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Income Measurement in the Medical Expenditure Panel Survey (MEPS)

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1. Introduction

Accurate measures of individual and family income within health surveys are important for many types of health policy analyses. For example, analyses of trends in insurance coverage are more policy relevant when the groups who lack insurance can be characterized by income or poverty status. Effective policy responses often depend on income and poverty status. In particular, accurate income data are critical when using survey data to estimate who is eligible for public programs such as Medicaid and SCHIP and determining the associated take-up rates. Income also plays the crucial role of denominator when estimating the financial burden on families of out of pocket expenditures for health care.

Health policy analyses can suffer from significant biases if they depend on poorly measured and underreported income data. When income levels are underreported then the extent of poverty will be overstated. Eligibility for public programs will be overestimated and the associated take-up rates will be biased downwards. Estimates of financial burdens as a function of family income will also be biased upwards if income levels are underreported.

The Medical Expenditure Panel Survey (MEPS) is one of the major on-going household surveys used extensively to provide health policy analyses at the national level. Policymakers routinely depend on MEPS data to inform the policy process. In this paper we briefly describe how income data are collected in the MEPS based on a series of detailed questions about various possible sources of income. We compare MEPS and Current Population Survey (CPS) poverty status distributions overall and by important subgroups to show that MEPS income data benchmark relatively closely to estimates from the CPS. We then compare an experimental poverty status measure based on a single question recently added to the MEPS Round 1/3 instrument with the standard poverty status measure based on the more detailed MEPS income questions.

Finally, we illustrate the usefulness of detailed income questions, such as those asked in the MEPS, for simulating tax-adjusted income. Tax-adjusted, or disposable, family income is a more appropriate measure of income for examining financial burdens. We show how estimates of financial burden based on disposable income differ significantly from estimates based on pre-tax income.

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2. Collection of Income Data in the Medical Expenditure Panel Survey

The MEPS – Household Component is a survey of households designed to yield national estimates of insurance status, health care utilization and expenditures, employment and other important health and sociodemographic variables. The sample is a subset of the National Health Interview Survey (NHIS) sample and in 2002 included about 15,000 households in 195 primary sampling units. Interviews are conducted with a single household respondent but detailed information, including income data, is collected for every member of the household. Respondents are interviewed five times over two and a half years, providing information referencing a two calendar year period. The income supplement is administered twice, once for each year of survey participation, in the first half of the year following the reference year. In other words, the income supplement for calendar year 2002 was administered sometime between January and June of 2003. Questions vary by the type of tax form filed and are asked at the level of the tax filing unit, either the individual or a married couple filing jointly.

In the MEPS – Household Component data for each person in the household are collected about most types of taxable and non-taxable income including wages, interest, dividends, pensions, IRAs, unemployment compensation, workers compensation, social security, SSI, DI, public assistance, child support, cash transfers, royalties, rental income, food stamps, and veterans payments. In addition, long form filers are asked about tax refunds, alimony, business income (farm and non-farm), sales of assets, and trusts.

Total person level income can be summed across various family members depending on what family definition is required to create a family or unit level income measure. For example, in addition to CPS family units, the MEPS also defines Medicaid eligibility units and health insurance eligibility units. These units are based on narrower definitions of a family than the CPS definition of a family.

MEPS income data are carefully edited to fill in for missing and incomplete data prior to public release. Response rates for selected sources of income are provided in Table 4-a. The editing process relies on a sophisticated sequential hotdeck imputation program guided by regression analysis. The editing process makes use of other sources of information to guide the imputations and attempts to preserve key relationships between different sources of income. In particular, detailed questions about current employment status, current hours worked, number of weeks worked, wage and salary rates are asked of all household members age 16 in the employment section of the MEPS instrument. These data are used to fill in for missing data on annual earned income when necessary.

Information on wages is missing from the annual income supplement in about 22 percent of all cases. When information collected in the employment section is used to fill in, then the rate of missing data falls to less than 4 percent of all cases. In addition, the link to NHIS allows information on previous years' income to help guide imputations. For example, information collected in the NHIS on whether a person receives Social Security income (not the value of the Social Security payment) is used to impute for missing Social Security income in the MEPS.

3. Comparison of MEPS and CPS poverty distributions

The final population weights that are released with the full year income data for MEPS are post-stratified to CPS poverty status categories. Thus, we make sure that MEPS income and poverty distributions match exactly those in the CPS. Table 1 provides MEPS and CPS estimates of the distribution of the civilian, non-institutionalized population by poverty category. Small differences occur because MEPS income is top-coded after the post-stratification and prior to public release in order to preserve data confidentiality.

The post-stratification of MEPS data to CPS poverty categories does not accommodate all age and poverty groups. For example the youngest age cut includes persons age 0 and persons age 1 to 20. The top two poverty categories displayed in these tables are collapsed into one during the post-stratification. When we subset to several different policy relevant subpopulations the similarities in the distributions of MEPS and CPS poverty categories are slightly less exact but remain very similar (Tables 2-4). Among children under age 19, MEPS and CPS both report 17.2 percent living below the poverty line. For both children and the elderly, there are compensating differences in the distribution of these groups in the two highest poverty categories. MEPS estimates slightly more children living between 200 and 400 percent of poverty than the CPS (34.3 vs. 32.2 percent), and slightly fewer children living above 400 percent of poverty than the CPS (27.3 vs. 29.3). Among persons aged 65 and older, MEPS and CPS estimate a similar percent living below poverty (10.9 vs. 10.5) and the difference is not statistically significant. MEPS estimates more elderly living at 400 percent or higher than the CPS (32.7 vs. 26.3).

The uninsured are a very important subpopulation for both surveys and annual estimates of the number of uninsured from the CPS are reported widely every September as soon as they are released. The income distribution of this population is a key part of every analysis of the new estimates. Again we find that the surveys yield similar results and the small differences are not statistically significant. The MEPS, however, finds more uninsured between 100 and 400 percent of poverty than does the CPS.

4. Comparisons of Single Income Question vs Detailed Income Questions

An experimental question was added to the MEPS as of 2003 asking respondents to estimate their total household income within a range. Depending on the size of the reporting unit and the age of the household head, respondents were shown a card that provided family income ranges corresponding to five poverty status categories. The five categories included: 1. below poverty; 2. 100 to 150 percent of poverty; 3. 150 to 200 percent of poverty; 4. 200 to 300 percent of poverty; and 5. 300 percent or more.

Although a single income question for the entire family is unlikely to be as accurate as a series of more specific income questions, the single question was added to the MEPS because of the potential to publicly release a poverty status categorical variable much

earlier than the standard income measure based on the detailed questions. In Tables 5 through 9 we show how well this single question income measure compares to the detailed questions income measure. For this part of the analysis, we subset to individuals in Panel 7, Round 3 who have positive responses for the single income question on family income.

[Table 5 will be rerun with weighted frequencies.] As expected, the distribution of the population across poverty categories indicates that people underestimate their family income when asked a single question rather than a series of more detailed questions. The distribution is shifted towards the lower income levels based on the single question compared with the detailed questions....

Table 6 shows that 63.1 percent of individuals with positive responses for the single income question provided data that matched the more detailed information collected later for the same calendar year. But 26.2 percent underreported their family income while 10.7 percent overestimated their family income. When we break down the comparisons by poverty category, we see that less than half of the middle categories are providing information consistent with the more detailed responses. For example, only 32.7 percent of those with income between 150 and 200 percent of poverty according to the detailed questions are providing responses to the single question that are consistent.

One of the main reasons to include a single question on family income in the MEPS Rounds 1 and 3 instrument is to use it in conjunction with the MEPS estimates of insurance status in the so-called Point in Time files. These files are released much earlier than the full year files that include the detailed income variables. We compare insurance status by poverty status according to the two different measures in Table 7 for the entire population and in Table 8 for children.

Taking into account the standard errors, the distributions by insurance and poverty status are not significantly different between the two income measures. Nonetheless, if we restrict our analyses to the point estimates, looking at the first row of each of the three panels in Table 7, we find that the single income question overestimates the percent of people in poverty who are covered by private insurance (24.3 vs 21.9), underestimates the percent who have public coverage (51.3 vs 55.6), and overestimates the percent who are uninsured (30 vs 27.9). The pattern is similar when we subset to children less than 18 as shown in Table 8. These differences are meaningful in terms of public policy.

5. Comparisons of Financial Burdens by Reported Income vs. Tax-Adjusted Income

In addition to providing more accurate estimates of individual and family income, the detailed series of income questions included in the MEPS income supplement also permit analysts to simulate tax payments and marginal tax rates. These simulated tax rates are useful in many research projects related to tax subsidies and health insurance. Furthermore, estimates of disposable family income (income less tax payments) are more appropriate when estimating the percent of family income spent on health care services and out of pocket premiums.

Table 9 shows how tax-adjusted income compares with reported income at the level of the health insurance eligibility unit. This definition of a family unit includes all members of family who would normally be eligible for coverage under a family insurance policy, including spouses and children under age 19 or full-time students up to age 24. Mean reported family income is \$37,169 compared to a mean tax-adjusted family income of \$30,267. As the distribution in the table indicates, the differences are greater at the higher end of the income distribution.

Using tax-adjusted family income rather than reported family income in the denominator of a ratio results in different point estimates of people living with high financial burdens. In Table 10 we compute the ratio of family out of pocket expenditures as a percent of family income, using two measures of family income. Individuals living in families that spend 10 percent or more of total family income on out of pocket health care expenditures are deemed to have a high financial burden. The first row of Table 10 indicates that 9.4 percent of the population has a high burden when we use reported family income in the denominator, while 10.2 percent of the population have a high burden when we use tax-adjusted family income in the denominator. These differences are larger among the older individuals, elderly, whites, and middle to upper income individuals. Although these differences are not statistically significant they do have policy significance.

6. Discussion

In a period of rapidly rising health care costs combined with continued high levels of uninsurance, health policy analysts will need to track changes over time by income and poverty status. Policymakers will likely need to devise various policy interventions based in part on income and poverty status. Health policy analysts continue to debate the success of existing public insurance programs and the possibility of future expansions of such programs as part of an incremental approach to policy change. For all of these reasons and others, accurate and timely income data are a critical component of major health surveys.

Studying the impacts of SCHIP and Medicaid require researchers to identify those eligible for the programs and this depends critically in accurate income measurement. In addition, the new Medicare Part D has income-based subsidies, thus accurate income measurement will be critical in studying the impact of the MMA in the future.

With respect to eligibility criteria for various public insurance programs such as Medicaid and SCHIP, in addition to complicated rules on what types of income are included or excluded, there are also complicated rules as to whose income is counted. Thus, income earned by an uncle, aunt, grandmother, or stepfather is not necessarily counted when determining eligibility of a child. Therefore a survey that collects income for each individual in the household or family is more flexible than a survey that collects information for the entire family unit.

The MEPS administers a detailed income supplement that produces income and poverty status estimates that are post-stratified to match the Current Population Survey's distributions, the nation's official source of poverty statistics. The flexibility of the MEPS design also supports formation of different family definitions depending on the analytic needs. The MEPS supports a simulation model that estimates tax payments and marginal tax rates. MEPS data is also used in another simulation model that estimates eligibility for public insurance programs, including Medicaid and SCHIP.

On-going methodological research aims to improve the quality, timeliness, and utility of MEPS income data. Future improvement to the single income question may combine answers to the single income questions with simulations of earned income based on employment status data.

Table 1. Distribution of Total Population by Poverty Categories, MEPS vs. CPS, 2002

Percent of Poverty Line	MEPS	CPS
0-<100	12.4	12.3
100-<200	18.3	18.4
200-<400	31.6	31.8
400+	37.8	37.6

Table 2. Distribution of Children Under Age 19 by Poverty Categories, MEPS vs. CPS, 2002

Percent of Poverty Line	MEPS	CPS
0-<100 %	17.2	17.2
100-<200 %	20.5	21.2
200-<400 %	34.3	32.3
400% +	27.3	29.3

Table 3. Distribution of Elderly Age 65 and Over by Poverty Categories, MEPS vs. CPS, 2002

Percent of Poverty Line	MEPS	CPS
0-<100 %	10.9	10.5
100-<200 %	27.0	28.0
200-<400 %	29.4	35.3
400% +	32.7	26.3

Table 4. Distribution of Uninsured by Poverty Categories, MEPS vs. CPS, 2002

Percent of Poverty Line	MEPS	CPS
0-<100 %	22.5	24.3
100-<200 %	31.8	29.0
200-<400 %	30.9	29.2
400% +	14.9	17.4

Table 4-a. Response Rates for Selected Sources of Income among all Primary Filers and Aged Primary Filers, MEPS, 2002

	All Primary Filers, 18 and over	Primary Filers, Age 65 and over
Wages: w/o employment data	78.2%	74.8
Wages: w/ employment data	96.3	97.5
Interest	84.2	76.5
Dividend	86.3	78.2
Pension	90.8	82.6
Social Security	90.0	72.4*
SSI	97.3	93.5
Welfare	98.0	95.7

* NHIS information on reciprocity of Social Security is used to guide imputations for missing Social Security income

Table 5. Comparing Poverty Distributions, Single Income Question vs Detailed Income Questions, MEPS, 2002

Percent of Poverty Line	Single Question (SE)	Detailed Questions (SE)
0-<100 %	14.9 (.61)	11.8 (.48)
100-<150 %	11.6 (.51)	8.6 (.42)
150-<200 %	11.3 (.50)	9.1 (.44)
200-<300 %	17.4 (.68)	18.7 (.73)
300% +	44.9 (.93)	51.8 (.92)

Table 6. Differences in Poverty Status, Single Income Question vs. Detailed Income Questions, MEPS, 2002

Poverty Status based on Detailed Questions	Poverty Status Based on Single Income Question Compared to Poverty Status Based on Detailed Income Questions <i>percent distribution (SE)</i>		
	Lower	Equal	Higher
All persons	25.9 (.78)	63.7 (.86)	10.5 (.48)
0-<100 %		71.4	28.6
100-<150 %	32.3	41.5	26.2
150-<200 %	45.8	33.9	20.3
200-<300 %	41.1	42.9	16.0
300% +	21.7	78.3	

Table 7. Insurance Status by Two Measures of Poverty Status, All Persons, MEPS, 2002

	Using Detailed Questions	Using Single Income Question
<i>Percentage of Persons with Private Insurance by Poverty Status</i>		
<100% FPL	21.9	24.3
100-150% FPL	36.8	40.1
150-200% FPL	48.5	54.9
200-300% FPL	68.7	75.9
>300% FPL	86.5	89.6
<i>Percentage of Persons with Public Insurance by Poverty Status</i>		
<100% FPL	55.6	51.3
100-150% FPL	43.0	40.9
150-200% FPL	35.1	29.0
200-300% FPL	22.3	20.9
>300% FPL	13.6	12.0
<i>Percentage of Persons without Any Coverage by Poverty Status</i>		
<100% FPL	27.9	30.0
100-150% FPL	30.4	28.4
150-200% FPL	27.3	25.8
200-300% FPL	18.2	13.8
>300% FPL	8.5	7.0

Table 8. Insurance Status by Poverty Status, Children less than 18, MEPS, 2002

	Using Detailed Questions	Using Single Income Question
<i>Percentage of Children with Private Insurance by Poverty Status</i>		
<100% FPL	16.0	16.2
100-150% FPL	31.0	38.2
150-200% FPL	47.9	53.1
200-300% FPL	68.4	75.9
>300% FPL	89.8	92.1
<i>Percentage of Children with Public Insurance by Poverty Status</i>		
<100% FPL	68.8	65.2
100-150% FPL	50.1	47.6
150-200% FPL	36.3	30.8
200-300% FPL	21.9	17.5
>300% FPL	5.4	3.9
<i>Percentage of Children without Any Coverage by Poverty Status</i>		
<100% FPL	18.8	22.3
100-150% FPL	23.3	18.8
150-200% FPL	20.0	19.2
200-300% FPL	12.6	9.9
>300% FPL	6.8	5.7

Table 9. Comparing Tax-Adjusted Family Income with Reported Family Income, MEPS, 2002,

Analyses at Family Level	Reported Family Income, not adjusted for taxes	Tax-Adjusted Family Income
Mean	\$37,169	\$30,267
75 th percentile	\$50,022	\$41,419
50 th percentile (median)	\$25,000	\$22,720
25 th percentile	\$11,094	\$10,987

Table 10. Comparing Rates of High Financial Burdens Calculated as Percent of Reported Family Income vs. as Percent of Tax-Adjusted Family Income, MEPS, 2002

Analyses at Individual Level	Percent Living in Family with High Financial Burden	
	Total out of pocket expenditures 10 % or more than reported family income	Total out of pocket expenditures 10% or more than tax-adjusted family income
All persons	9.4	10.2
Age Categories		
0-18	5.9	6.4
19-34	4.4	4.9
35-44	5.5	6.2
45-64	9.7	11.5
65+	28.4	30.0
Gender		
Male	7.7	8.6
Female	10.7	11.8
Race/Ethnicity		
Black, non-Hispanic	7.7	8.2
Hispanic	6.3	6.5
White and all others	10.0	11.2
Poverty Status		
< 100%	23.1	23.2
100-<200%	16.9	17.0
200-<400%	7.8	9.2
400% +	2.2	3.5
Health Status		
Excellent/VGood/Good	7.0	8.0
Fair/Poor	27.3	28.7
Insurance Status by Age		
Private, 0-64	4.7	5.8
Any Public, 0-64	12.6	12.7
Uninsured all year, 0-64	9.7	10.6
Medicare only, 65+	36.2	37.8
Medicare, plus private, 65+	24.5	26.2
Medicare, plus public, 65+	30.8	32.4