OOP) health care expenditures for families with children, and whether health insurance coverage decreases financial burden for low-income families.

Data Source. The Household Component of the 2001 Medical Expenditure Panel Survey.

Study Design. Cross-sectional family-level analysis. We used bivariate statistics to examine whether financial burden varied by poverty level. Multivariate regression models were used to assess whether family insurance coverage was associated with level of financial burden for low-income families. The main outcome was financial burden, defined as the proportion of family income spent on OOP health care expenditures, including premiums, for all family members.

Data Collection/Extraction. We aggregated annual OOP expenditures for all members of 4,531 families with a child <18 years old. Family insurance coverage was categorized as follows: (1) all members publicly insured all year, (2) all members privately insured all year, (3) all members uninsured all year, (4) partial coverage, or (5) mix of public and private with no uninsured periods.

Principal Findings. A regressive gradient was noted for financial burden across income groups, with families with incomes <100 percent of the Federal Poverty Level (FPL) spending a mean of \$119.66 OOP per \$1,000 of family income and families with incomes 100–199 percent FPL spending \$66.30 OOP per \$1,000, compared with \$37.75 for families with incomes >400 percent FPL. For low-income families (<200 percent FPL), there was a 785 percent decrease in financial burden for those with full-year public coverage compared with those with full-year private insurance ($p<.001$).

Conclusions. Socioeconomic disparities exist in the financial burden of OOP health care expenditures for families with children. For low-income families, full-year public coverage provides significantly greater protection from financial burden than full-year private coverage.

Key Words. Financial burden, family coverage, health care costs, health care financing/insurance/premiums, socioeconomic disparities

Socioeconomic disparities have been documented for children and adults in access to and use of health care, and in health outcomes (Agency for Health-care Research and Quality 2003). Socioeconomic disparities may also exist in the financial burden of illness, particularly since low-income individuals are more likely to lack the protection of health insurance (Holl et al. 1995; Institute of Medicine Committee on the Consequences of Uninsurance 2001). Even with insurance, cost is still reported as a large barrier to receiving needed care for those with lower incomes (Davidoff 2004).

Data from the 1970s and 1980s showed that poor and inadequately insured children and families experienced a greater burden of out-of-pocket (OOP) expenditures (Berki et al. 1985; Newacheck and Halfon 1986b; Wyszewianski 1986; Dicker and Sunshine 1988; Rasell, Bernstein, and Tang 1994). Since then, Medicaid expansions and the State Children's Health Insurance Program (SCHIP) have improved access and utilization for low-income women and children (Long and Marquis 1998; Banthin and Selden 2003; Szilagyi et al. 2004). While it has been documented that insurance coverage improves access and use for low-income children and adults (Newacheck 1988; St. Peter, Newacheck, and Halfon 1992; Newacheck et al. 1998; Kasper, Giovannini, and Hoffman 2000; Dubay and Kenney 2004), it is not clear whether insurance coverage has the presumed effect of reducing the financial burden of OOP health care expenditures. Medicaid expansions for children appear to have reduced the financial burden for families of Medicaid-eligible children (Banthin and Selden 2003). However, these children still had greater financial burden than higher-income children, and more than one-fifth of their families paid more than 10 percent of their family income for their child's health care expenditures. Other data from the 1996 Medical Expenditure Panel Survey (MEPS) showed that poor families appeared to be less likely to be protected from catastrophic health care expenditures compared with higher income families, regardless of the type of insurance (Waters, Anderson, and Mays 2004).

It is important to consider the financial burden of health care expenditures at the level of the family, particularly since children's access, utilization,

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and insurance coverage are intertwined with that of their parents (Newacheck and Halfon 1986a; Hanson 1998; Guendelman and Pearl 2004). Catastrophic costs for one family member may create a financial burden felt by the whole family, and could affect the decision to seek and pay for care for other family members. The issue of family financial burden has not been examined since the enactment of SCHIP. Many states have focused recent policy initiatives toward extending SCHIP coverage to parents of eligible children in an attempt to improve access to care for both children and parents. Hence, understanding financial burden at the family level takes on added importance, especially for low-income families targeted by public programs like SCHIP. Additionally, the separate effects of income and insurance have not been assessed in a multivariate manner that also controls for potential confounders such as health status and utilization.

In order to address these gaps, the objectives of this study were as follows: (1) to determine whether socioeconomic disparities exist in the financial burden of OOP health care expenditures for families with children and (2) to determine the extent to which health insurance coverage decreases the financial burden of OOP health care expenditures for low-income families with children.

METHODS

Data Source

This was a cross-sectional family-level analysis using the 2001 MEPS. MEPS is a continuous panel survey designed to be representative of the U.S. civilian non-institutionalized population. The Household Component (HC) of MEPS collected data on individual members of participating households through a series of five rounds of interviews for overlapping $2\frac{1}{2}$ -year periods. In addition to collecting data from household interviews, one adult respondent in the household maintained diaries of health care use and expenditure information for all family members. The HC collected data in each round on each household member's use and expenditures for office- and hospital-based care, home health care, dental services, vision aids, and prescribed medicines; these data were summed across rounds to produce annual utilization and expenditure data. The pooled response rate for 2001 MEPS was 66 percent. This yielded a combined sample of 32,122 individuals and 12,852 families for the full-year 2001 MEPS.

Subjects

The subjects for this study were limited to families with at least one child under 18 years of age. Families were defined according to the Current Population

Survey (CPS) as two or more persons living together in the same household who are related by blood or marriage.

Dependent Variables

Our main outcome variable was the family's relative financial burden, defined as the ratio of OOP family health care expenditures per \$1,000 of family income. OOP expenditures were defined as the amount paid by the family for medical provider visits, nonphysician services, hospital inpatient stays, emergency room services, dental visits, home health care, and prescription medications. These expenditures included direct payments, deductibles, co-insurance, co-payments, and premiums. We measured OOP financial burden both with and without premiums included. The MEPS HC provided a monthly premium amount that we multiplied by the number of months of coverage to derive an annual premium. All family members with public insurance were assigned a premium value of zero, as premium data were not available for those publicly insured individuals who were required to pay modest premiums. We excluded 188 families with missing data on premiums from the analysis.

OOP expenditures for each family member were summed to create a variable reflecting the total family OOP expenditures. Each family's income was calculated by summing incomes across individual household members. For each family, we calculated the ratio of OOP expenditures per \$1,000 of family income. In order to remove the influence of outlier ratio values, we excluded from the analyses 71 families with incomes less than \$1,000. Financial burden estimates were computed by averaging the financial burden experienced by individual families. For example, the estimated relative financial burden for families below the poverty level was computed by taking the mean of the relative financial burden scores of each family in the group living below the poverty level (excluding those with incomes of less than \$1,000). To provide a better indication of the distribution of high OOP health care expenditures, we also calculated the percent of families spending more than 10 percent of income on OOP health care expenditures.

Independent Variables

Using Aday and Andersen's behavioral model of health care (Aday and Andersen 1975; Andersen 1995; Phillips et al. 1998), predisposing, enabling, and need variables were selected as independent variables that could affect health care use and expenditures in our multivariate analyses. Predisposing

variables included the following: family size, race/ethnicity of the reference person in the family, highest educational level attained by a family member, geographic region of residence, and residence in a metropolitan statistical area (MSA). Enabling variables included family income (in categories based on percent of the Federal Poverty Level [FPL]) and health insurance—divided into five mutually exclusive categories: (1) families with all members with private insurance all year, (2) families with all members with public insurance all year, (3) families with all members uninsured all year, (4) families with partial or intermittent insurance coverage, that is, at least one member uninsured at any time, or (5) families with a mix of private and public insurance with no uninsured periods. Need variables included: whether the worst reported health status of any family member was fair or poor, and whether any family member was reported to have any limitation of activity.

Statistical Analyses

To assess disparities in financial burden by income group, we used the *t*-test (for mean OOP expenditures per \$1000 of family income), and the χ^2 test (for whether OOP expenditures exceeded 10 percent of family income) to compare financial burden between the lowest income group and the highest. We examined the association between family insurance type and financial burden for low-income families using multivariate regression for the subpopulation of our sample with incomes below 200 percent FPL. We used semilog regression models that controlled for family size, race/ethnicity, education, region, MSA, health status, and presence of limitations. Separate regressions were run for OOP financial burden with and without premiums included in OOP expenditures. Because data on financial burden were skewed, we log transformed the data for the regression models and then back transformed the results for ease of interpretation. Since log transformation would cause families with zero OOP expenditures to drop out of the regressions, we added \$1 to all families' OOP expenditures to be able to retain those families with zero expenditures in the regressions.

All analyses were carried out with *STATA 8* (StataCorp 2003). Unless otherwise noted, sampling weights were used to represent the U.S. civilian noninstitutionalized population and standard errors were adjusted to account for the complex survey design.

FINDINGS

We identified 4,790 families with children under 18 years of age in the 2001 MEPS. After excluding 71 families with incomes <\$1,000 and 188 families

with missing data on premiums, we were left with a sample of 4,531 families. Table 1 shows the unweighted descriptive characteristics of these families. The mean family size was 4.0 people (Table 1). The race/ethnicity of the reference

Table 1: Descriptive Characteristics of Study Families

	<i>No. (%) or Mean</i>
Total families	4,531 (100)
Mean family size	4.0
Race/ethnicity of reference person	
White	2,436 (53.8)
Black	733 (16.2)
Hispanic	1,194 (26.4)
Other	168 (3.7)
Highest education level in family	
No degree	650 (14.4)
High school or equivalent	1,548 (34.2)
Some college	1,131 (25.0)
College or higher	1,202 (26.5)
Region of residence	
Northeast	688 (15.2)
Midwest	913 (20.2)
South	1,731 (38.2)
West	1,199 (26.5)
MSA	
Yes	3,654 (80.6)
No	877 (19.4)
Family income (% FPL)	
< 100	774 (17.1)
100–199	1,066 (23.5)
200–399	1,557 (34.4)
> 400	1,134 (25.0)
Insurance coverage	
Public insurance for all members all year	262 (5.8)
Private insurance for all members all year	1,930 (42.6)
All members uninsured all year	226 (5.0)
Partial insurance coverage	1,050 (23.2)
Mix of public and private insurance	1,063 (23.5)
Worst health status of any member	
Fair/poor	912 (20.1)
Good/very good/excellent	3,619 (79.9)
Family member with any limitation of activity	
Yes	760 (16.8)
No	3,771 (83.2)

Data are unweighted.

Percentages may not add to 100% because of rounding.

MSA, metropolitan statistical area; FPL, federal poverty level.

person for the family was white for the majority of families, Hispanic for 26 percent, and black for 16 percent. The highest level of education in the family was a high school degree for a third of families, some college for a quarter, and college or higher for another quarter. The largest proportion of families lived in the South (38 percent) and the lowest proportion lived in the Northeast (15 percent), and 81 percent lived in metropolitan areas. Family income was below the poverty level for 17 percent of these families, between 100 and 199 percent FPL for 24 percent, between 200 and 399 percent FPL for 34 percent, and above 400 percent FPL for 25 percent. Forty-three percent of families had all members insured all year with private insurance, 6 percent had all members insured all year with public insurance, 5 percent had all members uninsured all year, 23 percent had partial or intermittent insurance coverage (i.e., at least one member uninsured at any time), and 23.5 percent had a mix of private and public insurance with no uninsured periods. Twenty percent of families had a member with fair or poor health status, and 17 percent had a member with a limitation of activity.

Overall, families spent an average of \$2,657.97 on total OOP health care expenditures, with an average of \$1,505.28 for premiums and \$1,152.69 for health care services (Table 2). The mean family income was \$61,101.60. In terms of relative financial burden, which was calculated as the mean of each family's ratio of OOP expenditures to family income, families spent an average of \$59.95 per \$1,000 of family income for total OOP health care expenditures. Families spent \$31.10 per \$1,000 of family income on premiums and \$28.85 per \$1,000 of family income on other health care services

Table 2: Summary Table of Mean Out-of-Pocket Expenditures and Income for Families

	<i>Mean Out-of-Pocket Expenditures</i>			<i>Mean Income (\$)</i>
	<i>Health Services (\$)</i>	<i>Premiums (\$)</i>	<i>Total (\$)</i>	
Family income				
< 100% FPL	627.90	376.27	1,004.17	10,523.55
100–199% FPL	822.59	942.77	1,765.36	27,010.37
200–400% FPL	1,138.76	1,605.64	2,744.40	50,988.42
> 400% FPL	1,548.98	2,146.62	3,695.60	109,251.40
Total sample	1,152.69	1,505.28	2,657.97	61,101.60

n = 4,531 families in total sample.

Data are weighted.

FPL, federal poverty level.

Figure 1: Mean Out-of-Pocket Health Care Expenditures per \$1,000 of Family Income for Different Income Groups

(Figure 1). High levels of financial burden were concentrated in a relatively small percentage of families; only 15 percent of families had total OOP expenditures that were greater than 10 percent of income (Table 3).

Disparities in Financial Burden

Families in the lowest income group paid a disproportionately larger share of family income for total OOP expenditures than all other income groups (Figure 1). For families below poverty, the mean amount spent out of pocket per \$1,000 of income was \$119.66, while it was \$66.30 for families with incomes 100–199 percent FPL, \$55.97 with incomes 200–400 percent FPL, and \$37.75 for incomes > 400 percent FPL; this is a three-fold difference between the lowest and highest income groups ($p < .001$). The regressive nature of this relationship appears to be driven by OOP expenditures for health services, more so than premiums. The proportion of family income paid OOP for health services ranged from \$15.55 per \$1,000 of income for families with incomes greater than 400 percent FPL to \$75.25 per \$1,000 of family income for families with incomes below 100 percent FPL. A less pronounced income gradient is visible for the proportion of income going toward premiums, taking up \$44.41 per \$1,000 of income for families below the poverty level and \$22.20 per \$1,000 of income for families in the highest income group.

Table 3: Percent of Families with Out-of-Pocket Expenditures >10% of Family Income

	<i>Percent of Families Spending > 10% of Income on Out-Of-Pocket Expenditures for</i>		
	<i>Health Services (%)</i>	<i>Premiums (%)</i>	<i>Total (%)</i>
Family income			
< 100% FPL	19.1	9.8	28.3
100–199% FPL	5.8	11.5	22.2
200–400% FPL	3.1	6.4	14.8
> 400% FPL	1.4	2.1	6.3
Total sample	5.1	6.4	15.0

n = 4,531 families in total sample.
Data are weighted.
FPL, federal poverty level.

The regressive nature of OOP financial burden is also noted when considering the percent of families whose total OOP expenditures exceed 10 percent of income (Table 3). More than a quarter of families below the poverty level had total OOP health care expenditures that exceeded 10 percent of family income (28.3 percent), which was significantly more than the 6.3 percent of families with incomes > 400 percent FPL (*p* < .001). Again, the income disparity was more pronounced for OOP expenditures for health services than for premiums.

Role of Insurance

Recognizing that low-income families (< 200 percent FPL) experience a much higher financial burden than families with higher incomes, we conducted a separate analysis to determine which factors are associated with financial burden for families with low incomes. The results of the multivariate analysis in Table 4 demonstrate no significant difference in the financial burden of total OOP expenditures for low-income families in which all members had public insurance coverage for the whole year compared with families with all members uninsured all year. Families with full-year private insurance coverage for all members had significantly increased financial burden relative to uninsured families, with a 758 percent increase in burden (*p* < .001). Compared with uninsured families, those with partial insurance coverage had a financial burden that was 129 percent greater (*p* < .001), and those with a mix of private and public had a financial burden that was 353 percent greater (*p* < .001). When compared with full-year private coverage, full-year public coverage was associated with a 785 percent decrease in financial burden for low-income

Table 4: Multivariate Regression Results Examining Insurance Coverage as a Predictor of Financial Burden for Families with Income <200% FPL

	<i>Percent Change in OOP Expenditures per \$1,000 Income (n = 1,840)</i>	
	<i>Excluding Premiums</i>	<i>Including Premiums</i>
Public insurance for all members all year	– 17.3%	– 2.2%
Private insurance for all members all year	105%*	758%**
All members uninsured all year	Ref	Ref
Partial insurance coverage	46.2%	129%**
Mix of public and private insurance	70.9%	353%**

* $p < .05$;** $p < .001$.

Controlling for family size, race/ethnicity, education, region, residence in a metropolitan statistical area, health status, and limitation of activity.

Data are weighted.

OOP, out-of-pocket; FPL, federal poverty level.

families ($p < .001$). When premiums were excluded and only OOP financial burden for health services was considered, the greater burden for privately insured families relative to uninsured families was less pronounced but still significant. Again, no significant difference in financial burden was detected for families with public insurance coverage compared with uninsured families when premiums were excluded.

While low-income families with full-year public coverage did not have significantly different financial burden compared with those who were uninsured all year, they did have significantly better levels of access and utilization. Low-income publicly insured families had a higher mean number of physician visits per family member than those who were uninsured all year (3.6 versus 0.6, respectively; $p < .001$ by the t -test), and were less likely than low-income uninsured families to have a family member forgo needed care because the family needed money to buy food, clothing, or pay for housing (5.0 versus 22.1 percent, respectively; $p < .01$ by the χ^2 test).

DISCUSSION

Our findings show that socioeconomic disparities exist in the financial burden of OOP health care expenditures for families with children. Low-income families paid a substantially higher share of their income for OOP

expenditures compared with higher-income families. Additionally, a larger percentage exceeded a high level of financial burden for health care expenditures, with more than a quarter of families below the poverty level having total OOP health care expenditures exceeding 10 percent of family income. Because we found such a disproportionate burden for these families, we examined whether insurance coverage was effective in ameliorating the excess financial burden experienced by families with incomes below 200 percent FPL. For these families, continuous public coverage provided significantly better protection from financial burden than continuous private coverage, but was not associated with reduced financial burden compared with being uninsured all year.

Why does a disproportionate financial burden exist for low-income families, despite insurance coverage? Although public insurance programs have minimal cost sharing, covered services may be limited, especially for adults (Rosenbaum 2002). A large proportion of the privately insured poor may be underinsured (Short and Banthin 1995), and low-income children with private insurance are less likely than higher-income children to have dental and prescription drug coverage (Chen 2004). For low-income families, traditional private insurance policies with standard cost-sharing limits may not provide adequate protection against a large financial burden from OOP expenditures (Tu 2004). Additionally, health insurance premiums have been noted to be consuming an increasing proportion of earnings in recent years (Families USA 2004).

We were surprised to find that families with full-year public coverage did not experience a reduction in burden compared with uninsured families, given the minimal cost sharing in public programs, particularly for children. The salutary effects of public insurance for low-income families may be more pronounced in the area of improved access and use of care (St. Peter, Newacheck, and Halfon 1992; Long and Marquis 1998; Newacheck et al. 1998; Banthin and Selden 2003; Dubay and Kenney 2004; Szilagyi et al. 2004) than in reduction of financial burden. Indeed, we found that even though publicly insured and uninsured low-income families had the same level of financial burden, the publicly insured group did so with a greater level of utilization of physician visits and with less need to forgo needed care to pay for other important goods such as food and housing.

This study is unique and important in its focus on the family as the unit of analysis. Financial burden affects all members of a family. A large burden due to health care costs from one member could have consequences for a child or other family members, acting as a deterrent to seeking needed health care,

making it difficult for the family to afford other necessities, and causing increased family stress (Damiano et al. 2003; May and Cunningham 2004; Tu 2004). Historically, employer-based insurance coverage was often obtained at the family level, although increasing premium levels in recent years have made it more difficult for family coverage to be provided by employers and taken up by employees (Families USA 2004).

Our study has a number of limitations. We excluded 4 percent of families because of missing premium data; compared with families included in the analyses, families with missing premium data had either partial insurance coverage or a combination of public and private insurance, and were more likely to have low incomes. We do not believe that such a small amount of missing data should have altered our results substantially. Even if it had, it would probably have caused our findings for financial burden for lower-income groups to be underestimated.

The creation of family-level variables does not account for some of the complexities of heterogeneous families, but was necessary to create a clearer analysis. Categorizing insurance coverage at the family level is particularly difficult, as it involves multiple variations in the type of insurance and duration of coverage for each of several family members. We attempted to isolate the effect of type of insurance coverage on financial burden by separating out families with mixed type and duration of coverage; our study is less able to draw conclusions about these heterogeneous groups. Other studies have suggested that the uninsured and those with gaps in coverage report similar levels of cost and access problems (Schoen and DesRoches 2000; Collins et al. 2004). Our study also found no difference between low-income families with insurance gaps and those uninsured all year with respect to financial burden when premiums were excluded, although we found that families with insurance gaps had increased financial burden when premiums were included. Further research is needed to examine how family financial burden is affected by differences in the duration and type of coverage across family members.

There are some limitations to our measure of financial burden. Our measure of financial burden was a ratio of OOP expenditures to income, which could be heavily influenced by outliers, particularly for families with very low incomes. To limit the effect of outliers and skewed data, we excluded families with incomes less than \$1,000 and used log-transformed data. To test the sensitivity to outliers, we reconducted our analyses so that OOP expenditures were top coded not to exceed family income; this affected only seven families, and there was no meaningful change in our results. Despite use of diaries and record charts, expenditure data are difficult to collect accurately

in household surveys and are subject to recall bias, although the Medical Provider Survey component of MEPS helps to address this issue.

Despite these limitations, our study has a number of important policy implications. For low-income families with children, continuous public insurance coverage for all family members appears to provide better protection from financial burden than continuous private insurance. While continuous public insurance coverage for all members did not provide low-income families with a decreased proportion of income paid OOP for health care expenditures compared with uninsured families, it allowed for a greater number of physician visits per family member and reduced the proportion who had to forgo needed care to pay for other important goods such as food and housing. Low-income families may benefit from policies to extend public insurance programs to family members of eligible children, which may increase take-up of eligible children as well (Dubay and Kenney 2003). Caution should be exercised with policies to move low-income uninsured families into private insurance plans, particularly those with high deductibles, which could leave families at risk for high OOP expenses. Adjusting costsharing levels and premiums according to income might help reduce financial burden in private insurance plans.

In conclusion, we found that socioeconomic disparities exist in the financial burden of OOP health care expenditures for families with children. For low-income families, there is greater protection from financial burden with full-year public coverage for all family members than with full-year private coverage. Health insurers and policymakers should consider the effects of cost sharing on low-income individuals and their families to help prevent excessively burdensome OOP expenditures.

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