*Misclassification in an experimental poverty measure*

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*A test of poverty misclassification using data from the Consumer Expenditure Survey does not support the contention that medical needs must be treated differently than other needs in the measurement of poverty.*

Among the recommendations and proposals from a National Research Council panel's 1995 report, *Measuring Poverty: A New Approach*,[i] perhaps the most controversial was the treatment of medical needs. The panel proposed poverty thresholds that reflected needs for food, clothing, shelter, and "a little more." These thresholds varied geographically and by *family-type*. However, the panel concluded that medical needs vary too much to include in poverty thresholds. Instead, *family-specific* amounts of medical out-of-pocket spending (*moop*) are to be subtracted from each individual family's actual income.[ii] Remaining income would be tested against a poverty threshold that included nothing for medical needs. The panel also proposed development of a companion "medical care risk index" to "…monitor people's risks of incurring medical care costs that exceed their ability to pay…."[iii]

According to the panel, if medical needs were included in the thresholds, "… the result would be that it would be very easy to make an erroneous poverty classification."[iv] We know that the distribution of medical expenditures is much more skewed than the distribution of expenditures for food, shelter, and clothing. Some families may not need any medical care during a year, while a small number of others require very expensive care. Poverty thresholds with typical amounts for medical needs for each *family type* would lead us to misclassify some of the former as poor and some of the latter as not poor.

The panel's report did not try to estimate how much poverty misclassification would result from including medical needs in the thresholds. Such an estimate is made below using Consumer Expenditure Survey (CE) data. Tabulated results show:

1. *Family-type* measures of need do indeed misclassify some families.
2. The poverty misclassification that results from including medical out-of-pocket spending needs in the poverty thresholds is not much, if any, more severe than the misclassification that results from including other needs.

The question is significant because the NRC proposal to make subtraction of each family's *moop* from income a necessary stage in poverty classification

would impose a significant burden on producers and users of poverty statistics. If including medical needs in a new poverty threshold does not lead to more misclassification than including other needs, then it may not be necessary to impose these substantial costs.

*Research sample*

Because medical expenditures usually do not occur uniformly over the year, only consumer units that provided four quarters of interview expenditure data in the 2000-02 CE panels were selected for the research sample. Three panels of data are combined to produce a reasonably large sample (n=13,277) for distributional analysis. To reflect sample design effects, sample weights from the last interview are employed. The research sample does not reflect the population at any actual point in time, although the distribution corresponds roughly to a sample gathered over three years. Percentages and means, but no aggregates, are used in the analysis that follows.

Because consumer units may change composition over the course of a year, individuals benefiting from expenditures reported quarterly may not be the same ones present and counted at the last interview.[v] When the key calculations on Table 3 were replicated with a subsample created to eliminate most consumer units with composition changes, the results were practically identical.

As with other panel surveys, sample loss in the CE is significant, and selecting only those who remain in the sample introduces bias. Table 1 compares the distribution of the four-quarter CE sample to another CE sample that includes the second interview of all 2001 panel consumer units (the first interview in which expenditure data are collected) when sample loss would be minimized.[vi] The four-quarter research sample is a little older and a little more likely to be married than the second-interview sample.

Table 2 compares mean *moop* amounts for the same demographic subgroups in the CE four-quarter research sample and the public use file for the 2000 Medical Expenditure Panel Survey (MEPS), a survey designed specifically to measure health expenditures. The MEPS 2000 public use file did not include amounts that households spent for health insurance premiums, so mean household expenditures from this survey are compared to total medical expenditures minus health insurance premiums in the CE. When health insurance premiums are excluded from *moop* in the CE data, mean amounts of remaining *moop* (in 2000 dollars) are reasonably close to household spending in the benchmark MEPS.

*Poverty misclassification due to family-type measures of need*

The panel's proposed thresholds reflecting needs for food, clothing, shelter, and "a little more" are the same for all families in a given location with the same numbers of adults and children. However, like medical needs, needs for food,

clothing, and shelter[vii] vary for families with the same numbers of adults and children in the same locality. In other words, needs for items included in the panel's threshold vary among families in ways not accommodated by variations in those thresholds. For example, feeding and clothing teenage children cost more than feeding and clothing infants. Housing need, which is the largest component in most families' budgets, varies as well. The Department of Housing and Urban Development would say that a couple with two teenaged boys would qualify for a two bedroom apartment, but a couple with a teenaged boy and a teenaged girl needs three bedrooms. Further, housing choices may be constrained by supply. From time to time, HUD estimates how much demand for housing by low-income families exceeds the affordable supply.[viii] To the extent that it does, some families must pay more than the *family-type* amounts for housing implicit in the panel's thresholds because more affordable housing is unavailable, and not because they choose to substitute more consumption of housing for other discretionary consumption.

The panel concluded that housing need could be measured by *family-type* while medical needs must be *family-specific* because including *moop* in the thresholds would lead to too much "erroneous poverty classification." Table 3 attempts an actual test of the misclassification. Such a test requires an assumption, although one that is weaker than the panel's assumption that, for purposes of poverty classification, all *moop* spending is necessary. The following assumption is adopted:

> Families are no more likely to make discretionary expenditures on shelter that leave insufficient resources for non-shelter needs than they are to make discretionary expenditures on *moop* that leave insufficient resources for non-medical needs.

Of course both types of poverty-inducing discretionary spending may occur, but it is assumed here that one type is no more likely than the other. To estimate poverty misclassification, spending of either type that leaves a family with remaining spending (or income) below its threshold will be regarded as not discretionary.

For consumer units in the four-quarter CE research sample described earlier, poverty thresholds that include amounts for food, clothing, shelter, out-of-pocket medical expenditures, and "a little more" were calculated.[ix] Conceptually, these thresholds approximated the experimental thresholds based on a variation of the NRC proposal and labeled "MIT" (*moop*-in-threshold) in the most recent Census experimental poverty report.[x] The panel first estimated a threshold for a reference family of two adults and two children, then applied family equivalence scales to vary this reference family threshold by family composition. The reference family threshold used in the current analysis is $19,527, which is the four-quarter threshold including *moop* from Table A-11 of P60-216. This reference family threshold was updated with the CPI-U for all items, then varied

by family composition, presence of members aged 65 or older, disability, health insurance status, and geography based on parameters from the Census report, to the extent that the CE public use file variables permitted such specification. These thresholds were compared to corresponding annual expenditure levels, as follows.

*MIT – moop-in-threshold:* a poverty basket that includes all the items in the panel's threshold proposal, plus amounts for medical out-of-pocket expenditures, is compared to total annual expenditures, other than purchase of cars or trucks. [xi]

*MS – moop-subtracted:* the same basket, but with nothing for *moop*, is compared to total expenditures minus *moop*.

*MITHS – moop-in-threshold-housing-subtracted:* MIT with nothing for shelter needs[xii] is compared to total expenditures minus shelter.

Assuming that units will not spend on *moop* unnecessarily with the result that spending on other needs falls below the threshold level, a unit that is not MIT poor but poor when *moop* is subtracted in MS may be deemed to be erroneously classified as not poor by MIT. For purposes of comparison, units poor under MIT and not under MS will be deemed erroneously classified poor by MIT.[xiii] Similarly, assuming that units will not spend unnecessarily on shelter to the extent other spending falls below the threshold, a unit not poor under MIT but poor when shelter is subtracted in MITHS will be judged to be erroneously classified as not poor by MIT.

Table 3 presents results from this exercise.[xiv] The first and third columns of numbers show first the percentage misclassified as not poor using the *family-type* measure of *moop* in MIT, then the percentage misclassified as poor. Column five shows the total misclassification one way or the other due to including *moop* in the thresholds, and six shows the net misclassification. Columns seven through twelve are a similar presentation subtracting shelter spending from MIT and total spending.

In the third and fourth rows of Table 3, the thresholds are the same, but they are tested against annual after-tax money income plus the value of food stamps received during the year. As appropriate, expenditures on *moop* and shelter are subtracted from this annual income before it is tested against the thresholds.[xv]

By the measures on Table 3, *family-type* measures of shelter need result in less *net* misclassification than *family-type* measures of *moop*, but more *total* poverty misclassification.[xvi] The differences are not as great with income poverty as with expenditure poverty, but directions are the same.[xvii]

If the characteristics of families misclassified as poor and not poor are similar in relevant ways, then an argument can be made that net misclassification is what really matters. However, Appendix Table A, which distributes the misclassification of *expenditure* poverty from Table 3, shows that using *family-type* measures changes the distribution of poverty a little. Appendix Table B, which presents the distribution of expenditure poverty under MIT, MS, and MITHS, and Appendix Table C, which presents the corresponding family poverty rates, allow comparisons of the net effects of the misclassifications.

As expected based on the panel's report, subtracting *moop* from both thresholds and income appears to increase the share of the poor who are aged, white, and married. (Standard errors are large.) In fact, 37 percent of the units misclassified as not poor by MIT have heads aged 75 or older. *Family-type* measures of shelter need appear to increase the share of the poor who live alone, perhaps suggesting need for further consideration of equivalence scales.

With different choices (e.g., the level for the reference family threshold, the shares of the threshold deemed to be for *moop* and shelter, the geographic adjustments, and various equivalence scales), levels of both total and net misclassification can be increased or decreased. However, the patterns on Table 3 persist in a wide range of alternatives. Both *family-type* measures introduce considerable error. But the differences in misclassification on Table 3 do not lend support to the contention that *moop* must be measured *family-specific* while a combined *family-type* threshold is sufficient for other needs.

Moreover, like the panel's proposal, the comparison on Table 3 assumes that all household medical spending is out of current income. If it isn't, then too much income is being subtracted in MS. In that case, the percentage misclassified as not income poor on Table 3 may be overstated and the percentage misclassified as income poor may be understated – moving both measures closer to parallel shelter need misclassifications on Table 3. That assumption will be addressed briefly in closing.

*How much moop in CE and MEPS is really out-of-pocket?*

When the panel subtracts *family-specific* amounts of *moop* from *family-specific* amounts of income, two assumptions are involved, but there has been more attention to the first than the second. First, it is assumed that actual *family-specific moop* is all necessary spending. This assumption was famously challenged in John Cogan's dissent from the panel's report.[xviii] Second, the panel assumes that all actual *moop* spending is funded out of *current income*, so that the remainder after subtracting *moop* from current income is the amount available for food, clothing, shelter, and a little more.[xix] However, none of our sources of data tells us how much household health spending is actually out-of-pocket (although the Consumer Expenditure Survey comes close).

In both CE and MEPS, 1-2 percent of all families report medical spending that exceeds their income. These extreme cases illustrate a broader point. Families with medical spending that is very high in relation to current income may nonetheless have resources for expenditures for food, clothing, and shelter if they can finance some spending out of dissaving or borrowing.[xx] We don't have a good measure of the extent to which unusually high medical costs are financed from sources other than current income. But a corollary of my earlier assumption is:

> If they can, families will finance medical spending out of dissaving and borrowing rather than reduce expenditures for food, clothing, and shelter below necessary levels.

It is well beyond the scope of this analysis to assess the NRC panel's choice not to expand the definition of economic resources in poverty measurement to include assets and debts.[xxi] However, to the extent that families faced with high medical costs do sometimes draw on wealth not included in the proposed poverty resource definition, subtracting total medical costs from resources included in the resource definition introduces error.

*Concluding remarks*

The analysis presented here finds that needs for medical out-of-pocket expenditures may be included in a poverty threshold without misclassification effects that are much more severe than those associated with including shelter needs. That is good news for two reasons. First, despite Pat Doyle's good work, [xxii] we remain far from being able to implement the NRC panel's companion recommendation for a "medical care risk index." Without this companion measure, the panel's proposed poverty threshold might not detect the deprivation of families that forego necessary medical care because they cannot afford it. Second, subtracting estimates of each individual family's out-of-pocket medical expenditures as a stage in determining poverty status would impose a serious practical burden on agencies that produce poverty statistics and analysts who use them. The finding here is that there is little empirical evidence justifying imposition of that burden.

We want our means-tested assistance programs to accommodate *family-specific* variation in need, and some do by making adjustments to countable income for unusually high actual expenditures for housing and medical care. However, for the statistical measure of poverty, *family-type* measures of medical needs are not significantly more error-prone than *family-type* measures of some other needs we include in the poverty thresholds.

**Table 1. Distribution of consumer units**

| | | 2000-02 CE pct.of column | 2000-02 CE std.err. | 2001 CE interview 2 pct.of column | 2001 CE interview 2 std.err. |
|---|---|---|---|---|---|
| | male | 51.4% | 1.0% | 52.0% | 1.0% |
| | female | 48.6% | 1.0% | 48.0% | 1.0% |
| | white | 84.2% | 0.7% | 83.8% | 0.7% |
| | black | 11.6% | 0.4% | 11.7% | 0.4% |
| | other | 4.1% | 0.6% | 4.5% | 0.6% |
| age | | | | | |
| | up to 21 | 0.9% | 0.2% | 4.3% | 0.8% |
| | 22 to 44 | 38.9% | 0.5% | 43.1% | 0.6% |
| | 45 to 54 | 21.7% | 0.4% | 20.2% | 0.4% |
| | 55 to 59 | 8.1% | 0.3% | 7.5% | 0.4% |
| | 60 to 64 | 6.9% | 0.3% | 5.6% | 0.3% |
| | 65 to 74 | 12.2% | 0.2% | 10.0% | 0.3% |
| | 75 and older | 11.3% | 0.2% | 9.3% | 0.4% |
| family size | | | | | |
| | 1 | 26.4% | 0.7% | 29.7% | 0.8% |
| | 2 | 32.2% | 0.7% | 31.1% | 0.8% |
| | 3 | 16.1% | 0.4% | 15.2% | 0.6% |
| | 4 | 14.8% | 0.4% | 14.0% | 0.4% |
| | 5 | 6.6% | 0.3% | 6.3% | 0.3% |
| | more | 3.9% | 0.3% | 3.7% | 0.3% |
| children | | | | | |
| | 0 | 64.8% | 0.4% | 65.0% | 0.6% |
| | 1 | 14.5% | 0.4% | 14.5% | 0.6% |
| | 2 | 13.4% | 0.4% | 13.2% | 0.4% |
| | 3 | 5.1% | 0.3% | 5.2% | 0.3% |
| | more | 2.2% | 0.2% | 2.0% | 0.2% |
| 65 or older | | | | | |
| | 0 | 73.5% | 0.3% | 78.1% | 0.6% |
| | 1 | 18.0% | 0.4% | 14.7% | 0.6% |
| | 2 | 8.4% | 0.3% | 7.1% | 0.3% |
| | more | 0.1% | 0.0% | 0.0% | 0.0% |
| marital status | | | | | |
| | married | 57.0% | 0.8% | 51.6% | 0.8% |
| | formerly married | 28.6% | 0.8% | 28.1% | 1.1% |
| | never married | 14.4% | 0.5% | 20.3% | 1.0% |
| education | | | | | |
| | under age 25 | 3.0% | 0.2% | 8.4% | 0.9% |
| | did not finish HS | 15.5% | 0.5% | 14.5% | 0.6% |
| | HS diploma | 28.9% | 0.8% | 26.7% | 0.8% |
| | some college | 26.4% | 0.7% | 25.4% | 0.7% |
| | college degree | 26.2% | 0.8% | 24.9% | 0.8% |
| welfare | | 1.5% | 0.2% | 0.1% | 0.0% |
| work limitation | | 5.3% | 0.3% | 4.6% | 0.3% |
| region | | | | | |
| | 1 | 19.5% | 0.5% | 19.0% | 0.6% |
| | 2 | 23.3% | 0.9% | 23.2% | 0.6% |
| | 3 | 36.2% | 0.9% | 35.7% | 1.0% |
| | 4 | 21.0% | 0.9% | 22.2% | 0.8% |

Standard errors from replicate weights.

**Table 2. Mean annual amounts of medical out-of-pocket expenditures**

| | | moop excluding insurance premiums, in 2000 dollars | |
|---|---|---|---|
| | | 2000-02 CE | 2000 MEPS |
| total | | 1,073 | 1,013 |
| | male | 1,137 | 1,054 |
| | female | 1,005 | 965 |
| | white | 1,171 | 1,095 |
| | black | 518 | 562 |
| | other | 634 | 734 |
| age | | | |
| | up to 21 | 310 | 224 |
| | 22 to 44 | 697 | 689 |
| | 45 to 54 | 1,125 | 1,112 |
| | 55 to 59 | 1,254 | 1,235 |
| | 60 to 64 | 1,511 | 1,272 |
| | 65 to 74 | 1,503 | 1,567 |
| | 75 and older | 1,468 | 1,637 |
| family size | | | |
| | 1 | 793 | 657 |
| | 2 | 1,332 | 1,196 |
| | 3 | 1,094 | 1,131 |
| | 4 | 1,045 | 1,169 |
| | 5 | 1,034 | 1,222 |
| | more | 902 | 1,560 |
| children | | | |
| | 0 | 1,141 | 995 |
| | 1 | 974 | 933 |
| | 2 | 933 | 1,075 |
| | 3 | 991 | 1,142 |
| | more | 762 | 1,530 |
| 65 or older | | | |
| | 0 | 919 | 842 |
| | 1 | 1,321 | 1,364 |
| | 2 | 1,875 | 2,175 |
| | more | 2,888 | 3,099 |
| marital status | | | |
| | married | 1,338 | 1,309 |
| | formerly married | 847 | 936 |
| | never married | 467 | 421 |
| education | | | |
| | under age 25 | 346 | 367 |
| | did not finish HS | 790 | 953 |
| | HS diploma | 970 | 1,015 |
| | some college | 1,125 | 1,074 |
| | college degree | 1,383 | 1,197 |
| welfare | | 365 | 285 |
| work limitation | | 907 | 1,523 |
| region | | | |
| | 1 | 951 | 1,074 |
| | 2 | 1,114 | 1,075 |
| | 3 | 1,088 | 1,021 |
| | 4 | 1,112 | 893 |

**Table 3. "Erroneous poverty classification"**

| | subtracting moop | | | | | | subtracting shelter | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MIT not poor to MS poor = misclassifed not poor | std. err. | MIT poor to MS not poor = misclassified poor | std. err. | total erroneous poverty classification | net rate change with MS | MIT not poor to MITHS poor = misclassifed not poor | std. err. | MIT poor to MITHS not poor = misclassified poor | std. err. | total erroneous poverty classification | net rate change with MITHS |
| expenditure poor | | | | | | | | | | | | |
| all CUs | 2.9% | 0.3% | 0.1% | 0.0% | 2.9% | 2.8% | 2.6% | 0.3% | 2.9% | 0.3% | 5.5% | -0.3% |
| with aged | 6.5% | 0.9% | 0.2% | 0.2% | 6.7% | 6.3% | 4.4% | 0.7% | 4.8% | 0.6% | 9.3% | -0.4% |
| post-tax income poor | | | | | | | | | | | | |
| all CUs | 3.0% | 0.4% | 0.1% | 0.0% | 3.1% | 3.0% | 4.3% | 0.3% | 1.4% | 0.2% | 5.7% | 2.9% |
| with aged | 7.3% | 0.9% | 0.3% | 0.1% | 7.6% | 7.0% | 7.8% | 0.8% | 2.4% | 0.4% | 10.2% | 5.3% |

note: moop share in the thresholds at .08, adjusted by moop equivalence from P60-216

note: shelter share in the thresholds at .4, adjusted by geographic factors from P60-216

**Appendix Table A. Distribution of "erroneous poverty classification"**

| | subtracting moop MIT not poor to MS poor | | subtracting shelter MIT not poor to MITHS poor | | MIT poor to MITHS not poor | |
|---|---|---|---|---|---|---|
| | pct. of column | std. err | pct. of column | std. err | pct. of column | std. err |
| total | | | | | | |
| male | 47.2% | 4.6% | 40.4% | 5.0% | 47.1% | 4.2% |
| female | 52.8% | 4.6% | 59.6% | 5.0% | 52.9% | 4.2% |
| white | 86.4% | 2.8% | 70.0% | 6.1% | 78.2% | 3.3% |
| black | 10.1% | 2.3% | 21.2% | 4.1% | 17.1% | 3.2% |
| other | 3.6% | 1.4% | 8.8% | 4.7% | 4.7% | 1.9% |
| age | | | | | | |
| up to 21 | 1.2% | 1.1% | 1.9% | 1.4% | 1.6% | 0.8% |
| 22 to 44 | 12.7% | 2.7% | 24.2% | 3.3% | 32.3% | 4.0% |
| 45 to 54 | 12.9% | 3.1% | 19.6% | 5.3% | 14.8% | 2.3% |
| 55 to 59 | 6.1% | 2.3% | 4.6% | 2.0% | 5.6% | 1.7% |
| 60 to 64 | 8.2% | 2.6% | 5.2% | 2.3% | 4.6% | 2.2% |
| 65 to 74 | 22.2% | 3.8% | 18.4% | 4.2% | 13.3% | 2.8% |
| 75 and older | 36.7% | 3.3% | 26.1% | 3.8% | 27.4% | 2.9% |
| family size | | | | | | |
| 1 | 34.5% | 3.8% | 52.0% | 4.5% | 21.4% | 3.6% |
| 2 | 40.7% | 3.3% | 24.9% | 4.2% | 31.4% | 4.2% |
| 3 | 11.8% | 2.9% | 10.0% | 3.2% | 11.6% | 2.3% |
| 4 | 4.9% | 1.6% | 6.4% | 1.9% | 18.4% | 2.9% |
| 5 | 4.3% | 1.3% | 5.0% | 1.8% | 6.6% | 2.2% |
| more | 3.8% | 1.8% | 1.8% | 0.9% | 10.6% | 2.3% |
| children | | | | | | |
| 0 | 85.9% | 2.9% | 77.9% | 3.6% | 59.8% | 4.0% |
| 1 | 2.9% | 1.5% | 8.1% | 2.3% | 12.4% | 2.9% |
| 2 | 5.1% | 1.7% | 8.5% | 2.5% | 12.6% | 3.7% |
| 3 | 3.0% | 1.2% | 3.4% | 1.5% | 8.0% | 2.3% |
| more | 3.1% | 1.5% | 2.1% | 1.1% | 7.3% | 2.1% |
| 65 or older | | | | | | |
| 0 | 36.7% | 5.3% | 52.1% | 6.4% | 54.1% | 2.7% |
| 1 | 34.7% | 4.8% | 40.8% | 5.9% | 28.0% | 4.0% |
| 2 | 27.8% | 3.3% | 7.1% | 2.5% | 17.6% | 3.0% |
| more | 0.8% | 0.7% | 0.0% | 0.0% | 0.3% | 0.4% |
| marital status | | | | | | |
| married | 53.9% | 4.7% | 33.9% | 4.4% | 51.6% | 6.0% |
| formerly married | 38.5% | 5.0% | 49.2% | 4.7% | 34.6% | 5.1% |
| never married | 7.6% | 2.3% | 16.9% | 3.5% | 13.8% | 2.8% |
| education | | | | | | |
| under age 25 | 1.5% | 1.2% | 3.6% | 1.8% | 3.0% | 1.1% |
| did not finish HS | 35.7% | 4.9% | 33.1% | 4.7% | 41.6% | 3.9% |
| HS diploma | 41.5% | 5.0% | 31.8% | 4.7% | 36.5% | 4.5% |
| some college | 15.4% | 3.7% | 20.8% | 4.0% | 14.6% | 3.5% |
| college degree | 6.0% | 2.5% | 10.7% | 3.2% | 4.3% | 1.6% |
| welfare | 2.6% | 2.0% | 3.9% | 1.6% | 6.1% | 2.0% |
| work limitation | 11.5% | 3.2% | 18.7% | 4.9% | 12.3% | 3.2% |
| region | | | | | | |
| 1 | 17.5% | 3.1% | 15.9% | 3.2% | 20.7% | 3.1% |
| 2 | 20.8% | 6.1% | 20.3% | 3.6% | 14.8% | 3.8% |
| 3 | 44.6% | 5.3% | 42.6% | 5.3% | 39.4% | 6.0% |
| 4 | 17.0% | 3.7% | 21.2% | 5.8% | 25.1% | 4.8% |

Standard errors from replicate weights.

**Appendix Table B. Distribution of expenditure poor**

| | | MIT expenditure poor | | MS expenditure poor | | MITHS expenditure poor | |
|---|---|---|---|---|---|---|---|
| | | pct. of column | std. err | pct. of column | std. err | pct. of column | std. err |
| total | | | | | | | |
| | male | 37.9% | 1.9% | 39.9% | 1.7% | 35.9% | 2.4% |
| | female | 62.1% | 1.9% | 60.1% | 1.7% | 64.1% | 2.4% |
| | white | 71.8% | 2.4% | 75.0% | 2.1% | 69.5% | 3.0% |
| | black | 22.5% | 2.4% | 19.9% | 2.0% | 23.7% | 2.5% |
| | other | 3.7% | 1.3% | 5.1% | 1.5% | 6.7% | 2.5% |
| age | | | | | | | |
| | up to 21 | 1.4% | 0.5% | 1.4% | 0.4% | 1.5% | 0.6% |
| | 22 to 44 | 29.1% | 1.8% | 25.7% | 1.7% | 27.0% | 1.9% |
| | 45 to 54 | 12.9% | 1.4% | 13.0% | 1.4% | 14.0% | 1.8% |
| | 55 to 59 | 4.3% | 1.0% | 4.7% | 0.9% | 4.0% | 1.1% |
| | 60 to 64 | 6.0% | 1.1% | 6.5% | 1.2% | 6.1% | 1.1% |
| | 65 to 74 | 17.5% | 2.0% | 18.4% | 1.9% | 18.9% | 1.8% |
| | 75 and older | 28.5% | 1.7% | 30.2% | 1.7% | 28.2% | 1.5% |
| family size | | | | | | | |
| | 1 | 32.8% | 2.0% | 33.1% | 1.7% | 40.8% | 2.4% |
| | 2 | 27.0% | 2.2% | 29.9% | 2.0% | 25.2% | 2.1% |
| | 3 | 14.2% | 1.5% | 13.7% | 1.3% | 13.8% | 1.8% |
| | 4 | 10.8% | 1.4% | 9.6% | 1.1% | 7.6% | 1.4% |
| | 5 | 6.4% | 0.9% | 6.0% | 0.8% | 6.0% | 1.3% |
| | more | 8.8% | 1.3% | 7.7% | 1.1% | 6.6% | 1.2% |
| children | | | | | | | |
| | 0 | 65.7% | 2.2% | 69.9% | 1.9% | 70.4% | 2.0% |
| | 1 | 11.6% | 1.9% | 9.7% | 1.5% | 10.6% | 1.8% |
| | 2 | 10.4% | 1.8% | 9.3% | 1.5% | 9.3% | 1.5% |
| | 3 | 6.5% | 1.0% | 5.8% | 0.8% | 5.3% | 1.1% |
| | more | 5.7% | 0.9% | 5.2% | 0.8% | 4.4% | 0.9% |
| 65 or older | | | | | | | |
| | 0 | 50.5% | 1.9% | 47.8% | 2.0% | 49.9% | 2.4% |
| | 1 | 34.3% | 2.2% | 34.1% | 2.1% | 37.6% | 2.7% |
| | 2 | 15.1% | 1.3% | 17.7% | 1.3% | 12.4% | 1.3% |
| | more | 0.1% | 0.1% | 0.3% | 0.1% | 0.1% | 0.1% |
| marital status | | | | | | | |
| | married | 39.6% | 3.0% | 42.6% | 2.6% | 34.8% | 2.7% |
| | formerly married | 44.7% | 2.2% | 43.3% | 2.2% | 48.6% | 2.1% |
| | never married | 15.8% | 1.8% | 14.1% | 1.5% | 16.6% | 1.8% |
| education | | | | | | | |
| | under age 25 | 3.1% | 0.7% | 2.8% | 0.6% | 3.3% | 0.8% |
| | did not finish HS | 48.1% | 1.8% | 45.7% | 1.3% | 46.2% | 1.9% |
| | HS diploma | 31.7% | 2.0% | 33.7% | 1.9% | 30.3% | 1.8% |
| | some college | 12.3% | 1.6% | 12.8% | 1.5% | 13.8% | 1.3% |
| | college degree | 4.8% | 0.8% | 5.1% | 0.6% | 6.4% | 1.1% |
| welfare | | 7.3% | 1.1% | 6.4% | 1.1% | 6.8% | 1.0% |
| work limitation | | 17.3% | 1.6% | 16.1% | 1.5% | 19.1% | 2.1% |
| region | | | | | | | |
| | 1 | 21.8% | 2.3% | 21.0% | 2.1% | 20.7% | 2.3% |
| | 2 | 16.7% | 2.5% | 17.6% | 2.7% | 18.1% | 2.4% |
| | 3 | 42.8% | 3.7% | 43.2% | 3.2% | 43.7% | 3.6% |
| | 4 | 18.7% | 2.8% | 18.2% | 2.4% | 17.5% | 2.3% |

Standard errors from replicate weights.

[i] Constance F. Citro and Robert T. Michael, Editors, *Measuring Poverty: A New Approach*, (Washington, DC: National Academy Press, 1995).
[ii] Citro and Michael (1995), pp.223-37.
[iii] Citro and Michael (1995), pp.237.
[iv] Citro and Michael (1995), p.224.
[v] Income and poverty data from the Annual Social and Economic Supplement to the Current Population Survey (CPS) share a similar disconnect between the reference periods of their demographic and economic variables. The demographic unit reflects persons present as of the March survey date, while the reference period for most income questions is the preceding calendar year.
[vi] The row labeled "work limitation" on the accompanying tables reflects the variable INCNONW1, identifying "ill, disabled, unable to work" as the reason the reference person did not work over the last 12 months.
[vii] The terms 'shelter' and 'housing' are used interchangeably here to refer to the set of expenditures measured by the CE variables HOUSPQ and HOUSCQ, minus amounts for babysitting in the home. This includes rent, utilities, housing operations, furnishings, interest on mortgages, property taxes, maintenance, repairs, and insurance.
[viii] U.S. Department of Housing and Urban Development, "A Report on Worst Case Housing Needs in 1999: New Opportunity Amid Continuing Challenges," (Washington, DC, U.S. Government Printing Office, 2001).
[ix] Like the current thresholds, the NRC panel's thresholds were estimated for families. For this analysis, the threshold parameters were applied to all persons in a CE consumer unit, whether or not they were related.
[x] Kathleen Short, *Experimental Poverty Measures: 1999,* U.S. Census Bureau, Current Population Reports P60-216, (Washington, DC, U.S. Government Printing Office, 2001).
[xi] The relevant CE quarterly shelter and moop variables, summed over four quarters, are: shelter = HOUSPQ+HOUSCQ-BBYDAYPQ-BBYDAYCQ; moop = HEALTHPQ+HEALTHCQ. The total expenditure summary interview variable in CE includes the full purchase price of durable goods, including those that are financed by borrowing. On Table 6, total expenditures do not include car and truck purchases = TOTEXPPQ+TOTEXPCQ-CARTKNPQ-CARTKNCQ-CARTKUPQ-CARTKUCQ. When Table 3 was calculated with the unadjusted total expenditure variable, the levels of misclassification were lower, but the patterns were not significantly different. No attempt was made to subtract other items the panel proposed to subtract from income rather than include in thresholds, including direct taxes, necessary child care, and work expenses. CE collects amounts of these categories of expenditures, although direct taxes are not included as an expenditure category in the total expenditure variable used here. Subtracting the same capped amounts for child care and work expenditures would show lower levels of net spending, and increase poverty rates for all alternatives.
[xii] In the attached tables, the share of the MIT reference family threshold deemed to be for moop is .4, roughly equivalent to the .44 of the moop-less threshold assumed to be for shelter by the panel. Sensitivity analysis with the shelter share set at .35 and .44 resulted in different levels of misclassification, but still, as on Table 3, more net misclassification with moop in the thresholds and more total misclassification with shelter in the thresholds.
[xiii] The assumption adopted earlier allowed that, under specific circumstances, the presence of medical need may be inferred from the presence of moop. However, because families may not be able to afford necessary medical care, we cannot infer the absence of medical need from the absence of moop.
[xiv] In order to produce consistent expenditure and income poverty measures on Table 3, only units with RESPSTAT=1, sometimes called "complete income reporters," in the last interview are included. With both sets of rows, units with negative incomes or negative amounts for moop were excluded from calculations.

[xv] As has been well-noted, household expenditures often exceed reported income towards the bottom of the distribution in CE. See John M. Rogers and Maureen B. Gray, "CE data: quintiles of income versus quintiles of outlays," *Monthly Labor Review*, December 1994, pp. 32-37. Consequently, income poverty rates appear higher than expenditure poverty. In the CE, missing expenditure amounts may be imputed in processing, while income amounts are not imputed. In addition, some spending may not be financed from current income, as discussed below.

[xvi] The result may be surprising, considering that the coefficient of variation of moop among families (113.1 in the CE research sample used here) is greater than the coefficient of variation of shelter spending (87.1). However, variance in the total of needs measured in a poverty threshold may be understood as the sum of the variances of the separate needs included, minus any covariances that happen to offset. (For example, a family with a disabled head may have no work expense needs.) Even when family composition is held constant and the presence of discretionary spending is minimized by selecting couples with two children and family-size-adjusted expenditures in the second quintile, and variation in shelter spending is controlled by geographic variation factors from P60-216, Table A-4, the standard deviation of shelter in the CE research sample used here (3,564) is still much greater than the standard deviation of moop (1,321).

[xvii] Assuming that units would not unnecessarily spend themselves into non-health poverty, the small share of units classified as MIT poor but MS not poor is surprising. This group should include those who were assigned an amount in their thresholds for moop but who, as it turned out, had no moop, or very little moop. Citro and Michael (1995), p. 232. David M. Betson, "Imputation of Medical Out of Pocket (Moop) Spending to CPS Records," poverty measurement working paper, www.census.gov/hhes/poverty/povmeas/papers/moopdb.pdf, 2001, p. 2f.

[xviii] Citro and Michael (1995), Appendix A.

[xix] Richard Bavier, "Three False Steps," poverty measurement working paper, www.census.gov/hhes/poverty/povmeas/papers/falstp.html. 1999.

[xx] Home-buyers also usually finance their purchase though borrowing. However, CE treats purchase of homes differently than purchase of consumer durables. The interest portion of mortgage payments are included in HOUSCQ and HOUSPQ. Such costs do reduce current income. Payments on principal increase unit wealth and are not counted in the summary shelter cost variable, even though they too reduce current income. Shelter costs subtracted here from MITHS do not include any payment of principal. So while borrowing to cover acute medical costs may *over*state misclassification due to *family-type* measures of moop on Table 3, the handling of mortgage principal payments may *under*state misclassification due to *family-type* misclassification of shelter needs.

[xxi] Citro and Michael (1995), pp217-18

[xxii] Pat Doyle's 1997 working paper, "Who's At Risk? Designing A Medical Care Risk Index," www.census.gov/hhes/poverty/povmeas/papers/mcrindex.html, addresses the possibility that dissaving may make health care more affordable. For some families, payment of medical bills over time, either through formal loans or informal installment payment arrangements with providers, may also help make medical costs more affordable.