Medical Spending, Health Insurance, and Measurement of American Poverty

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CONTROVERSY HAS SWIRLED around the measurement of U.S. poverty for at least three decades. Unlike other economic indicators, such as the gross domestic product or the unemployment rate, the poverty rate arouses such intense controversy that government statisticians have been unable to make fundamental improvements in its calculation. The consumer price index is the only other economic indicator that receives a comparable degree of public scrutiny. Political controversy surrounding the measurement of price change has not prevented the Bureau of Labor Statistics from implementing major improvements in measuring inflation over the past two decades, however. Indeed, the political controversy over price measurement probably hastened a technical revision process in the late 1990s that might otherwise have stretched out over several years.

One of the most controversial aspects of poverty measurement is the appropriate treatment of personal spending on health care. Patterns of medical care use and of paying for health care have changed significantly since the current poverty measure was developed in the 1960s. In addition, the total resources devoted to health care consumption have also risen steeply, in part because modern medical practice delivers a much improved level of care. The way the government measures poverty has not changed to reflect these developments, however. The current measure of poverty takes no explicit account of consumer medical spending or of the subsidized health insurance that families receive as a result of participating in employer-sponsored or government insurance plans. Critics are divided on how health insurance and medical expenses should be included in poverty measurement.

In 1960 medical spending accounted for just 5 percent of national income, but by 1999 this fraction had risen to 13 percent. Medical care now represents a large fraction of all consumption, and many observers believe it has become a necessity at least as important as food and shelter. They believe the poverty definition should accurately reflect this development. If poverty measurement took full account of households' expenditures on

medical care, the poverty rates of the disabled and aged would be particularly affected because of their heavy spending on care.

On the other hand, relatively little of the health spending increase was financed directly out of household budgets. Between 1960 and 1999, the proportion of health spending paid out of public budgets more than doubled, and the fraction financed through third-party payments from private health insurers rose almost 60 percent. The actual percentage of health care costs paid as out-of-pocket payments by households fell from 55 percent to 18 percent between 1960 and 1999 (Health Care Financing Administration, 2000). In spite of the dramatic increase in medical care consumption, a smaller percentage of household expenditures is now devoted to health care than was the case in 1960.[1] Many critics of the current poverty measure believe the consumer value of subsidized health insurance should be included when counting the income available to American households. Depending on how the subsidy is included in income, the resources of many households could be substantially increased and poverty rates reduced. On the other hand, U.S. health insurance coverage is very uneven. More than one in seven Americans, or 42 million people, lacked health insurance coverage during all twelve months of 1999.

This paper examines the effects of three basic methods of including household spending on health care in the measurement of poverty. The first is the method embodied in the official poverty statistics. The other two are based, directly or indirectly, on the recommendations of the National Academy of Sciences Panel on Poverty and Family Assistance (Citro and Michael, 1995). That panel argued that the nation's poverty statistics should be revamped to reflect a new measure of family need and an improved measure of family resources. Its recommendations for treating health insurance and medical spending have not won wide acceptance in the research community, but they offer a starting point for analysis.[2]

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[1] In the 1960-61 Consumer Expenditure Survey, 6.7 percent of household expenditures was devoted to health care consumption; in the 1999 Survey, the share devoted to health care was just 5.3 percent (Jacobs and Shipp, 1990, p. 21; and ftp://ftp.bls.gov/pub/special.requests/ce/standard/y9399/multiyr.txt [downloaded on 16-Mar-2001]).

[2] After attending a two-day conference on poverty measurement, 44 social scientist specialists and public policy students were asked to evaluate the recommendations of the NAS panel. Only 40 percent of voting participants -- and just 27 percent of all participants at the conference -- approved of the panel's recommendation for treating household medical spending. This is a far lower level of agreement than reported for other elements of the panel's proposal (Corbett, 1999, p. 53). See also Bavier (2000) and the response by Betson (2000).

The paper is organized as follows. In the next section we review the definition of poverty and describe alternative approaches to treating household medical spending in an assessment of family needs and resources. This section describes the theoretical approach proposed by the NAS poverty statistics panel, and it outlines an alternative to this approach that have been suggested since publication of the panel's report. In the next section we describe the alternatives implemented in this paper and outline our methods for calculating household medical spending and health care needs. The last substantive section presents and discusses our statistical results. The paper ends with a brief discussion of conclusions.

I. Medical spending and poverty

Most social scientists who have studied poverty believe the official U.S. poverty definition does a poor job of distinguishing between the nation's poor and nonpoor. The official measure is deficient in a number of respects, a fact that has long been recognized by specialists. These defects can pose problems both for policymaking and for social science. For example, trends in the number of people who are officially classified as poor are often used to decide whether public policies have been effective in reducing poverty. If poverty is mismeasured, this kind of assessment can produce seriously misleading results.

Official poverty definition. The Census Bureau's current estimate of the official poverty rate is based on poverty thresholds and definitions of countable income developed in the early 1960s by the Social Security Administration and modified by the Council of Economic Advisors. The official poverty thresholds were originally developed by determining the minimum cost of an adequate diet and then multiplying a family's minimum food budget by a multiplier believed to cover other consumer necessities. This multiplier, in turn, was derived from a 1955 food consumption survey which showed that families on average spent about one-third of their budgets on food. Part of the remaining two-thirds of spending was devoted to purchasing medical products and services, so in one sense the poverty thresholds reflect Americans' medical consumption behavior in the mid-1950s. The poverty thresholds vary by family size, under the assumption that large families require more income than small ones to enjoy the same standard of living.

In order to determine whether a family is poor, its resources are compared with the poverty threshold. The family resource measure used by the Census Bureau is gross money income. It includes before-tax cash income from all sources except gains or losses on the sale of property. This definition includes gross wages and salaries, net income from the operation of a farm, business, or partnership, pensions, interest, dividends, and government transfer payments that are distributed in the form of cash, including social security and public assistance benefits. The measure is not comprehensive, because it ignores all sources of noncash income, including food stamps, housing subsidies, and government- and employer-provided health insurance. The resource measure is also inappropriate for measuring poverty, because some of the noncash income sources which are ignored can be used to pay for basic necessities, such as food and shelter.

NAS panel recommendations. The official poverty estimates have been subject to intense criticism over the past three decades. Specialists have offered a variety of technical criticisms, and politicians and journalists have offered critiques of their own. The most comprehensive evaluation of the official poverty statistics was published by the National Academy of Sciences in 1995 when it presented the recommendations of the Panel on Poverty and Family Assistance (Citro and Michael, 1995). The NAS panel described flaws of the official measure and suggested methods for reducing or eliminating them. It described the pros and cons of different methods for dealing with problems of the current measure, and it made specific recommendations for improvement. Some of the most important problems identified by the panel were the following:

- The official poverty measure excludes in-kind benefits, including food stamps and housing assistance, when counting family resources.

- It ignores the cost of earning wage income, including child care costs, when calculating the net income available to families containing working members.

- It disregards regional variations in the cost of living, especially the cost of housing, in determining a family's consumption needs.

- It ignores direct tax payments, such as payroll and income taxes, when measuring family resources. By the same token, it ignores the contribution to family resources provided by refundable income tax credits, such as the Earned Income Credit (EITC).

- Differences in health insurance coverage are ignored in determining family resources, and differences in medical spending are disregarded in determining family consumption needs.

- The official thresholds have never been updated to reflect the changing consumption levels or patterns of American households.

To remedy these defects, the NAS panel recommended a complete overall of the procedures and data used to measure poverty. Its core recommendations can be summarized briefly:

- The poverty thresholds should be based on the budget needed for food, clothing, shelter, and a small additional amount for other needs (personal care, non-work-related transportation, etc.). These budgets in turn should be based on *actual spending patterns* observed in surveys of representative American households, and the budget amounts should be updated each year based on spending patterns over the previous three years. (In other words, the budget amounts should be updated on a regular basis to reflect the society-wide trend in *actual* consumption; they should not be fixed for all time based on a *fixed* market basket of goods and services.) [pp. 4-5 of the NAS report]

- Family resources should be defined as the sum of money income from all sources plus the value of near-money income, such as food stamps, that are available to buy goods and services in the budget, minus expenses that cannot be used to buy these goods and services. [p. 5]

- The expenses subtracted from available family resources should include --

  - Payroll and income taxes;

  - Child care and other work-related expenses;

  - Child support payments to another household; and

  - Out-of-pocket medical care costs, including payments for health insurance premiums. [p.5]

- The equivalence scale that reflects differences in consumption needs according to family size and composition should be revised. The panel's suggested scale reflects a higher estimate of the anticipated cost of supporting a couple and a lower estimate of supporting a single person than are reflected in the existing scale, for example. [p. 8]

- The poverty thresholds should be adjusted to reflect differences in the cost of housing across geographical areas of the country. The panel recommended that the Census Bureau make estimates of the cost of housing for the nine census regions and, within each region, for several population-size categories of metropolitan areas. [p. 8]

- Assistance provided to the family in the form of near-money nonmedical in-kind benefits -- specifically, food stamp benefits, subsidized housing, school lunches, and home energy assistance -- should be directly added to net cash income to determine family resources. [p. 10]

- Work-related expenses should be subtracted from cash income using the following procedures –

  - For each working adult, a flat amount per week worked should be subtracted from net cash income (up to a limit of after-tax earnings) to reflect transportation and other miscellaneous expenses connected to work;

  - For families in which there is no nonworking parent, actual child care costs per week worked (up to a limit of the net earnings of the parent with lower earnings or a standard weekly limit, whichever is lower) should be subtracted from net cash income. [p. 10]

- The Survey of Income and Program Participation (SIPP) should replace the March Current Population Survey (CPS) as the source of survey data used to estimate the poverty rate. [p. 12]

The NAS panel made no recommendation for including the flow of housing services from owner-occupied homes in its new definition of family resources. Families of the same size which live in the same communities would be assigned the same budget for housing regardless of whether they rented an apartment, made monthly loan payments on a home mortgage, or owned their homes free and clear of mortgage debt. While public housing subsidies would be treated as resources available to pay for a family's housing costs, the flow of services from an owner-occupied home would not be treated in an equivalent way.

If the panel's proposals were fully implemented there would be a substantial effect on the level and distribution of poverty across groups and regions and important changes in the eligibility standards for some federal programs. For this reason, the NAS panel report attracted close scrutiny from scholars interested in poverty measurement. Burtless, Corbett, and Primus (1997) proposed a sequence of studies to examine the statistical and policy implications of adopting part or all of the panel's proposal. They also urged publication of micro-census data sets containing the resource and threshold data necessary to calculate the poverty rate under the definition suggested by the NAS panel as well as under plausible alternatives to the panel's definition. Garner et al. (1998) and Short et al. (1999) performed

careful analyses of the panel's proposals to determine how they would affect the poverty rate if adopted either alone or in combination. The Census Bureau has subsequently made available public-use files that allow researchers to reproduce the calculations described in Short et al. (1999). (These Census files are the source of some of the tabulations reported in this paper.)

Although many of the NAS panel's recommendations enjoy wide support among poverty specialists, some have aroused opposition. Thomas Corbett (1999) has summarized a discussion among poverty experts of many aspects of the NAS panel's proposal. Corbett reports overwhelming support for the panel's recommendation that near-cash in-kind benefits should be included in the definition of resources and income and payroll tax payments and estimated work-related expenses should be subtracted. He also reports wide acceptance of a new equivalence scale to replace the one in the current poverty thresholds. Corbett reports far less agreement with the panel's proposal that poverty thresholds should reflect regional differences in the cost of housing and should be up-dated from year to year in proportion to recent changes in median consumption. As noted above, only a minority of conference participants accepted the panel's recommendation for treating health insurance and out-of-pocket medical expenses.

The remainder of this paper focuses on the treatment of health insurance and health care expenses in the definition of poverty. This issue is almost certainly the most difficult and controversial one that remains in defining an appropriate measure of U.S. poverty. Although our estimates of poverty are based in part on many of the NAS panel's recommendations, we will not discuss any of them in detail except those that relate to measuring health care expenses.[3]

Health care expenses and poverty measurement. The measurement of poverty involves the comparison of some index of household well-being or economic resources with household needs. When command over economic resources falls short of needs, a household (or person or family) is classified as poor. Economic well-being refers to the material resources available to a household. The definition of poverty in the United States usually begins with

[3] At the end of section II we describe the basic procedures used to measure family resources and estimate poverty thresholds for families with different sizes and compositions.

the assumption that households must have command over at least enough resources to purchase a basket of basic necessities. The original poverty thresholds were derived by estimating the cost of a minimally adequate diet and then multiplying this estimate by a factor large enough to cover other necessities. The NAS panel on poverty and family assistance included food, clothing, and shelter in its short list of consumer necessities.

Most Americans would surely include adequate medical care within the core set of basic needs. The architects of the original poverty thresholds and members of the NAS poverty panel probably agreed with this judgement. However, they chose radically different approaches to recognizing medical care expenditures in their definitions of poverty. The official thresholds implicitly treat medical care expenditures in the same way as they treat expenditures on all other necessities. Some portion of the poverty budget is implicitly set aside for each basic need, with one-third of the budget assigned to food consumption and perhaps 7 percent of it set aside for medical spending.[4] This approach to poverty measurement made sense in an era when most families paid for almost all their consumption with cash income, but it makes less sense when a large fraction of consumption is financed with in-kind transfers and third party insurance payments.

In attempting to define a more comprehensive definition of household resources, the NAS panel explicitly recognized the growing importance of in-kind transfers to the low-income population. It proposed adding "near-cash" in-kind benefits to after-tax cash income when determining household resources. Near-cash benefits clearly include food stamps and probably include most housing subsidies. The NAS panel did not believe third-party payments for medical care or the insurance value of a third-party-provided health plan could be treated in the same way as food stamps, however. The panel mentioned two reasons for treating health insurance subsidies differently from food stamp benefits. First, all noninstitutionalized households must devote some resources to purchasing food. This implies that food stamps directly help to pay for necessary consumption, freeing up part of the household's other income to be spent on other basic necessities. Moreover, food stamp allotments are intentionally set at a modest level, so it can be safely assumed that every $1 in

[4] Roughly 7 percent of household expenditures were devoted to health care spending when the original poverty thresholds were adopted. See note 1.

food stamp benefits frees up $1 of the household's remaining income for spending on other necessities.[5] The second problem with treating health insurance subsidies in the same way we treat food stamps is that households of the same size and composition have similar food requirements but widely varying requirements for medical care. As the panel notes, "Everyone has a need to eat and be sheltered throughout the year, but some people may need no medical care at all while others may need very expensive treatments." (Citro and Michael, 1995, p. 224) Thus, a free insurance policy that has an average cost of $6,000 per year for an average household with two members might be worth only $500 to a household containing two young, healthy adults. That is, this healthy household might reasonably expect that coverage by the insurance plan will only reduce it's out-of-pocket spending on medical care by $500. If the young family has only $10,000 in net income aside from the health insurance plan, the way we count their insurance plan in measuring household resources could be crucial in determining whether the household is classified as poor.

The Census Bureau has tried to resolve these two problems by calculating the "fungible cash value" of medicare and medicaid insurance. The insurance is converted into a cash value equal to the amount of resources that are freed up to pay for necessities other than food and shelter.[6] Rather than place a value on the subsidy value of insurance received by households, however, the NAS panel proposed subtracting from other resources households'

[5] This reasoning clearly does not apply in the case of a household for which an overwhelming percentage of household resources is received in the form of food stamps. In this case, however, the family would be classified as poor regardless of the treatment of food stamp benefits, because the basic food coupon allotment is far below any plausible poverty threshold. Thus, the NAS panel's proposal only makes a difference in measuring poverty status where the household's resources, aside from food stamps, bring the household reasonably close to the threshold. The panel's proposed treatment of "near-cash" in-kind benefits is more problematical in the case of housing subsidies. In some parts of the United States, the market value of this subsidy can be very high; it may even approach the poverty threshold. Yet households occupying subsidized apartments may have limited ability to use the housing subsidy to pay for other necessities, such as food or medical care. This is particularly true in the case of households with few other resources aside from the housing subsidy.

[6] The Census Bureau describes fungible value as follows: "The fungible approach for valuing medical coverage assigns income to the extent that having the insurance would free up resources that would have been spent on medical care. The estimated fungible value depends on family income, the cost of food and housing needs, and the market value of the medical benefits. If family income is not sufficient to cover the family's basic food and housing requirements, the fungible value methodology treats medicare and medicaid as having no income value. If family income exceeds the cost of food and housing requirements, the fungible value of medicare and medicaid is equal to the amount which exceeds the value assigned for food and housing requirements (up to the amount of the market value of an equivalent insurance policy (total cost divided by the number of participants in each risk class)." http://www.census.gov/hhes/income/histinc/redefs.html [downloaded 19-Mar-2001]

spending on medical care, including the premiums they pay for health insurance. This treatment of medical spending is fundamentally different from the implicit treatment in the official poverty standards because it does not include an estimate of necessary medical spending in the poverty thresholds. Instead, it treats *actual* medical spending as a subtraction from other family resources. Thus, spending on medical care is given special priority over other spending on basic necessities in the measurement of *resources*, though medical care is not explicitly recognized as a necessity in the definition of thresholds.

Although the NAS panel's proposed treatment of medical spending is logical and internally consistent, it raises two issues that disturb some observers. First, because medical care is not explicitly included as a necessity in the definition of poverty thresholds, some households may be classified as nonpoor even though they do not have command over enough resources to obtain adequate health care. Consider a household with net income just slightly above the NAS panel's proposed poverty threshold but with no health insurance. If the household spends no money to purchase medical care, it would be classified as nonpoor under the panel's proposed definition. But the household may have failed to receive necessary medical care precisely because its resources are strained and it lacks minimal health insurance. Households with adequate command over resources should have better access to medical care. This problem with the NAS definition may cause some households to be classified as nonpoor even though they do not have enough resources to obtain adequate care, which implies that they are poor if adequate care is a necessity.

A second problem with the panel's proposal is that all medical spending receives privileged treatment in the determination of household resources, regardless of whether the spending is necessary. This issue was highlighted in John Cogan's dissent to the NAS panel report (Citro and Michael, 1995, pp. 388-90). Cogan notes that medical spending, like spending on other kinds of goods and services, is responsive to both prices and family income. Subtracting expenditures on this one item from family resources, while setting fixed thresholds for spending on other kinds of necessities, is inconsistent with the basic theory of consumer choice. People who elect to receive expensive medical treatments or use the services of high-priced health providers should not be classified as poor as a result of their own consumption choices. Such a procedure makes no more sense than classifying households as poor if they choose to live in expensive apartments or purchase costly designer

gowns. This problem with the NAS panel's treatment of medical spending could cause poverty rates to be overstated. Well-off households that voluntarily chose to spend lavishly on health care could be classified as poor even though their health insurance and incomes give them command over enough resources to live comfortably.

The second criticism of the NAS panel's recommendation may seem unduly harsh. Most Americans believe their medical spending is devoted to insurance and care that are needed to protect or restore their health. People who are sick or injured may think they have little alternative but to pay for prescribed medical care, unless they are covered by a free and exceptionally generous insurance plan. Little medical spending seems voluntary. This was essentially the position adopted by the NAS panel. A problem with this view is that different groups in the population spend widely differing amounts on medical care, even if we hold constant their net incomes and insurance coverage.[7] The resource definition proposed by the NAS panel requires that much more spending be subtracted from the resources of some groups than of others, even though the extra spending may contribute to greater well-being in the high-spending groups. This difference in average well-being might not be apparent at a single point in time, when it is plausible to assume that both high- and low-spending groups are spending whatever is needed to maintain or protect their health. Over long periods of time, however, it is difficult to believe that systematically faster increases in spending by a particular group fail to translate into systematically faster improvements in that group's relative well-being. Perversely, however, the NAS panel's resource definition would produce the result that a faster rate of increase in health spending causes an increase in the poverty rate of groups in which expenditures increase fastest.

According to the 1999 Consumer Expenditure Survey, consumer units with a family head under age 55 devoted 3.9 percent of their total expenditures to out-of-pocket health costs. Among families headed by someone between ages 55 and 64, the proportion of expenditures devoted to health care was 5.7 percent. For families headed by a person age 65 or older, the fraction devoted to medical care was 12.0 percent, or more than three times the

[7] Another problem is that, contrary to the popular view, an important fraction of medical spending *is* discretionary. Two people who have identical health and health insurance plans may choose to visit doctors, dentists, and physical and mental therapists on differing schedules, depending on their taste for medical services. It is extremely unlikely that every visit to a doctor or therapist is equally necessary to the maintenance of good health.

percentage spent on health care by families headed by people under 55.[8] These spending patterns imply that much larger amounts must be subtracted from the net incomes of aged households than from the net incomes of nonelderly households in order to calculate household resources under the proposed NAS definition. David Betson and Jennifer Warlick (1998) show that these subtractions from household resources have a sizable impact on trends in relative poverty among aged and nonaged households. Under the official definition of poverty, the poverty rate of the elderly fell from 13.8 percent to 11.7 percent between 1983 and 1994, while the poverty rate in the population at large fell much more modestly from 15.2 percent to 14.6 percent. Using the more comprehensive definition of resources suggested by the NAS panel, but subtracting medical spending from resources, the poverty rate of the aged *increased* between 1983 and 1994 while the poverty rate of the general population fell. Out-of-pocket medical spending among the lower-income elderly apparently increased faster than after-tax incomes. Instead of falling sharply below the poverty rate in the population at large, the elderly poverty rate under the NAS definition remained significantly higher than the rate in the general population (Betson and Warlick, 1998, Table 1).

There is some evidence that the increases in out-of-pocket medical spending by the elderly (and the far larger increases in third-party expenditures on health consumption of the elderly) produced tangible benefits for the aged. The death rate of men between 65 and 84 years old fell 1.2 percent a year from 1982 and 1994, while the death rate of men between 14 to 64 years old fell just 0.6 percent a year. There was a much smaller difference in the mortality rate improvements of women younger and older than age 65. Women between 65 and 84 experienced mortality rate reductions of 0.6 percent a year, while women between 14 and 64 enjoyed reductions of 0.7 percent a year (Bell, 1997, Table: Historical Average Annual Percentage Reductions in Age-Adjusted Central Death Rates). The mortality statistics nonetheless suggest that older Americans enjoyed relatively rapid gains in life spans during much of the period in which their out-of-pocket medical spending was rising. If the spending increases produced faster gains in the well-being of the low-income aged than were enjoyed by low-income but nonaged Americans, some people might be skeptical of a poverty index

[8] Authors' tabulations of BLS data from the 1999 Consumer Expenditure Survey.

that shows destitution among the elderly has worsened in comparison with that among the nonaged.

An alternative to the NAS proposal. The NAS panel considered alternative methods for including health expenditures in the measurement of poverty (Citro and Michael, 1995, pp. 223-37). Later analysts have also proposed alternatives. We consider variants of the NAS panel proposal which add estimates of necessary medical spending to the poverty thresholds rather than subtract actual spending amounts from household resources. The basic idea is to treat spending on medical care as a necessity in the basic poverty thresholds. An estimate of how much money should reasonably be devoted to this necessity is obtained by measuring the actual out-of-pocket medical spending of selected (mostly nonpoor) members of the population and then adjusting these estimates to reflect the health insurance status of families. This alternative was suggested by an informal working group of academic and government analysts interested in improving the nation's poverty statistics. While researchers have found no ideal method of including health care spending in the definition of poverty, the two general approaches we consider offer contrasting views of the problem.

II. Methodology

As implemented by the Census Bureau, the NAS panel's approach to measuring family resources involves making an estimate of each family's spending on medical care and then subtracting this amount from the family's other after-tax cash and near-cash income. An ideal data set to implement the NAS poverty definition would be one that combines accurate and timely information about family income, tax payments, and work-related expenses with reliable reports of family spending on medical care and health insurance. No large and nationally representative data set combines all of these features. The data source used to estimate the official poverty rate is the Annual Demographic Survey supplement to the March Current Population Survey (CPS), but this survey contains no questions concerning family medical spending and very limited information about health insurance coverage. To compensate for the lack of information about medical spending on the CPS, the Census Bureau has imputed predicted medical expenditure amounts to families and unrelated individuals surveyed in the CPS.

The Bureau's imputation procedure is performed in three steps.[9] In the first step, the Bureau predicts whether a family incurs any medical expenses during the relevant year. This prediction is made on the basis of a statistical model estimated with data from the 1987 National Medical Expenditure Survey (NMES), which contains information on family medical spending, health insurance coverage, income, and individual demographic data (Short et al., 1999, Table C13). Since similar data, except for medical expenditures, are contained in the March CPS file, the statistical model estimated with the NMES can be used to predict out-of-pocket health spending for families in the CPS file. The second step of the Bureau's procedure imputes actual medical spending amounts, including premiums for most health insurance, to the families that were predicted to incur positive medical expenses in the first step. The statistical model used in this step was also estimated with data from the 1987 NMES, although the data were aged to reflect medical prices and spending patterns in the calendar year covered by the CPS file. That is, the Census Bureau adjusted the predictions of family medical spending to ensure that the weighted sum of spending was equal to an aggregate total estimated in an independent source. In the final step, the Census Bureau imputed medicare Part B premiums to people insured under medicare who did not have their premiums reimbursed by the medicaid program.

Significantly, the Census Bureau's imputation method attempts to impute *actual* medical spending amounts rather than the *expected* amount of spending given the family's characteristics. In other words, the medical spending amounts imputed to CPS respondents reflect the full distribution of health expenditures observed in the NMES sample. Because annual medical spending is very unequal, even among families with identical characteristics, some families are predicted to have extremely high health outlays. This point is illustrated in Figure 1, which shows the cumulative percentage distribution of out-of-pocket medical spending for two kinds of families. The top panel shows the distribution of spending among families without an aged member which contain either two or three members. To make the sample even more homogenous, we restrict it to families in which every member has health insurance and in which at least one family member reports "poor" or "fair" health. Note that only half of all spending in this sample is incurred by the 84 percent of families with smallest

[9] Procedures for developing estimates of household medical spending are described in Betson (1997) and Betson (1998) and in Short et al. (1999), pp. C-16 – C-19.

spending amounts. Only 78 percent of spending is incurred by the 95 percent of families with lowest spending. In other words, the top 5 percent of families accounts for 22 percent of all out-of-pocket expenditures. The distribution of out-of-pocket spending is even more skewed among elderly unrelated individuals who are in "fair" or "poor" health (bottom panel of Figure 1). The top 5 percent of spenders in this group accounts for 35 percent of out-of-pocket expenditures.

A striking feature of the Census Bureau's predictions is that family out-of-pocket spending among people with low income is 61 percent of the amount of average out-of-pocket spending among all people, poor and nonpoor (Short et al., 1999, Table C5). What makes this result remarkable is that 43 percent of persons classified as poor under the official poverty definition are insured by the medicaid program, which provides free health insurance to the covered population. One-quarter of the poor are insured under some other plan besides medicaid.[10] Obviously, people who are insured by medicaid do not receive completely free health care, for some medical goods and services are not covered and many in the insured population do not receive insurance in every month of the year. It is nonetheless surprising that the low-income population is predicted to spend such a large fraction of the average amount of out-of-pocket expenditures, even though many low-income Americans receive free health insurance and the remainder have cash incomes that are only a small percentage of those received by the nonpoor population.[11] It follows that many uninsured and poorly insured low-income families are predicted to face (and to actually pay) large medical bills.

Under the alternative treatment of medical spending considered here, an estimate of "reasonable" health spending is added to each family's poverty threshold to reflect the expected cost of obtaining necessary medical care.[12] We derive our estimates of reasonable

[10] The Census Bureau estimates the 1997 poverty population consisted of 35.6 million people. http://www.cache.census.gov/hhes/hlthins/hlthin97/hi97t1.html [downloaded on 19-Mar-2001]. Of these, 15.4 million (or 43.3 percent) were insured by medicaid and 8.95 million (or 25.2 percent) were insured by some other plan. Some people who are insured under a government or private insurance plan are not insured during all 12 months of a calendar year.

[11] Our tabulations of the March 1999 CPS files show that the average income-to-needs ratio of people below the official poverty threshold was about one-ninth of the ratio among people above the poverty line. These calculations are performed using the Census Bureau's definition of pre-tax money income.

[12] The term "family" is used loosely. Our analysis is performed for families and unrelated individuals as defined by the Census Bureau. For purposes of this discussion, a "family" may be either a Census-defined family or an unrelated individual.

health spending with the NMES medical spending data used by the Census Bureau when it estimated the poverty rate under the NAS panel's proposal. We also follow the Census Bureau's practice and up-date the expenditures reported in the 1987 NMES to reflect medical price inflation and estimates of aggregate out-of-pocket spending provided by an individual source (see Appendix).

Our estimates of "reasonable" health spending are based on spending patterns among a subset of families on the NMES file. To ensure that our estimates do not reflect spending on unnecessary or excessively costly care, we usually restrict our estimation sample to families with income-to-needs ratios no higher than the median income-to-needs ratio in the population. (The income-to-needs ratio is defined as the family's Census money income divided by its official poverty threshold.) To ensure that families are not excessively constrained by low income in their consumption of health care, we usually restrict the sample used to measure reasonable medical spending to families which have at least one-half the median income-to-needs ratio in the population.[13]

Once these income restrictions are imposed on the analysis sample, we calculated the average out-of-pocket health expenditures of families within cells defined by four characteristics:

- Age of head: (1) Under 65 (2) 65 or older.
- Number of persons in family: If the family head is under 65, the categories are (1) One; (2) Two or three; (3) Four or more. If the family head is 65 or older, the categories are (1) One; (2) Two; (3) Three or more.
- Health of family members: (1) All family members report health as "good," "very good," or "excellent." (2) At least one family member reports health as "fair" or "poor."
- Health insurance status: (1) The family is fully insured but is not insured under the medicaid program; (2) The family is fully insured and at least one family member

[13] While it might seem plausible to expect lower average spending in a sample restricted to families with income-to-needs ratios between 0.5 and 1.0 times the median income-to-needs ratio than in a sample containing all families, regardless of income, this expectation is not always realized in the NMES. In about one-third of the sample cells, average health spending was actually higher in the income-constrained sample than in the full sample. This may reflect the sensitivity of the estimated sample mean to spending among families at the extreme upper tail of the distribution. High-expenditure families are almost as likely to be found in the income-constrained sample as in the full sample.

is insured under medicaid; (3) One or more family members are not covered by health insurance.

In principle, we could estimate "reasonable" health spending within each cell by calculating the average amount spent by families within that cell. It is possible, however, that families which are uninsured or only partially insured may consume less medical care than is warranted by the health needs of family members. If they had adequate insurance, they might receive a more appropriate level of care. How much on average would it cost uninsured families to obtain an appropriate level of care? If this average spending amount were known, we could impute it to families in the uninsured cell. Because this hypothetical spending amount is unknown, however, our research strategy is to perform a sensitivity analysis in which alternative estimates of "reasonable" medical spending are calculated and then imputed to families whose members are uninsured or only partly insured. In our basic sensitivity analysis, we derive three estimates of reasonable spending corresponding to "high," "medium," and "low" assessments of the medical spending needs of uninsured or partly insured families.

- ♦ High assessment of needs: Uninsured and partly insured families will purchase an individual health insurance plan and spend the same average amount for out-of-pocket medical costs (including health insurance premiums) as families which purchase individual plans.
- ♦ Medium assessment of needs: Uninsured and partly insured families will pay health insurance premiums and pay out-of-pocket medical costs that are the same as out-of-pocket spending of *all* families which have health insurance, including families enrolled in either individual or group plans.
- ♦ Low assessment of needs: (a) Uninsured and partly insured families that are eligible for medicaid but which report that they are not insured by medicaid are assigned the same average out-of-pocket medical costs as families that are insured by medicaid;[14] (b) Uninsured and partly insured families that are *ineligible* for medicaid are assigned the same average out-of-pocket medical costs as families that are insured by a private insurance plan.

Ideally, the high, medium, and low estimates of "reasonable" medical outlays would be measured using a sample with at least one-half of median income and no more than the

[14] Our imputations of eligibility for medicaid are based in part on descriptions and analysis described in Broaddus and Ku (2000). Eligibility criteria were found in Hoffman and Schlobohm (2000) and the 1998 and 2000 editions of *The Green Book*. It is likely we slightly overestimated the number of children who would be eligible for medicaid or SCHIP in 1998, for our data sources estimated insurance eligibility rates using the 2000 SCHIP program rules.

median income. This proved impractical for two of our estimates. Only a small percentage of Americans obtain health insurance coverage outside of a group insurance plan. To estimate average out-of-pocket medical spending of families covered by individual health insurance plans, we therefore use the average spending levels of *all* families covered by individual plans, regardless of the family's income. In addition, very few families with incomes greater than one-half median income are covered by the medicaid program. To estimate average out-of-pocket medical spending of medicaid-insured families, we measured the average spending levels of *all* families covered by medicaid, regardless of whether the family had income above or below one-half the median income. (Our estimates of "reasonable" medical spending for different classes of families are presented in the Appendix.)

The three alternative estimates of "reasonable" medical spending may span the plausible range of spending requirements for families which do not have insurance for most of their members – under the assumption that lower income families should expect to face average out-of-pocket spending requirements. The out-of-pocket spending of persons or families which purchase individual health insurance plans is an upper-bound estimate of "reasonable" medical spending for two reasons. First, some families which are uninsured probably have access to a group health insurance plan that is less expensive and more advantageous than a private, individual plan. The imputed cost of health insurance premiums thus is higher than the amount that some uninsured families would actually have to pay. Second, families that purchase private, individual plans probably expect to incur higher average medical costs than similar families which do not purchase such plans. One reason that people choose to become insured under an individual health plan is that they expect to incur above-average medical expenses. If families which purchase individual plans use more medical care services than average, while families which do not purchase insurance would consume less care than average if they were insured, then we would overstate the likely spending of uninsured families by assuming they would consume as much care as families that purchase an individual policy.

Similarly, our low assessment of medical spending of the uninsured and partially insured is intended to represent a lower-bound estimate of their expected spending if they had adequate access to medical care and anticipated paying average out-of-pocket amounts for care. Some of the people whom we predict could become eligible for a free medicaid

insurance plan may not be eligible for medicaid during every month of the year. In months when they are uninsured, their out-of-pocket medical spending may be higher than that of people who are actually insured under medicaid. It is possible, of course, that many families which are eligible for medicaid but which do not become insured remain uninsured because they do not expect to incur large medical expenses. If they faced a medical emergency, they would apply to become insured under medicaid. In this case, we might be overstating the likely medical spending of these families by assuming they will spend as much as families which actually become insured under medicaid.

To derive our smallest estimate of "reasonable" medical spending, we performed one last sensitivity test. As illustrated in Figure 1, the medical expenditures of apparently similar families are very unequal. Families with the largest medical bills account for a high percentage of aggregate out-of-pocket health costs. It is conceivable that most low-income families remaining uninsured are in good enough health so that they do not expect to incur extremely large medical bills. Such families may also anticipate that if a severe medical episode occurred, they would become insured under a means-tested insurance plan, such as medicaid or emergency medical assistance. If this expectation is valid, uninsured families would not need to provide for the contingency of facing extremely large medical bills, because such bills would be paid by a public insurance program or absorbed by health care providers as an unreimbursable expense. To embody this idea in our estimate of "reasonable" medical outlays, we top-code the spending amounts of families which have medical expenditures in the top 5 percent of the medical spending distribution when calculating average medical spending in each cell.[15] In particular, we calculate medical spending at the 95th percentile and convert all values of medical spending larger than this amount to 95th-percentile amount. Because the distribution of medical spending is so skewed, top-coding can significantly lower our estimate of "reasonable" medical spending. For example, among nonaged families with 2 or 3 members in which all members are insured and in which at least

[15] Another approach suggested and analyzed by Richard Bavier (2000) is to include an estimate of 80 percent of the *median* out-of-pocket health spending in the basic poverty thresholds. Because of the highly unequal distribution of medical expenditures illustrated in Figure 1, this method would clearly produce a lower set of thresholds than the methods we examine here. In light of the very skewed distribution of medical spending, some observers might wonder whether median medical spending provides families with a reliable cushion for paying for the medical care episodes they can anticipate over the course of their lifetimes -- or even over the space of a few years.

one member has "poor" or "fair" health, top-coding reduces the estimate of "reasonable" spending by 16 percent. Among aged unrelated individuals who are in "poor" or "fair" health, top-coding reduces estimated "reasonable" spending 20 percent. If we top-coded respondents' expenditure reports at a lower value, such as the 90th or the 80th percentile, in our estimates of "reasonable" medical outlays would be smaller still.

Our estimates of "reasonable" medical expenditures were added to one variant of the NAS panel's recommended poverty thresholds. The NAS panel recommended that the thresholds provide enough income to cover the cost of food, clothing, shelter, and something extra to cover other common needs (except medical care). This basic threshold is calculated for a reference family consisting of two adults and two children. The panel proposed that the reference family's threshold be set equal to some plausible percentage of the median spending on food, clothing, and shelter of all families of that type, as measured in the Consumer Expenditure Survey. Members of the panel believed a plausible range would be 89.7 percent of median spending up to 103.75 percent of median spending on food, clothing, and shelter. Our basic threshold represents the midpoint of this range, or 96.725 percent of median spending. (For a more detailed discussion of how the basic threshold is estimated using the Consumer Expenditure Survey, see Short et al. 1999, pp. 4-5 and p. C-2).

To calculate poverty thresholds of families with different sizes and compositions, we used the three-parameter equivalence scale proposed by Betson (1996) as implemented by Short et al. (1999, pp. C-1– C-3). The three-parameter equivalence scale is defined as follows:

1. For single parents: $[\boldsymbol{A} + 0.8 + 0.5*(\boldsymbol{K} - 1)]^{0.7}$
2. All other families: $[\boldsymbol{A} + 0.5*\boldsymbol{K}]^{0.7}$
3. Ratio of the scale for 2 adults compared to 1 adult is 1.41

where $\boldsymbol{A}$ = Number of adults in family, and
$\boldsymbol{K}$ = Number of children in family.

To adjust our alternative thresholds for successive years between 1990 and 1998, we increased the thresholds in line with the annual percentage change in the CPI-U. The same procedure is used to adjust the official poverty thresholds. (The NAS panel recommended, however, that the thresholds be increased in line with changes in median spending on food,

clothing, and shelter.) We used a single set of poverty thresholds for the entire nation, the same procedure used to develop the official poverty thresholds. (The NAS panel recommended that thresholds be adjusted across geographical regions and, within geographical regions, across different sizes of metropolitan areas to reflect differences in shelter costs.)

When we implemented our new treatment of medical spending in the definition of poverty we took the poverty thresholds described above and added an estimate of the family's "reasonable" medical spending.[16] In the empirical section below, we show poverty rates estimated under six variants of this new poverty definition. Each variant uses a different estimate of "reasonable" out-of-pocket medical spending, with the alternative estimates calculated using the procedures described above.

Family resources. Except when estimating the poverty rate under the official poverty definition, we use a variant of the comprehensive definition of family income proposed by the NAS panel. Our definition of family income consists of the sum of the following elements:

- Pre-tax cash income (the measure of income used in the official poverty definition);
- Near-cash in-kind benefits (except health insurance) at market value (food stamps, school lunches, energy assistance, housing subsidies);
- Net capital gains;
- Refundable tax credits (Earned Income Tax Credit, or EITC);
- MINUS Estimated payroll and income taxes (federal income taxes, state income taxes, and FICA contributions);
- MINUS Work-related expenses.[17]

[16] Because our estimates of "reasonable" medical spending increase from year to year in line with changes in actual medical spending, this part of the poverty threshold would on average increase faster than the change in the CPI-U.

[17] We use the "SIPP median method" of estimating child care expenses and other work-related expenses. Essentially, a small weekly allowance is made for work-related expenses *except for* child care expenses. Child care expenses are imputed to a family only when all parents are working. In that case, the imputed child care expense can be no larger than the wages of the lower paid parent. SIPP panel "median child care expense" values are taken from Short et al. (1999) Table C12 (p. C-13). The procedures used by the Census Bureau to implement the NRC panel's recommendations with respect to child care and other work-related expenses are described in Short et al. (1999), pp. C-11 to C-14.

This definition of family resources is used to evaluate families' poverty status under the alternative definitions we examine, except the alternative that is directly based on the NAS panel's recommended treatment of medical spending. To calculate poverty under the NAS panel recommendation, we subtract from resources as defined above the family's out-of-pocket medical spending, including spending on insurance premiums.[18]

III. Estimated poverty rates

Table 1 contains our estimates of poverty rates in 1998 under the official poverty definition and eight alternatives to the official definition. Poverty rates are shown for the entire CPS population as well as a variety of subgroups within the noninstitutionalized population. The estimates in column 1 were obtained using the official poverty definition. That is, family resources were measured as pretax money income and were compared to the official poverty threshold to determine whether each family is poor.

The second column implements all of the NAS panel's recommendations except its proposed treatment of out-of-pocket medical spending. Out-of-pocket health expenditures are *not* subtracted from other net cash and near-cash in-kind income in this column to determine family resources. However, this column implements the NAS panel's other recommendations with regard to defining the poverty thresholds and measuring family resources. The third column implements all of the NAS panel's recommendations *including* its proposed treatment of family medical spending.

If out-of-pocket medical spending is not subtracted from available resources, the poverty rates under the official definition and the NAS panel definition are very close. The estimated poverty rate under the two definitions is within 1 percentage point over the entire period since 1979 (Burtless and Smeeding, forthcoming). The most striking feature of the tabulations in the first three columns of Table 1 is the much higher rate of poverty if out-of-pocket medical expenses are subtracted from household resources. In comparison with a

[18] Estimates of out-of-pocket spending are derived using the "MOOP imputation method" as described by Short et al. (1999, pp. C-16 to C-19). We took the imputed spending amounts directly from the Census Bureau's data files posted in the Bureau's Web site. For 1998, see http://ftp.census.gov/housing/povmeas/pov98/.

definition that ignores household medical spending, a definition that subtracts such spending adds 3.4 to 4.1 percentage points to the national poverty rate.

Subtraction of health expenditures also significantly changes the apparent composition of the nation's poor. Many of the people who are pushed into poverty have high spending on medical care because they are old or chronically disabled. Thus, the choice of a poverty definition makes a big difference in the relative poverty rates of different age groups. Under the official poverty definition, both elderly and nonelderly adults had the same poverty rates in 1998. The rate among children was 80 percent higher than that of adults (18.9 percent versus 10.5 percent). Under the second definition of poverty, the rate among children and the elderly falls while the rate among nonelderly adults is virtually unaffected (column 2). Under this definition, the elderly face the *lowest* risk of poverty (8.9 percent). Under the alternative definition that subtracts out-of-pocket medical spending, the poverty rate among the elderly almost doubles, rising to 17.7 percent (column 3). The rates among children and nonelderly adults rise more modestly, to 21.2 and 13.5 percent, respectively. Because the elderly face the biggest medical bills, their relative income position suffers the most under the third poverty definition.

As noted above, the high and rising medical spending of the elderly has also provided genuine improvements to their well-being. As older Americans' spending has increased over time, their average health has improved and their risk of dying at a given age has declined (Wolfe and Smeeding, 1999, Table 2). Under a definition of income that subtracts medical spending from household income, the upward trend in out-of-pocket spending could yield an increase in their measured poverty, even though it has also produced a real enhancement to their health, especially among the people who are spending the largest amounts.

The next six columns display poverty rates estimated using several variants of the poverty thresholds that include estimates of "reasonable" health outlays. The first three of these columns contain poverty estimates under "low," "intermediate," and "high" estimates of reasonable medical spending, where the estimates of reasonable spending were obtained without top-coding of NMES respondents' health expenditure reports (columns 4a, 4b, and 4c). The last three columns contain poverty estimates obtained using somewhat lower

estimates of reasonable medical spending. In particular, the estimates of reasonable spending were calculated with top-coded values of health expenditure reports (columns 5a, 5b, and 5c).

The estimated poverty rates in columns 4b, 4c, and 5c are uniformly higher than those shown in column 3. The estimates in column 4a and 5a are usually slightly below those displayed in column 3, while those in column 5b are usually a bit above those in column 3. Thus, only our lowest estimates of "reasonable" out-of-pocket medical spending produce a set of poverty thresholds that results in a lower poverty rate estimate than the one obtained under the NAS panel's recommendation. The other four estimates of poverty thresholds produce a higher poverty rate than the poverty definition proposed by the NAS panel.

All six variants of the new poverty definition produce a substantially higher estimate of poverty than the official poverty definition. The poverty rate under the new definition is 2.8 percent to 6.7 percent higher than the official poverty definition, depending on the variant of "reasonable" medical spending that is included in the poverty threshold. The jump in the poverty rate occurs because the poverty thresholds under all variants of the new definition are substantially higher than the thresholds in the official definition. Even using the lowest estimate of "reasonable" medical needs, the average poverty threshold in 1998 was 17 percent higher than the average poverty threshold under the official poverty definition (compare the first and third rows in Table 2). For families headed by a person aged 65 or older, the discrepancy is even larger. The addition of "reasonable" medical needs to the NAS-recommended poverty thresholds yields an average threshold that is 40 percent higher than the official poverty line. Even though the NAS-recommended measure of income used in the new poverty definition results in a much higher estimate of family resources at the bottom of the income distribution, the increase in the poverty thresholds produces the bigger impact on poverty. As a result, inclusion of medical needs in the thresholds greatly increases the estimate of poverty.

Why is the estimated poverty rate typically higher when reasonable medical spending is added to the poverty thresholds than when actual medical spending is subtracted from family resources? When we add an intermediate estimate of reasonable medical spending to the poverty thresholds, the overall poverty rate is 16.6 percent (column 4b). Under the preferred NAS poverty measure, the rate is just 16.1 percent (column 3). In part, the higher

poverty rate under the alternative poverty definition is explained by the fact that our intermediate estimate of reasonable medical spending includes a higher estimate of average spending than the actual average observed for some families. In particular, we assume that families which lack health insurance will spend as much as lower-middle-income families which are covered by an insurance plan, even though on average uninsured low-income families spend less than this amount. Under the NAS definition, only the actual amount of out-of-pocket spending is subtracted from other family resources to determine net family resources.

The most important reason for the higher poverty rate under our alternative definition, however, is that actual medical spending is very unevenly distributed in the population (see Figure 1). Among lower-middle-income nonaged families with health insurance containing two or three members, at least one of whom is in fair or poor health, average out-of-pocket medical spending is $3,545. This estimate of reasonable medical spending is added to the NAS panel's recommended poverty thresholds for all families with the indicated characteristics. However, two-thirds of all families in the category spent less than $3,545; one-third of all families spent less than half of $3,545; and 15 percent spent less than $500 on medical care. Thus, compared with the NAS panel's recommended procedure, our alternative procedure includes a higher provision for medical spending for the great majority of families. In a minority of cases, the NAS panel's procedure includes a bigger provision for medical spending than our alternative procedure, but these cases represent a small proportion of the families counted as poor.

As noted above, the NAS panel did not endorse a single set of poverty thresholds. Instead, it described a method for estimating thresholds that would cover the cost of minimal food, clothing, and shelter consumption, plus a small extra allowance for other necessary items except for medical care. It suggested that an appropriate threshold should fall in the range between 89.7 percent and 103.75 percent of median spending on food, clothing, and shelter. In deriving the thresholds used to estimate poverty rates under alternative definitions, we have used a multiplier at the mid-point of this range (96.725 percent of median spending). If instead we used the NAS panel's lowest multiplier, 89.7 percent of median spending, the thresholds and estimated poverty rates under the alternative definitions would fall. Under any of the variants we examined, however, the estimated poverty rate would remain above the rate

measured using the official poverty definition. For example, if we combined our lowest estimate of "reasonable" medical spending with the NAS panel's lowest multiplier on food, clothing, and shelter needs, the estimated poverty rate would be 13.9 percent, or 1.2 percentage points above the official estimate.

In order to reproduce the official estimate of poverty using the new poverty definition, it is necessary either to scale back the NAS panel's minimum estimate of spending needs for food, clothing, and shelter (plus a little extra) or to reduce our lowest estimate of "reasonable" medical spending. Assuming that all of the adjustment is made in the NAS panel's estimate of minimum food, clothing, and shelter requirements, we could reproduce the official estimate of the poverty rate by assuming that minimum spending requirements for food, clothing, and shelter (plus a little extra) are equal to about 85.4 percent of median spending on food, clothing, and shelter. This spending level is about 5 percent lower than the *minimum* proposed poverty thresholds suggested by the NAS panel. On the other hand, the new poverty threshold makes an explicit allowance for spending on medical care, with different medical spending allowances for families with differing health needs and health insurance coverage. In contrast, the poverty thresholds recommended by the NAS panel included no provision for medical spending. Under these circumstances, it is not obvious whether a threshold that provides enough resources for families to obtain 85.4 percent of median spending on food, clothing, and shelter plus an allowance for "reasonable" medical spending should be judged too parsimonious.

Relative poverty rates across subgroups in the population. Table 3 presents estimates of the relative poverty rates of different population subgroups under the competing poverty definitions. In each case, the poverty rate of the indicated group is measured as a percentage of the total poverty rate under that definition. For example, persons who are white and non-Hispanic have a poverty rate using the official poverty definition that is 65 percent of the overall official poverty rate. African Americans have a rate that is 206 percent of the official poverty rate for the population as a whole. In each column we show the relative poverty rates calculated under a different definition of poverty or using a different estimate of "reasonable" medical needs.

Although relative poverty rates are usually similar under all of the definitions we consider, there are some notable exceptions. Relative poverty rates are most similar under the definitions that include medical spending either in the measure of family resources or in the poverty thresholds. The biggest differences in relative poverty rates are between the two definitions that exclude any explicit treatment of medical spending (columns 1 and 2) and the remaining seven definitions that include such spending either in the measure of family resources (column 3) or in the poverty thresholds (columns 4a through 5c).

This important difference is highlighted in Table 4, which shows relative poverty rates under the official poverty definition (column 1) and under an alternative definition that includes "reasonable" medical spending allowances in the poverty thresholds (column 5a'). In this case we have used our lowest estimates of "reasonable" medical spending (used to estimate poverty rates in column 5a of Tables 1 and 3), but we have reduced our estimate of family spending requirements for food, clothing, and shelter to just 85.4 percent of median spending on food, clothing, and shelter reported in the Consumer Expenditure Survey. This estimate of the poverty thresholds yields an estimated poverty rate of 12.7 percent, exactly the same as the official poverty rate in 1998. Thus, the relative poverty rates displayed in Table 4 reflect relative poverty differences when the overall poverty rate estimated by the two definitions is exactly the same.

Including an estimate of necessary medical spending in the 1998 poverty thresholds increases the relative poverty rate of the elderly and reduces the relative poverty rate of children. It leaves the relative poverty rate of nonelderly adults virtually unchanged. The reason for the increased relative poverty of the elderly has already been mentioned. Older Americans spend larger amounts on medical care. Whether this fact is reflected in the poverty thresholds, as it is in the second column of Table 4, or in the measure of family resources, as it is in the poverty definition proposed by the NAS panel, the old-age poverty rate will increase. On the other hand, the relative poverty rate of children is reduced by inclusion of medical spending in the definition of poverty. Under the official poverty definition, the child poverty rate is nearly one-and-a-half times the poverty rate of the entire population. Under the alternative definition examined in Table 4, the child poverty rate is just 1.28 times the overall poverty rate. Two factors account for the improvement of the relative condition of children under the new poverty definition. First, since few families containing

children also contain elderly members, average health spending is somewhat lower among families with children than it is in the population as a whole. Second, many low-income families containing children receive free or nearly free health care as a result of enrollment in the means-tested medicaid program. This program has been gradually expanded over the past decade, allowing a larger fraction of low-income children to obtain free or inexpensive care. Moreover, in the implementation of the alternative poverty threshold examined in Table 4, we have assigned relatively low medical spending thresholds to many low-income families with children. Children who are reported to be uninsured are sometimes assigned out-of-pocket spending amounts characteristic of families that are insured by the medicaid program. This is done in cases where the income and other characteristics of the family suggest it is eligible for medicaid.

This method of assigning medical spending thresholds to families that appear to be eligible for medicaid, even if they do not report they were insured by medicaid, also helps explain changes in the relative poverty rate of families with a single-female head. These families have a lower relative poverty rate under the alternative definition than they do under the official poverty definition. Many of these families are insured by medicaid or have income and other characteristics that suggest they are eligible to be insured, even if they report they are uninsured.

Note that the relative poverty rate of central cities residents is reduced by including medical spending in the poverty threshold. On the other hand, the relative poverty rate of residents of nonmetropolitan areas increases when medical spending is included in the thresholds. Residents of rural areas, small towns, and small cities tend to be older and hence to face larger medical bills. Table 4 also shows that the alternative poverty definition would have a noticeable impact on the regional distribution of poverty. People living in the south face a relatively higher risk of poverty under the alternative definition; people in the northeast face a significantly lower relative risk under that definition. Of course, some of these changes in relative poverty rates are due to the different measures of family resources under the two poverty definitions. Nonetheless, the poverty differentials displayed in Table 4 show that adopting alternative ways of measuring poverty can subtly alter common perceptions of poverty.

IV. Conclusion

Critics of U.S. poverty measurement have long complained that the official poverty definition has serious defects. These deficiencies are most apparent in its treatment of health spending needs. Unfortunately, there are no simple approaches to incorporating medical spending in poverty measurement that command wide support among economists or policy analysts. Neither social scientists nor policymakers have defined a basic bundle of health care "necessities" as opposed to less essential health care "luxuries." The same medical procedure may save one person's life, ameliorate pain for another, and be harmful to another. Welfare evaluation of either medical consumption or medical need is notoriously difficult.

Some people have tried to implement simple fixes in our existing measures of family deprivation or household resources. For example, several early researchers proposed adding the monetary value of health insurance subsidies to other components of cash and noncash income to estimate a family's total spendable resources. This procedure greatly reduces measured poverty in population groups, such as the elderly, which have both generous health insurance subsidies and heavy medical utilization. A drawback of this procedure is that it assumes an unrealistic substitutability between health insurance protection and ability to consume other goods. Because households cannot easily use their health insurance coverage to pay for non-medical necessities, such as food and shelter, adding the cash value of health insurance subsidies to other household income overstates its value to most households, especially households with modest incomes.

A panel of the National Academy of Sciences proposed a radically different approach toward accounting for medical spending in the measurement of poverty. It suggested that health care expenses be integrated into poverty measurement by subtracting out-of-pocket spending on medical care from other elements of household income. In effect, all health care expenses, including those on health insurance premiums, would be treated as a "tax" on incomes. Under this procedure, the benefits provided by health care subsidies are assumed to be incommensurate with benefits generated by other consumption expenditures. The procedure treats two families as equally poor (or equally well off) if each has income of X, but one receives a free health insurance plan and the other does not. Many economists do not find the implications of the NAS Panel's procedure very appealing. Is it really true that two families with the same income and the same medical spending, but different medical

insurance plans, are both equally well off, even if one family has no insurance and the other is very generously insured?

Subtracting health care expenses from other income also produces a resource measure that does not directly address the problem of households' differing health care needs. Actual expenses reflect differences in health status and insurance coverage to some extent, because out-of-pocket spending is higher for those who are seriously ill and lower for those who are covered by a generously subsidized insurance plan. But actual medical spending provides no clear indication of the adequacy of health care available to individuals or households or of the appropriateness of the health services they receive.

In this paper, we have examined a procedure for measuring poverty that includes an estimate of the "reasonable" medical spending in the poverty thresholds. Instead of subtracting actual medical spending from other family income to measure net family resources, as proposed by the NAS panel, we obtain plausible estimates of expected medical spending requirements faced by different classes of families. The estimates take account of the number, age, and health of family members as well as their coverage under a health insurance plan. For families that lack insurance coverage, we attempt to estimate their expected spending to gain insurance coverage as well as to pay their medical bills after insurance coverage has been obtained. Because we do not have enough evidence to calculate "reasonable" health spending with much precision, we examine the sensitivity of poverty rates to the use of different estimates of "reasonable" medical spending.

Two conclusions stand out in this analysis. First, the inclusion of medical spending in the poverty definition has a large effect on the level and composition of poverty. Groups which are heavy users of medical care, such as the aged and disabled, appear to suffer relatively worse poverty when explicit account is taken of the burden of medical spending. This is true whether medical spending is subtracted from family resources – as proposed by the NAS panel – or approximations of "reasonable" spending levels are added to the poverty thresholds. Under either of these procedures, groups with high out-of-pocket expenditures on health care appear to suffer worse poverty rates than revealed by the official poverty statistics. Second, the level and composition of poverty is comparatively unaffected by the decision to add "reasonable" medical spending to poverty thresholds rather than subtract actual medical

spending from family resources. By judiciously selecting estimates of "reasonable" health spending, analysts can derive estimates of poverty thresholds that nearly duplicate the level and pattern of poverty found when actual medical spending is subtracted from family resources. The choice between these two methods of measuring poverty then largely depends on theoretical preferences and convenience of estimation, for both approaches to including health spending can produce virtually identical pictures of the nation's poor.

Appendix - Method of updating NMES medical spending amounts to reflect out-of-pocket spending in 1998

Our estimates of medical spending are ultimately derived from survey results obtained in the 1987 NMES. However, these estimates must be updated to reflect spending patterns in 1998, the calendar year for which poverty rates are estimated in this paper. We follow the Census Bureau's practice and up-date the expenditures reported in the 1987 NMES to reflect medical price inflation and estimates of aggregate out-of-pocket spending provided by an individual source (Short et al., 1999, pp. C-16 - C-20). To compute this aggregate spending total we first divide both the NMES and the CPS observations into cells based on four family characteristics:

- Age of family head: (1) Under 65 (2) 65 or older.
- Number of persons in family: If the family head is under 65, the categories are (1) One; (2) Two or three; (3) Four or more. If the family head is 65 or older, the categories are (1) One; (2) Two; (3) Three or more.
- Health of family members: (1) All family members report health as "good," "very good," or "excellent." (2) At least one family member reports health as "fair" or "poor."
- Health insurance status: (1) Every family member is insured; (2) Not every family member is insured, but more than half are insured; (3) Not every family member is insured, but at least half are uninsured; (4) Every family member is uninsured.
- We then determine the average spending within each cell of NMES and impute those average spending amounts to every family within the same cell of CPS. The weighted sum of the resulting spending in CPS is then compared to the independent aggregate total to obtain an adjustment factor. The spending amounts in NMES cells are then multiplied by this adjustment factor (and updated to 1998

dollars by medical price inflation), and these adjusted numbers are the ones used in our final calculations of average medical spending and alternative poverty rates.

Our estimates of "reasonable" medical spending for different categories of families are displayed in the Appendix table. The estimates we present there were derived using the *untruncated* distribution of medical spending. The estimates are of course lower if derived using mean spending within a sample where the top 5 percent of spenders have their spending amounts truncated at the 95th-percentile spending amount.

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Table 1. Profile of the Poor under Alternative Poverty Definitions, 1998 a/

Percent

Group or characteristic	Percent of population that is poor under definition number--								
	Official	NAS (a)	NAS (b)	*Mean spending not top-coded*			*Mean spending top-coded at 95th percentile*		
	(1)	(2)	(3)	(4a)	(4b)	(4c)	(5a)	(5b)	(5c)
All persons	12.7	12.0	16.1	16.4	16.6	19.4	16.0	16.2	19.0
Race and ethnicity									
White Non-Hispanic	8.2	7.9	11.5	11.5	11.6	13.3	11.1	11.3	13.0
White	10.5	10.0	14.0	14.2	14.4	16.8	13.8	14.0	16.5
African American	26.1	23.6	28.8	30.0	30.5	35.0	29.4	29.9	34.5
Asian or Pacific Islander	12.5	12.8	16.3	15.8	15.9	18.1	15.8	15.8	18.0
Hispanic b/	25.6	24.0	30.0	31.4	32.2	39.4	31.0	31.8	39.0
Member of immigrant household c/									
Yes	20.3	19.5	25.1	25.9	26.5	32.8	25.5	26.1	32.4
No	11.6	10.8	14.7	14.9	15.2	17.3	14.5	14.8	17.0
Age group									
Children (under age 18)	18.9	17.0	21.2	21.1	21.2	25.0	20.7	20.9	24.8
Nonelderly adults (age 18 to 64)	10.5	10.4	13.5	13.8	14.2	16.9	13.6	13.9	16.6
Elderly (age 65 and older)	10.5	8.9	17.7	19.2	19.3	19.7	17.9	18.1	18.5
Family structure									
In all families	11.2	10.7	14.6	14.6	14.9	17.8	14.3	14.6	17.5
In married-couple families	6.2	6.0	9.3	9.1	9.3	11.6	8.9	9.1	11.4
In families with a female householder, no spouse present	33.1	31.1	37.4	37.9	38.8	43.4	37.4	38.2	43.1
Unrelated individuals	19.9	17.4	22.9	24.9	24.9	26.6	23.9	23.9	25.5
Residence									
In metropolitan areas	12.3	11.5	15.1	15.4	15.7	18.3	15.1	15.3	18.0
In central cities	18.7	17.0	21.6	22.2	22.6	18.7	21.7	22.1	18.7
In suburbs	8.6	8.2	11.3	11.5	11.6	8.6	11.2	11.4	8.6
Outside metropolitan areas	14.4	14.0	19.5	20.0	20.3	14.4	19.4	19.7	14.4
Region									
Northeast	12.3	10.7	14.6	14.6	14.8	12.3	14.2	14.5	12.3
Midwest	10.3	9.8	13.5	13.8	14.0	17.0	13.4	13.6	16.6
South	13.7	13.5	17.9	18.5	18.8	15.9	18.1	18.4	15.6
West	14.0	13.0	17.1	17.2	17.5	22.0	16.8	17.2	21.7
Head of family or spouse works									
Yes	8.7	8.6	11.9	11.8	12.1	20.9	11.6	11.8	20.5
No	31.6	28.0	35.9	38.0	38.4	40.0	36.9	37.2	38.8

a/ Definition 1: Official poverty measure; Definition 2: Modified NAS definition, ignoring the impact on net income of medical out-of-pocket spending; Definition 3: Modified NAS definition, subtracting medical out-of-pocket spending from household income. Definitions 4a, 4b, 4c, 5a, 5b, and 5d: Six different alternative measures using the fixed averages method for medical out-of-pocket spending. For details see text.

b/ Persons of Hispanic origin may be of any race.

c/ Member of a family headed by an immigrant or an unrelated individual who is an immigrant.

Sources: U.S. Census Bureau and authors' tabulations of March 1999 CPS file.

Table 2. Average Poverty Thresholds under Alternative Threshold Definitions, 1998

Threshold definition	Families headed by person under 65	Families headed by person age 65 or older
Official poverty threshold	$14,840	$10,660
NAS-recommended threshold	14,960	11,520
NAS threshold + "reasonable" medical expenses a/	17,390	14,970

a/ Lowest estimate of "reasonable" medical expenses (see text).

Source: Authors' tabulations of March 1999 CPS files.

Table 3. Relative Poverty Rates of Population Subgroups under Alternative Poverty Definitions, 1998 a/

Poverty rate as a percentage of the overall poverty rate under the definition

	Percent of population that is poor under definition number--								
	Official	NAS (a)	NAS (b)	*Mean spending not top-coded*			*Mean spending top-coded at 95th percentile*		
Group or characteristic	**(1)**	**(2)**	**(3)**	**(4a)**	**(4b)**	**(4c)**	**(5a)**	**(5b)**	**(5c)**
All persons	100	100	100	100	100	100	100	100	100
Race and ethnicity									
White Non-Hispanic	65	66	71	70	70	69	70	69	68
White	83	83	87	86	87	87	86	86	87
African American	206	197	179	183	183	181	184	184	182
Asian or Pacific Islander	98	107	102	97	96	94	99	98	94
Hispanic b/	202	200	187	192	193	204	194	196	205
Member of immigrant household c/									
Yes	160	163	156	158	159	169	160	161	170
No	91	90	91	91	91	90	91	91	89
Age group									
Children (under age 18)	149	142	132	129	128	129	130	128	131
Nonelderly adults (age 18 to 64)	83	87	84	84	85	87	85	86	88
Elderly (age 65 and older)	83	74	110	117	116	102	112	111	97
Family structure									
In all families	88	89	91	89	89	92	89	90	92
In married-couple families	49	50	58	56	56	60	56	56	60
In families with a female householder, no spouse present	261	259	233	232	233	224	234	235	227
Unrelated individuals	157	145	143	152	149	137	150	147	134
Residence									
In metropolitan areas	97	96	94	94	94	95	94	94	95
In central cities	147	142	134	135	136	97	136	136	99
In suburbs	68	68	71	70	70	44	70	70	45
Outside metropolitan areas	113	117	121	122	122	74	122	121	76
Region									
Northeast	97	89	91	89	89	63	89	89	64
Midwest	81	82	84	84	84	88	84	84	87
South	108	113	112	113	113	82	113	113	82
West	110	108	106	105	105	114	105	106	114
Head of family or spouse works									
Yes	69	72	74	72	72	108	72	73	108
No	249	233	223	232	231	206	231	229	204

a/ Definition 1: Official poverty measure; Definition 2: Modified NAS definition, ignoring the impact on net income of medical out-of-pocket spending; Definition 3: Modified NAS definition, subtracting medical out-of-pocket spending from household income. Definitions 4a, 4b, 4c, 5a, 5b, and 5d: Six different alternative measures using the fixed averages method for medical out-of-pocket spending. For details see text.

b/ Persons of Hispanic origin may be of any race.

c/ Member of a family headed by an immigrant or an unrelated individual who is an immigrant.

Sources: U.S. Census Bureau and authors' tabulations of March 1999 CPS file.

Table 4. Relative Poverty Rates of Population Subgroups under Alternative Poverty Definitions, 1998 *a/*

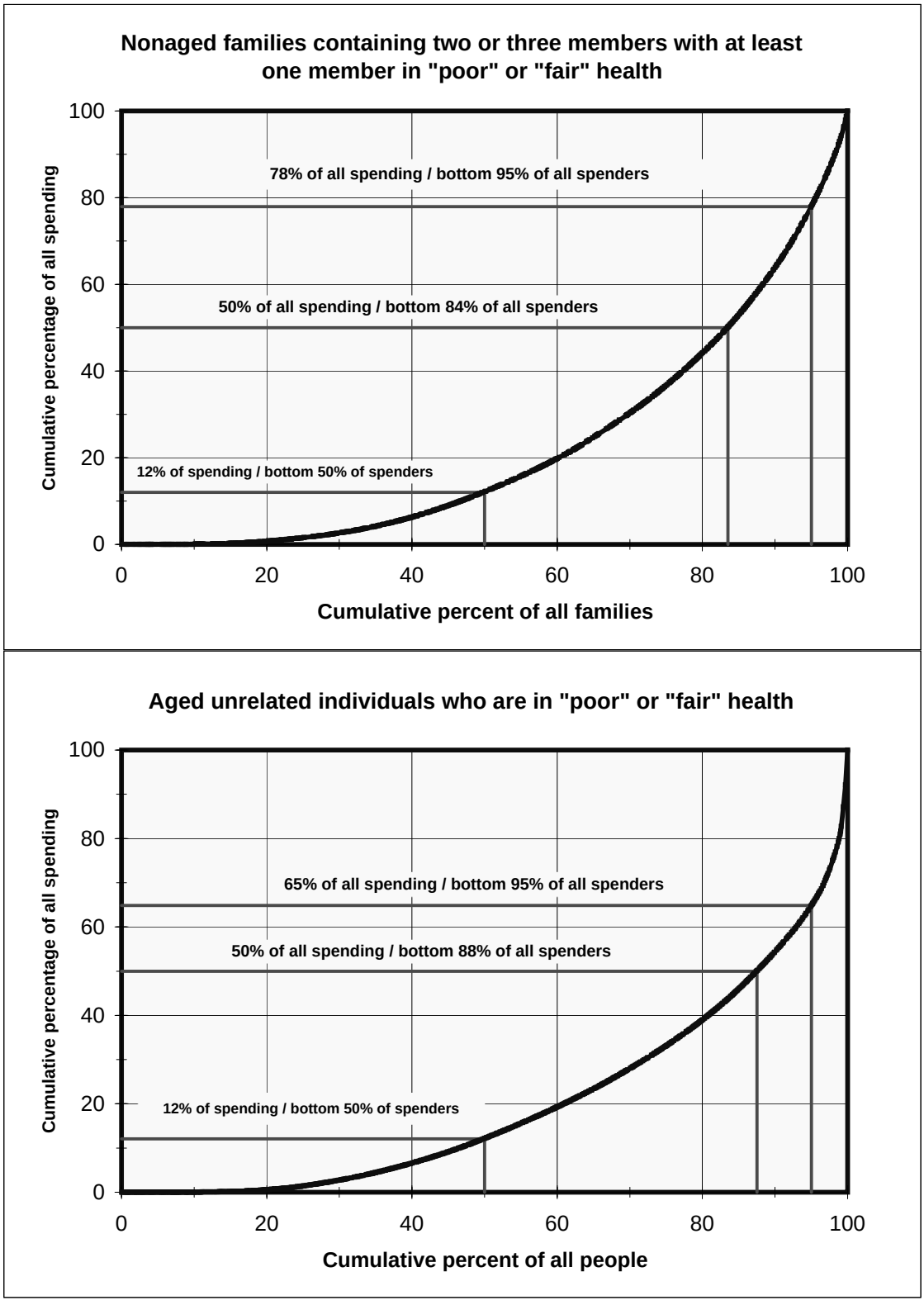
Poverty rate as a percentage of the overall poverty rate under the definition

Group or characteristic	Poverty definition	
	Official	(5a')
All persons	100	100
Age group		
Children (under age 18)	149	128
Nonelderly adults (age 18 to 64)	83	86
Elderly (age 65 and older)	83	109
Family structure		
In all families	88	87
In married-couple families	49	50
In families with a female householder, no spouse present	261	244
Unrelated individuals	157	162
Residence		
In metropolitan areas	97	94
In central cities	147	137
In suburbs	68	70
Outside metropolitan areas	113	121
Region		
Northeast	97	89
Midwest	81	83
South	108	115
West	110	104

a/ Definition 1: Official poverty measure; Definition 2: Alternative poverty definition that yields same estimate of poverty rate as official poverty definition (see text).

Sources: U.S. Census Bureau and authors' tabulations of March 1999 CPS file.

Figure 1. Cumulative Distribution of Out-of-Pocket Medical Spending in the 1987 National Medical Expenditure Survey



Source: Authors' tabulations of 1987 National Medical Expenditure Survey.

Appendix Table. "Reasonable" Out-of-Pocket Medical Spending and Its Relation to Family Characteristics, Measured in 1998 Prices

High Estimate[1]			*Healthy Family*[2] Family Size[6]			*Less Healthy Family*[3] Family Size		
			1	2	3	1	2	3
Non-elderly family head,[4]	Not fully insured,	Not Receiving Medicaid	$3,346	$6,938	$7,525	$4,349	$7,668	$7,104
		Receiving Medicaid	3,346	6,938	7,525	4,349	7,668	7,104
	Fully insured,	Not Receiving Medicaid	1,382	2,862	2,935	2,896	3,544	3,518
		Receiving Medicaid	512	580	953	332	1,200	1,903
Elderly family head,[5]	Not fully insured,	Not Receiving Medicaid	2,409	4,201	4,843	2,696	5,011	4,134
		Receiving Medicaid	2,409	4,201	4,843	2,696	5,011	4,134
	Fully insured,	Not Receiving Medicaid	1,987	2,968	3,146	2,549	4,421	4,482
		Receiving Medicaid	485	1,372	1,388	1,670	1,230	2,962

Middle Estimate[1]			*Healthy Family*[2] Family Size[6]			*Less Healthy Family*[3] Family Size		
			1	2	3	1	2	3
Non-elderly family head,[4]	Not fully insured,	Not Receiving Medicaid	$1,382	$2,862	$2,935	$2,896	$3,544	$3,518
		Receiving Medicaid	512	580	953	332	1,200	1,903
	Fully insured,	Not Receiving Medicaid	1,382	2,862	2,935	2,896	3,544	3,518
		Receiving Medicaid	512	580	953	332	1,200	1,903
Elderly family head,[5]	Not fully insured,	Not Receiving Medicaid	1,987	2,968	3,146	2,549	4,421	4,482
		Receiving Medicaid	485	1,372	1,388	1,670	1,230	2,962
	Fully insured,	Not Receiving Medicaid	1,987	2,968	3,146	2,549	4,421	4,482
		Receiving Medicaid	485	1,372	1,388	1,670	1,230	2,962

Low Estimate[1]			*Healthy Family*[2] Family Size[6]			*Less Healthy Family*[3] Family Size		
			1	2	3	1	2	3
Non-elderly family head,[4]	Not fully insured,	Not eligible for Medicaid[7]	$1,382	$2,862	$2,935	$2,896	$3,544	$3,518
		Eligible for Medicaid	512	580	953	332	1,200	1,903
	Fully insured,	Not eligible for Medicaid	1,382	2,862	2,935	2,896	3,544	3,518
		Eligible for Medicaid	512	580	953	332	1,200	1,903
Elderly family head,[5]	Not fully insured,	Not eligible for Medicaid	1,987	2,968	3,146	2,549	4,421	4,482
		Eligible for Medicaid	485	1,372	1,388	1,670	1,230	2,962
	Fully insured,	Not eligible for Medicaid	1,987	2,968	3,146	2,549	4,421	4,482
		Eligible for Medicaid	485	1,372	1,388	1,670	1,230	2,962

Source: Authors' tabulations of NMES as explained in the text.

[1] All calculations are based on the untruncated distribution of medical spending observed in the NMES updated to spending amounts for 1998.

[2] All family members report health as "good," "very good," or "excellent."

[3] At least one family member reports health as "fair" or "poor."

[4] Under 65.

[5] 65 or older.

[6] If the family head is under 65, the categories are (1) One member; (2) Two or three members; (3) Four or more members. If the family head is 65 or older, the categories are (1) One member; (2) Two members; (3) Three or more members.

[7] Our imputations of eligibility for Medicaid are based in part on descriptions and analysis described in Broaddus and Ku (2000). Eligibility criteria were found in Hoffman and Schlobohm (2000) and the 1998 and 2000 editions of ***The Green Book*** .