

Who's at Risk? Designing a Medical Care Risk Index

Pat Doyle, U.S. Bureau of the Census
patricia.j.doyle@ccmail.census.gov
May 1, 1997

ABSTRACT

This paper strives to do three things: (1) operationalize the concept of a Medical Care Risk Index, (2) recommend an approach for computing the index, and (3) identify how the value of benefits of health insurance plans held at a particular point in time can be calculated. This effort was undertaken because, in 1995 the National Academy of Sciences (NAS) Panel on Poverty and Family Assistance recommended that the Federal government develop a Medical Care Risk Index to be used as a companion to measures of the well-being of the population. They suggested that this be a prospective measure of the adequacy of health insurance in the U.S., focusing on future risk by identifying that proportion of the population which has inadequate coverage in the face of potentially high medical expenditures. While NAS expressed the opinion that the index could be computed independent of an economic poverty measure, they recommended it take into account each family's resources in determining its ability to pay for needed to receive medical care. This approach is in accord with recent literature in the area of a health services research. This recent research points to an approach for defining underinsurance that relies on individuals' potential out-of-pocket costs in the event of a catastrophic illness or injury. Being a prospective measure, and not dependent on explicit insurance provisions, this method of defining underinsurance proves to be an excellent model for the Medical Care Risk Index.

DISCLAIMER

The views expressed in this paper are those of the author. No endorsement by the U.S. Bureau of the Census is intended or should be inferred.

ACKNOWLEDGMENTS

My great thanks to the following people who commented on early drafts of this paper and tolerated my seemingly endless set of questions: Connie Citro of the National Academy of Sciences, Committee on National Statistics; Ted Anagnoson and George Greenberg of the Office of the Assistant Secretary for Planning and Evaluation, Department of Health and Human Services; Pam Short of the Rand Corporation; Richard Bavier of the Office of Management and Budget; and Dan Weinberg and all of the members of the poverty measurement committee at the U.S. Bureau of the Census (Enrique Lamas, Larry Long, Mary Naifeh, Chuck Nelson, Martina Shea and Kathy Short). Thanks also to Karen Wheelless of the U.S. Bureau of the Census for her very helpful editorial assistance.

INTRODUCTION

In 1995, the National Academy of Sciences (NAS) Panel on Poverty and Family Assistance recommended sweeping changes to the way the Federal government measures poverty in the United States (Citro and Michael, 1995). Areas which they focused on as needing revision included the treatment of benefits received in kind and, in particular, the benefits of subsidized health insurance. The NAS panel had two recommendations with regard to health insurance and expenditures for medical care: (1) deduct out-of-pocket costs of medical care from income in computing economic poverty, and (2) add a Medical Care Risk Index (MCRI) to the roster of Federal statistics on well-being. The panel explicitly desired that such an index be distinct from economic poverty and be indicative of a person's ability to meet the financial burdens of potential future health care needs.

The NAS recommendation to produce the MCRI left wide open the questions of how to produce the index and who will publish the corresponding Federal statistics. This paper addresses these technical issues of implementation, providing more detailed criteria for creation of the index itself, a proposed implementation approach based on some recent work on estimating the underinsured, and a set of recommendations for the Federal government and the broader research community to consider. Following an in-depth description of the NAS recommendations this report presents five criteria for a MCRI:

1. It should reflect risk,
2. It should reflect medical and resource needs,
3. It should be quantifiable,
4. It should incorporate well-defined accounting periods, and
5. It should be measurable with available data or at least data which could be obtained with reasonable time, cost, and effort.

The report then proceeds to suggest a methodology with the potential to satisfy the criteria posed, discusses potential changes to that methodology to improve its utility for this purpose, and concludes with recommendations for implementation of the index.

THE NAS RECOMMENDATIONS

In their report on the NAS recommendations for poverty measurement, Citro and Michael(1995) stated:

- Recommendation 4.3. Appropriate agencies should work to develop one or more "medical care risk" indexes that measure the economic risk to families and individuals of having no or inadequate health insurance coverage. However such indexes should be kept separate from the measure of economic poverty. (p. 225)

This recommendation, together with the recommendation to deduct out-of-pocket medical costs from income in defining economic poverty, addressed thorny issues which have plagued early attempts to define benefits from subsidized health insurance programs. However, it left technical issues to be resolved in the areas of insurance definition, adequacy, and value.

A. ISSUES RESOLVED BY THE NAS RECOMMENDATION

The NAS recommendation clearly distinguished between two distinct accounting periods--the past and the future--and noted that the MCRI applies to the future. The recommendation also avoided the old anomaly that insurance (if not properly valued) can make a sick person look better off than a healthy person at the same income level. Finally, the academy proposal emphasized the notion of defining the index for the family unit rather than a health insurance unit for consistency with the poverty definition.

1. Accounting Periods Clearly Defined

Previous measures of benefits of insurance lacked clarity with regard to whether the measure was retrospective (like the economic poverty measure itself) or prospective (like insurance typically is viewed).

The benefits received in the past (i.e. the retrospective view) are the amount of expenses toward health care actually paid for by the insurance provider; plus, reimbursements for expenses incurred in prior periods less payments by the individual to obtain those benefits (i.e., household share of premiums and expenses).⁽¹⁾

However, insurance plans are valued for their potential prospective benefits, (i.e., benefits to be received in the future, should the need for medical care arise).

The academy proposal suggested the prospective accounting of insurance benefits through the establishment of the MCRI. The prospective view is a longer term view, unlike the typical prior one-year or one-month accounting of economic well-being. The MCRI recognizes that insurance is purchased for the protection it may offer in the future. The perceived benefit to be gained "in case" of a need for medical care is the value of the plan and a major factor in the family's computation of a cost/benefit ratio. This concept (like the concept of assets) does not fit well in the measure of economic poverty because it does not apply to the appropriate period in time. Separating it, as the academy recommends, allows the measurement of insurance adequacy to more appropriately reflect expected values.

On the other hand, the Academy recommendations explicitly employed the retrospective accounting period in the proposed economic poverty measure in two ways: (1) they propose to exclude medical needs in computing the poverty threshold, and (2) they propose to deduct actual out-of-pocket costs of nondiscretionary health care and premium expenses from income. The NAS proposal counts medical benefits so long as they offset medical expenses and are not considered available for other purposes.⁽²⁾ The more insurance reduced necessary family out-of-pocket expenses toward medical care during the period over which economic poverty is measured, the higher the value and benefits of the plan and the less that's deducted from income. If no expenses were required for health care, then there were no benefits gained during the time period of interest (other than reimbursements for prior period expenses).

2. Equity in Benefit Measures

Insurance benefits under either accounting period are not fungible; you must incur medical costs in order to receive insurance benefits. Unfortunately, (from the perspective of valuing benefits) in any given year even generous insurance plans pay very little benefits to healthy persons while skimpy plans pay vast amounts for persons with catastrophic health care needs. As a result, some previous attempts to define or value medical benefits yielded the unacceptable conclusion that the sicker you are, the more benefits you receive, and hence the richer you are.⁽³⁾

The NAS proposal for the MCRI avoided this anomalous outcome in that it recognized "benefits" to healthy persons as well as benefits to persons with more than a small amount of medical expenses. The notion was to construct, for the index, an indicator of whether insurance held at a fixed point in time was "adequate" for some future period in time. Adequacy in this context referred to insurance plan provisions in addition to ability to pay for services. Once you defined adequate, you could compare expected costs and benefits over some period to the level of financial resources and to the level of adequacy to determine the MCRI.

Defining adequacy and defining expected costs and benefits are technical details to be addressed in this paper (see subsequent sections). Citro and Michael (1995) state that the technical problems to be faced in defining

adequacy "... appear to be overwhelming." However the works of Farley (1985) and Short and Banthin (1995) suggest a method of valuing plans (SB method) that takes into account the richness in detail of insurance plans, the great variety of options which can be included in an insurance plan, and the net cost of medical care relative to income. Hence, the recommended MCRI is quite promising.

The reference period for the SB method is prospective, consistent with the NAS view of insurance adequacy. This method requires prediction of future medical expenditures, insurance benefits, financial resources, and health status. Because it measures the adequacy of plans held at a specific point in time, it assumes the observed insurance status, financial resources, and health and disability status remain constant over the prospective period of one year. The only thing that changes in that period is the pattern of medical expenses. The method imposes a catastrophic medical event and then determines the adequacy of the insurance benefits for protecting against undue financial hardship as a result of illness or injury.

3. Benefits to Families

The measures of insurance adequacy that rely strictly on attributes of an insurance plan are difficult to generalize to the Census family, i.e., the unit appropriate for poverty measurement.⁽⁴⁾

However, the NAS proposal implicitly specified benefits to Census families in its retrospective measure of economic poverty through the exclusion from income of out-of-pocket costs. Specifically, out-of-pocket costs incurred by an individual (toward nondiscretionary services) whether for his own or someone else's health care were deducted from his/her income and the net result summed to the family level.⁽⁵⁾

Depending on the method of implementation, the NAS's proposed prospective MCRI can be defined at the Census family level as well. For example, if the measure of adequacy, as defined for the index, is a function of the reduction in out-of-pocket costs for expected health care needs and premiums, then the index for each family can be quantified as the expected total medical and premium expenses of family members less the out-of-pocket costs expected to be incurred by the family members after all insurance claims are paid. There is a technical problem of defining the accounting period over which expected expenses and expected reimbursements are computed but this can be addressed in the design of the MCRI.

B. TECHNICAL ISSUES NEEDING RESOLUTION

While the concept of the medical care risk index shows great promise, the actual approach has not yet been fully specified. Some issues need to be addressed in the areas of data availability, measuring financial security, defining adequacy, and valuing benefits.

1. Data Availability

The MCRI will necessarily rely on detailed expenditure and insurance information only available through the National Medical Expenditure Surveys. Until recently this was a major drawback due to the once-a-decade administration of the surveys. However, with the redesigned Medical Expenditure Panel Survey (MEPS) the needed data collection will occur frequently and regularly. Unfortunately, this rich source of data on out-of-pocket medical expenditures does not currently provide detailed asset information, which will restrict the options for determining the ability to pay. It also does not reflect the income and nonmedical expense information needed to define economic poverty as proposed by NAS.

The Survey of Income and Program Participation (SIPP) provides detailed income and asset information, some information on health insurance, and some newly-added questions on health care utilization but it does not measure medical expenditures.⁽⁶⁾ Thus, no single survey is adequate by itself. Together the medical expenditure surveys and SIPP provide a rich source of information on which to base the MCRI.

2. Measuring Financial Security

In describing the MCRI, the NAS report explicitly considered the role of formal health insurance programs in providing protection against future liabilities for nondiscretionary medical services. However, they repeatedly referred to "...the ability to pay for required out-of-pocket costs". (p 237). To clarify the affordability issue, we need to explicitly address the role assets can play in "...people's risk of incurring medical care costs that exceed their ability to pay..."(p.237)

One form of financial protection that is particularly relevant is liquid assets that can be easily converted to cash to cover excess out-of-pocket medical expenses. Persons may opt not to purchase a formal insurance policy if they are confident in their ability to cover any medical costs that should occur. Such people are not "inadequately insured". They simply choose an unconventional form of financial protection. The cost of this form of protection is potentially less because there is no overhead or profit to pay the insurance provider and interest earned on the accrued balances goes to the individual. On the other hand, the cost is potentially more since medical expenses could be higher in the absence of utilization controls imposed by large insurance carriers.

Another form of financial security is the use of credit lines to facilitate borrowing to cover medical costs. One can have a credit card or credit line established for the sole purpose of meeting future medical expenses. In that way, payment for services can be stretched over some period of time subsequent to the use of services, rather than in advance of the use of services as is often the case with insurance. However, credit generally does not come without net positive asset balances, so the credit card/credit line option is another use of assets to cover future medical costs. Furthermore, it is not costless given that repayment of the loan involves interest to the lender.

The MCRI concept can be designed to take into account the role that assets can play in protecting families against unaffordable health care expenses. In essence, the expected out-of-pocket costs projected to occur (over some time period) can be compared to countable net assets and any amount in excess of the countable assets will assumed to be a liability to be offset by income. Of course, countable assets is a term needing explicit definition. Does it encompass nonliquid as well as liquid assets, does it allow for sufficient assets to be set aside to cover future nonmedical obligations such as college tuition or retirement benefits, and does it include any equity in the principle residence?

3. Defining Adequacy

The Academy recognized the dilemma of valuing benefits in that medical expenses, no matter how large, are not burdensome until they begin to take away from resources needed for basic living expenses.⁽⁷⁾ However, the Academy did not propose an approach to measure adequacy in terms of affordability.

Moon (1993) suggested an approach to defining adequacy based on attributes of insurance plans quantified in some manner. She suggested one approach to quantifying health insurance plan attributes would be to compute an actuarial value. The actuarial value represents the expected average direct costs to the insurance carrier of benefits to be paid to or on behalf of its policyholders and dependents in a given year.⁽⁸⁾ With this approach, Moon recommended defining adequacy by comparing the actuarial value of plans held to the actuarial value of a basic benefit plan with no copayments or deductibles. Insurance plans with actuarial values at least as large as the basic benefit package would be considered adequate.

However, given that the role of out-of-pocket costs is ideally to reduce utilization and thus keep overall costs down, it is not clear that basing a health benefits standard on a plan with no cost controls is appropriate. The actuarial value of the threshold plan in this case would presumably reflect the behavior of persons with no barriers to access and thus represent a higher rate of utilization of services than that which is actually needed to maintain health. Hence, the thresholds for the health benefits standard would be too high relative to the medical needs.

Most importantly, however, this approach ignores the affordability issue. Low income working people may have an adequate insurance plan based on the actuarial value of that plan but not be able to take advantage of plan benefits because they cannot afford the necessary out-of-pocket costs.

We can begin to see the likely outcome of the actuarial value approach in Short and Banthin (1995), who implemented it in two of their options for defining the underinsured.⁽⁹⁾ One of the two options defined the basic benefit packages to be the insurance plan described in the Health Security Act proposed by President Clinton in his first term of office (HSA plan). The other option defined the basic package to be the largest federal employee health benefits plan (FEHB plan). The authors compared rates of underinsurance from each of these two options to the SB method (discussed in detail later) that defines health need standards based on the level of out-of-pocket costs for medical care relative to income.⁽¹⁰⁾

Short and Banthin found that estimated rates of underinsurance based on actuarial values were sensitive to the attributes of the basic benefit plan selected and thus to assumptions regarding imposition of costs controls. The HSA plan yielded overall rates of underinsurance well above the corresponding rates yielded by the FEHB plan option (31 percent versus 16 percent). At the same time, the actuarial value of the HSA plan only exceeded the actuarial value of the FEHB plan by 8 percent. The similar actuarial values combined with different rates of underinsurance suggests a high concentration of insurance plans at about the same level of actuarial value. Another important finding was that the overall rates of underinsurance in the FEHB and SB-method were similar (16 percent versus 19 percent), but the characteristics of those underinsured were different. The SB method yielded an underinsured population that was poorer and sicker than the FEHB plan underinsured population.

4. Valuing Benefits

The MCRI as discussed in the context of the NAS report did not explicitly value benefits of insurance plans held. However, such valuation is necessary to help quantify benefits under subsidized plans.

The NAS-recommended approach to measuring economic poverty implicitly valued benefits of plans held over the retrospective period of poverty measurement. The implied benefits equaled the reduction in out-of-pocket expenditures on medical care less the out-of-pocket costs of obtaining those benefits. For example, in the case of Medicaid covered services, the out-of-pocket costs are zero in many states so the benefits of the plan during the poverty measurement period would, in fact, be the net total costs incurred by the government and the providers of services used. Also, in the case of employer-subsidized insurance, the implicit retrospective value of the employer subsidy equaled the total expenditures incurred less the employee share of the premium and less the required out-of-pocket costs toward medical care.

However, the value of the benefits of current plans held over a prospective period was not quantified under the Academy proposal. Defining this value prospectively is fraught with technical difficulties including determination of the appropriate accounting period over which to measure it and the appropriate formula for the value. In this paper, I propose an approach to the valuation of benefits based on one of the Short and Banthin approaches to defining the underinsured. The SB method based insurance adequacy on the expected annual costs of persons should they experience a catastrophic event and the resulting impact of the medical expenses on the family

finances. Before discussing their approach I propose a set of criteria against which this and other proposed approaches to the MCRI can be measured.

CRITERIA TO EVALUATE DIFFERENT APPROACHES TO MCRI

The fundamental question of insurance adequacy to be addressed by the MCRI is:

- Do you now have sufficient insurance to ensure your future net liabilities for nondiscretionary medical services fall within a level you can afford?

To be accurate the MCRI needs to reflect the risk of incurring unaffordable, out-of-pocket costs toward needed medical care and toward premiums. I quantify the answer to this question in terms of five major criteria abstracted from Moon (1993), Citro and Michael (1995) and the earlier discussion. The following sections discuss each criteria in turn.

A. INDEX MUST REFLECT RISK

The most important criteria for the MCRI is equity across persons of varying health status. While someone may be healthy today and not expect to incur any medical costs in the near term, accidents do happen and unexpected illnesses do occur. Thus the MCRI should not be conditioned exclusively on current health status. In other words, the procedure for constructing the MCRI should avoid the outcome that sick people are better off because they have the potential to receive higher insurance benefits.

Another criteria is that it reflect the true risk of incurring excessive out-of-pocket costs independent of the decision to purchase insurance. Health insurance differs from other benefits in that it represents protection against some (usually unknown) future event where the "future" is an ill-defined period of time. Persons who choose no insurance (self-administered or otherwise) may choose to be unprotected because they perceive themselves to be invulnerable. It is unrealistic, however, to place a value of zero on insurance benefits for such persons because there is a nonzero probability that sometime in the future they will become ill or otherwise in need of medical services, even though they do not expect that to be the case.

The MCRI must recognize the variation in need among homogeneous groups of persons. Typically insurance companies will group units into homogeneous groups over which medical costs are averaged. In that way, the companies can adjust premiums according to demographic characteristics that tend to be associated with medical care utilization. Unfortunately for our purposes within these otherwise homogeneous groups, persons do not actually have uniform levels of risk of incurring medical costs.

B. INDEX MUST REFLECT RESOURCE AND MEDICAL NEED

Establishing the index suggests that a standard for adequacy will be constructed against which the circumstances of each unit can be compared. Measures of adequacy need to reflect the provisions of insurance plans held, potential access to free or subsidized care, and the ability to pay the required amounts for receipt of insurance benefits.

1. Insurance Adequacy

Insurance adequacy can be defined broadly in terms of plan characteristics. Having well-child care, for example, is an important factor in determining the quality of an insurance plan, not just because it is a popular feature. It is also a feature that encourages preventative behavior which in the long run reduces medical costs.

However, there are pitfalls to just considering plan characteristics in the abstract. For example, having well-child care coverage is of no benefit to persons with no dependent children. Thus, the plan attributes need to be evaluated in the context of the characteristics of the individual unit.

Short and Banthin noted "The biggest problem [in estimating the number of underinsured] is that different people emphasize different objectives in formulating a definition of underinsured. In particular, there has long been a tension between those who favor generous insurance for primary care and those who would limit insurance to more costly services ...[Health insurance] Reformers [in the debates of the early to mid-1990's] also had to face the question of whether 'one size fits all' in setting insurance standards or identifying the underinsured. For example, do healthy people require less insurance than unhealthy people? Should the standards be relaxed for high-income families who can afford more out-of-pocket expenses"? (P. 1302) At the end of the health care reform debate of the first Clinton administration, there was no agreement on a benefit standard against which a person's insurance plan could be compared to determine its adequacy.

2. Access to Subsidized Care

Subsidized medical care is available in several forms: professional courtesy, charity care, research institutions like the National Institutes of Health (NIH), and health clinics managed by the public health service and others. Professional courtesy and charity care are at the prerogative of individual health care providers on a case-by-case basis and thus cannot be considered as a substitute for insurance. The availability of research institutions, like the National Cancer Institute, offers people the opportunity to take part in a clinical trial if they have illnesses covered by research funds. In that way subsidized care is provided to the individual, and thus any insurance plan held is reduced in value. However, the uncertainty regarding the eligibility of a future illness for coverage under a research project makes this option an inappropriate substitute for insurance.

The Public Health Services Act directs the government to provide medical services to medically underserved areas of the U.S. These are either urban or rural areas where more than half the population does not have access to medical care.⁽¹¹⁾ The services are available to the full community in the qualified areas and include acute care as well as preventative care, ancillary services, and links to programs for the needy. While most beneficiaries of these services are poor,⁽¹²⁾ poverty status is not an eligibility criteria. Thus the Community Health Centers (i.e., the centers sponsored by the government under the public health service act) provide a safety net for all persons in a given geographical area to acquire at least minimal health care when needed. Such programs can therefore be viewed as a substitute for insurance.

3. Affordability

All persons, except the very rich, are at some level of risk of incurring medical costs beyond their ability to pay. High medical costs arise for life-saving procedures used to cure catastrophic illnesses; as well as, maintenance of function and comfort for persons with severe and chronic health problems. They come in the form of charges for advanced surgical and diagnostic techniques as well as long-term care. The question is: What is an acceptable level of risk such that being above it classifies someone as inadequately insured?

The level of risk varies by the level of income. Obviously, regardless of health status or probability of incurring a catastrophic event, the very rich have a small chance of incurring costs they cannot afford. On the other hand, persons in families with income below the official poverty threshold have, by definition, no extra income to spend on anything beyond food, shelter, and clothing, even if the out-of-pocket costs were minimal.

The level of risk also varies by the amount of nonmonetary resources at the disposal of the individual. As a prime example, consider liquid assets. A money market account of \$100,000 in 1993 would cover the expenses of most hospital-based surgical procedures even without the benefits of insurance.⁽¹³⁾ Even nonliquid assets provide a resource to cover medical costs as they can be used to secure needed loans (for example, home equity loans or loans from profit-sharing plans.) As noted, assets can provide a form of self-protection against unaffordable medical expenses that should not be overlooked among persons who choose not to buy insurance. Furthermore, the level of risk varies by the amount of necessary nonmedical or uncovered costs incurred. For example, to get the appropriate care for some catastrophic illnesses, it may be necessary for the patient and family to relocate to a new city, thus incurring extra travel and living expenses and perhaps facing a loss in earnings. Also, families with no insurance may become eligible for Medicaid benefits under the Medicaid spend down provisions, but they have to liquidate virtually all of their current assets and resources to do so.

The final level of risk varies by access to and the services provided by public health service and other forms of subsidized care discussed above.

C. INDEX MUST BE QUANTIFIABLE

Implicit in the formulation of the MCRI is that policies held at a specific point in time have some value in comparison to some expected expenditures. Also implicit in the formulation is the notion that there is some time period over which future liabilities and benefits will be assessed. With this view of the question we have four important concepts to be defined under a Medical Care Risk Index: threshold, value, cost, and benefits.

1. Threshold

Typically a threshold is the minimum standard against which income or other quantitative measures are compared. However, in the context of the Medical Care Risk Index, its useful to think more in terms of the maximum standard against which liabilities can be compared, i.e., an "inverted" threshold. The inverted threshold is the amount of out-of-pocket expenses you should be able to afford for needed medical care. Such a measure can be established for a group as a function of the poverty threshold itself or can be computed for an individual or family as a function of income or assets.

2. Value

The value of the current insurance is the potential reduction in the patient's (or his/her family's) liability for medical costs attributable to the insurance. In other words, if potential total medical expenditures in a given time period are \$100,000, and you are obligated to spend only \$20,000 for medical care, then the prospective value of the insurance policy during that period is \$80,000.

3. Cost

The cost is the full premium payment including the household share and any subsidy that may be provided by an employer or the government. However, the accounting period over which cost is measured is not clear, as discussed in Section D.

4. Benefits

Benefits, on the other hand, accrue when you incur medical costs and the benefits equal the value of the plan less the household share of the premium. The amount of benefits varies significantly depending on the accounting period as discussed in section D. Note, for individuals covered under unsubsidized insurance policies, benefits over the lifetime of the policy can theoretically be negative, representing the cost of paying the insurer to provide the insurance. The cost of paying the insurer to provide the insurance can be reduced to the extent the insurance plan provisions induce cost saving behaviors either on the part of the medical provider or the patient. Benefits to persons in subsidized plans are theoretically:

- (the reduction in household share of the premium) + (any savings in out-of-pocket costs that are attributable to insurance) - (the cost to the insurer to provide benefits). However, for both subsidized and unsubsidized plans, actual benefits rise and fall with the need for medical care and the establishment of the prescribed accounting period for benefit measurement.

D. INDEX REQUIRES WELL-DEFINED ACCOUNTING PERIOD

Two aspects of the accounting period are crucial. First is the period covered and second is the period length.

1. Period Covered

As discussed, retrospective versus prospective views of insurance adequacy yield very different conclusions. Viewed retrospectively, having no insurance is adequate if you incur no medical costs. Viewed prospectively, unless there are sufficient resources to cover out-of-pocket costs toward a catastrophic medical event, having no insurance is not adequate, even for the healthiest people.

Obviously, creating a prospective index requires assumptions and or predictions about future medical events. It also requires assumptions regarding future insurance coverage, family composition, and financial resources. Note that a prospective measure of insurance adequacy can be applied to insurance held at any point in time. Hence it clearly applies to determining the adequacy of plans held at the point of most recent observation. However, it also applies if you are interested in insurance adequacy during a retrospective period such as the period over which income is determined for the official poverty measure. In the latter case, you would simply examine reports of insurance coverage at various points during that period and apply the prospective measure of adequacy based on that insurance coverage, even though you are observing the insurance coverage in a historical time period.

2. Period Length

Period length is a hard issue to resolve in the context of insurance since the payment for insurance can span a lifetime while the use of the bulk of the benefits can be limited to a few months. If we measure value only over an episode of illness (say two months) and measure cost as the sum of premium contributions to date, then we do not adequately balance the two in determining benefits. Early in the cycle of an insurance policy, the value is high to those persons who incur significant medical expenses and the value is low (or even negative) to persons who do not incur such expenses. On the other hand, over the lifetime of a policy (that is not subsidized), premiums on average will exceed the amount of the reduced liabilities for medical care (in the absence of utilization and cost controls) so that, on average, no one has positive value or benefits and insurance companies cover their administrative costs and profit. In actuality some people (the very sick) will have very high value while many (the very healthy) will have negative value, having paid considerably more in premiums than they eventually used to reduce out-of-pocket medical costs.

Given that the index is intended to measure how adequate your current insurance will be in the future, the index must necessarily be developed from prospective information on medical care liabilities. It is also appropriate to require that costs, value, and benefits be measured over the same prospective period. The length of that period is arbitrary since presumably an individual can cancel or acquire an insurance policy at any time, and can change policies during an employee's open season or a job change. However, as a practical matter, one year is reasonable as the period length for three reasons: (1) it is consistent with the accounting period over which poverty is typically defined, (2) insurance contracts are often effective for a period of one year with renewable options⁽¹⁴⁾ and (3) nonpayment of the premium will cause cancellation of the policy with no further benefits even if previous premium payments exceeded any reimbursements for medical costs incurred (plus the insurance load).⁽¹⁵⁾ Under that assumption, we would define total expenses, reduction in out-of-pocket costs, and household premium contributions as the sum of such items over a one-year period, and compute value, costs, and benefits for that same time period.⁽¹⁶⁾

Also, given the context of the query, it is fine to assume the future financial resources, insurance policies, and family composition are the same throughout the prospective measurement period with some exceptions that directly relate to health benefits. It is important to capture whatever safety net exists for the provision of health services. A prime example is Medicaid spend down provisions. A family with limited resources which can become eligible for Medicaid after exhausting all of the current financial resources is not strictly uninsured. On the other hand, they should not be classified as adequately protected, if they have to become impoverished to deal with a significant medical event.

E. INDEX IS DEFINED BY AVAILABLE DATA

Clearly any index must be feasible to produce with available data or through modest extensions of current data collections. In fact, attributes of publicly available information that is timely, comprehensive, routinely available, and accessible will determine the specifics of any given index.

1. Type of Needed Information

In order for the MCRI to describe insurance adequacy, obviously the data need to describe the attributes of insurance plans held. In order to describe risk, the data need to capture some key determinants of medical

utilization and expenditures. Actual expenditures are not necessary data elements for the routine application of the index because the index is a function of likely future events. However, researchers need medical expenditures to develop and update models that predict future utilization and expenditures. Finally, in order to describe affordability, analysts need both income and asset measures along with attributes that determine potential eligibility for subsidized insurance or medical care in the event of catastrophic illness.

Additional attributes are desirable in a data set to facilitate the coordination of the MCRI with economic poverty measures. For example, having the data for the MCRI within the same data set used to compute the poverty measure facilitates cross tabulating the index with poverty. Such analysis can inform policy makers as to how best to target insurance reform to those least able to fulfill their financial obligations toward medical care.

2. Limits To Be Faced

Technical issues pose barriers in constructing the appropriate data base and software to compute a MCRI.

Furthermore, resolution of these issues may not yet be within reach.

As discussed in detail in Doyle and Johantgen (1996), ideally we need sufficient information to distinguish between discretionary and nondiscretionary health care costs. With such distinction we could exclude expenses not needed to maintain health from the predictive model of medical costs. However, such information does not now exist and so we cannot list it as a strict criterion for the data to support the MCRI. In fact, Citro and Michael (1995) thought the likelihood of collecting such information was so remote that the issue should be ignored for now in deducting out-of-pocket costs for the retrospective poverty measure.

It is unclear, in the current environment of changing medical care delivery systems, even what constitutes total expenditures, and hence the value of insurance policies, and how to compute benefits. In the traditional fee-for-service environment, medical providers were not insurers and they charged a fee for each service they provided. The sum of the fees, from all relevant providers across all services provided, constituted a total charge against which insurance benefits would be applied. However, in today's world, medical providers are not always completely distinct from insurance providers⁽¹⁷⁾ and the lack of boundaries results in a loss of information on costs per unit of service.

THE SB APPROACH

Short and Banthin noted an irony of the recent health care reform debate: no agreement surfaced on a benefit standard against which all insurance policies could be compared and hence on the definition of the underinsured population; yet, some general consensus arose as to the number of underinsured. That number originated with a Short (a.k.a. Farley (1985) estimate of the number of persons with inadequate insurance. She derived this measure based on the likelihood that an individual would incur catastrophic illness, injury, or condition resulting in out-of-pocket expenditures exceeding 10% of family income.

This section discusses the Short method (a.k.a. SB method) and its strengths and weaknesses as a candidate for constructing a MCRI. It concludes with recommended changes to the approach to make it more suitable for the MCRI.

A. THE SB METHOD IN DETAIL

Following is a summary of the approach used by Farley and by Short and Banthin to determine insurance adequacy among nonelderly persons with private health insurance. Subsequently, I present a summary of some design features which can be easily altered and explored if this approach is adapted for the MCRI.

1. The Methodology

Short and Banthin defined persons as underinsured if they were privately insured but at risk of incurring catastrophic medical expenditures not adequately covered by their current insurance policy(ies). They chose to define catastrophic illness as "...a high level of total expenditure, corresponding to the average for people in the 99th percentile of actual expenses... for two different risk groups." (P.1303) They implemented this definition of underinsurance on a nationally representative sample of the civilian noninstitutionalized U.S. population using a five-step procedure:

1. The authors first classified each individual into one of two risk groups based on age, race/ethnicity, sex, income, perceived health status, disability days, and usual activity limitations.
2. Within each risk group, the authors identified an annual expenditure scenario reflecting expenses of a person in that group who experienced a catastrophic event. A person experienced a catastrophic event if the total medical costs paid across all payers fell above the 99th percentile of annual costs, ranked by costs from least to most.
3. The authors assigned the catastrophic expenditure scenario from the low-risk group to all persons in that risk group and assigned the other expenditure scenario to all persons in the high-risk group.
4. The authors computed for each person out-of-pocket expenses on direct medical care as a function of the attributes of insurance plans covering each person, the expenditure scenario assigned to each person in each risk group, and the net payments after reimbursement.
5. The authors deemed persons to be underinsured if they were covered under private insurance and their out-of-pocket costs exceeded 10 percent of family income.

Short and Banthin applied the method to nonelderly persons in NMES, which collected detailed medical expenditures by type of service and detailed attributes of insurance plans held. The NMES data originated from a combination of household in-person interviews and follow-back surveys to employers, insurance providers, and medical providers (Edwards and Berlin, 1989). Short and Banthin used data from the 1987 survey aged to represent 1994. However, the earlier Farley application relied on unaged data from the 1977 NMES (formerly known as the National Medical Care Expenditure Survey).

2. Optional Features

In the conduct of these studies of underinsurance, some key design decisions were based on common practice and/or characteristics of the underlying data in the original study.⁽¹⁸⁾ Farley made the initial design decisions for the earliest study and then Short and Banthin replicated them for the second study to examine changes in the outcome. These design alternatives can be revisited as the approach is adapted to the Medical Care Risk Index, examining sensitivity of the outcome to the design choice and exploring alternative functional forms. A discussion of these design choices as they were made by Farley follow.

a. Inverted Threshold

Based on common practice, Farley chose to set the "inverted" threshold of determining adequacy (upper bound on out-of-pocket costs) to 10 percent of family income. The SB method used the NMES total income concept which resembled the total money income concept used in the March Current Population Survey (CPS). Family income in the 1977 survey matched the money income concept used in the official poverty definition. On the other hand, family income used in the 1987 survey was close in concept to CPS-based money income but not precisely the same.⁽¹⁹⁾ Nonetheless, income-to-poverty ratios derived from the 1987 survey compare reasonably well to the March CPS (Doyle, Beauregard and Lamas, 1993).

There is some room for sensitivity analysis here and perhaps for reconsidering the form of the function. It is true that 10 percent of money income among the poor is small and that this inverted threshold is more likely to define a person as underinsured among the low-income population than among the upper-income population. However, it is also true that units with income below poverty can not even afford to spend the 10 percent of their income on medical care without giving up some other basic necessities. Perhaps, therefore, the fraction of income can be decreased as income declines so that at the poverty cutoff, insurance needs to reduce out-of-pocket costs to the level provided in the poverty threshold in order to be adequate.

If the new definition of poverty is used in analysis then, perhaps, the income definition used the SB method should change to be consistent. For example, projected out-of-pocket medical costs could be compared to disposable income rather than to total income.⁽²⁰⁾

b. Defining Risk

As noted, the SB method classifies persons into one of two risk groups, low and high. Predicted expenditures, computed as a function of the characteristics listed above, determine the assigned risk category. Based on the distribution of predicted expenditures by level of expenditures, the SB method places persons in the low risk group who had predicted expenditures in the lower 75th percentile. It places other persons in the high risk group. The choice of two risk categories (as opposed to more than two) and the split of the sample at the 75th percentile were constrained by the sample size in the 1977 survey and the definition of catastrophic events (the top 1 percent). The study needed sufficient sample from the 1977 survey to support a reasonable estimate of the level and distribution of expenditures within the top expenditure category. Choosing the appropriate balance between the number and definition of risk groups was at the discretion of the authors. For the MCRI project, some room exists for sensitivity analysis and experimentation with alternative designs.

The definition of catastrophic as a function of the top 1 percent of expenditures was also arbitrary; although, Farley performed some sensitivity analysis in the earlier study. When Farley lowered the cutoff for catastrophic illness from the 99th percentile of expenses to the 95th percentile, the number of underinsured declined by one-third.

B. STRENGTHS AND WEAKNESSES OF THE SB METHOD AS A MODEL FOR MCRI

The SB method of defining underinsurance goes a long way toward meeting the criteria for a Medical Care Risk Index. The discussion which follows evaluates the method using the criteria set forth above.

1. Risk

The SB method captures the risk of incurring high out-of-pocket costs and does not rely directly on expenditures incurred over a retrospective period of time. It also recognizes variation in expenditures among homogeneous groups.

However, it is not fully independent of the decision to purchase insurance since persons with no insurance are treated as uninsured regardless of the predicted expenditures or other factors associated with the choice to obtain insurance. Furthermore, it has a fundamental problem in that the method, as originally designed, ignores the elderly population which are predominantly covered under Medicare and assumes persons with public but no private insurance are adequately insured.

Like the poverty measure itself, the SB method has only been applied to persons in the civilian noninstitutionalized population. While institutionalized persons may be at risk of incurring excessive out-of-pocket costs, it is acceptable for our purposes to exclude them.

2. Resource and Medical Need

The SB method relies explicitly on the details of each person's insurance plan(s) and thus provides a good measure of insurance adequacy that applies across all types of plans. It does not attempt to rank insurance plans based on a standard set of insurance provisions.

It also considers the adequacy of the insurance in the context of the individual's liability for and ability to pay for medical care. Hence, persons with low income need not incur much in the way of out-of-pocket costs in order to be judged as inadequately insured.

However, this method does not reflect a broad interpretation of ability to pay since persons with no private or public insurance are treated as uninsured regardless of their financial resources. That is, persons are treated as uninsured if they have no formal insurance policy, regardless of whether their income or assets are sufficient to cover the predicted out-of-pocket costs of catastrophic care.

Also, the SB approach does not take into account the availability of subsidized care. It focuses instead, on the adequacy of private insurance plans among persons privately insured.

3. Quantifiable

The SB method yields a measure of the value of insurance plans and, from that, a method to compute benefits under subsidized insurance plans. The value of the plan is the difference between the predicted total expenses over the given accounting period and the predicted out-of-pocket costs toward those expenses, once insurance has provided the complete amount of reimbursement to the appropriate parties. This method works well for expenditure under a fee-for-service environment as they reflect charges per unit of service multiplied by the number of units provided. The method also works well under managed care arrangements that have comparable per person per unit of service cost accounting typical of a fee-for-service environment.

However, in today's world, and hence in future MEPS surveys, total expenditures may not be so clearly defined. When they are not, plan valuation under the SB (and other) method(s) will need to be modified. In a capitated plan where physicians are either paid a salary or a fixed amount per patient, the cost per unit of service may vary and, more likely, may not be recorded at all. In managed care plans, persons' out-of-pocket costs often consist of flat fees per office visit which do not vary by the number or intensity of procedures performed. Plan administrators set the fees so that the sum of the fixed fees collected over the plan services plus the sum of premiums collected over plan members (total of premiums paid by all parties affiliated with subsidized plans) are sufficient to cover the plan costs and administrative expenses in the aggregate. There is often no cost accounting at the patient-visit level and the declining availability of these data has been a source of frustration of the health services research industry.⁽²¹⁾ Researchers and policy analysts cannot now define a total expenditure that is necessarily reflective of volume or intensity of service use, so they are left to question how or even if they will define total expenses.⁽²²⁾

4. Accounting Period

Consistent with the above recommendations for the MCRI the accounting period of the SB method is prospective for medical costs. The accounting period for measurement of the value, the cost, and the benefits of insurance is one year. Income and insurance status over the prospective period are assumed to be equal to the income reported for the prior year which is adequate for the MCRI.

5. Data Availability

Finally, the SB method relies on data that (as of today) are expected to be continuously available. Short and Banthin used data from the 1977 and 1987 NMES surveys. However, with the advent of the MEPS in 1996, these data will be collected continuously and will be made available starting in Spring 1997. There, necessarily, will be a lag in the availability of the detail needed for this method (i.e., the data from the follow-back surveys which are not projected to be available until fall of 1998) but with the continuous processing of data, we expect the lag to be considerably less than it was for the earlier NMES surveys.

MEPS began in 1996 with substance and design comparable to the earlier NMES's. There are important differences between MEPS and NMES but they only strengthen MEPS applicability to the measurement of the MCRI. MEPS is collected using Computer Assisted Personal Interviewing techniques and includes questions more highly tailored to the individual respondent's circumstances than NMES. Its supplements will vary from those included in NMES but include the information important to MCRI, including the possibility of collecting some asset data. The potential period of observation for each MEPS unit is longer than NMES and plans call for new panels to be introduced each year, thus providing continuous data collection and increased sample size for analysis. Finally, the initial MEPS samples are drawn from the Health Interview Survey, which also serves as the initial screening interview.

MEPS has some drawbacks common to the earlier expenditure surveys. It reflects a lower priority on, and hence less emphasis on, income than SIPP, with the corresponding reduction in detail and quality. MEPS also reflects a lower priority and hence less emphasis on asset balances, with a reduction in the amount of detail collected,

when compared to SIPP. Finally, there is less information on the items needed to define countable income under the proposed new retrospective poverty measure.

C. POSSIBLE CHANGES

The SB method will be well-suited as a model for the MCRI if a few adjustments can be made to the approach. These adjustments include expanding the underlying universe, extending the measure of affordability, and redefining income. Other issues -- expanding the universe to the institutionalized population and compensating for the change in cost accounting in the health industry -- are important to consider in the context of the MCRI but not necessary to address as yet.

1. Universe

We in the poverty research community need to expand the approach to the full civilian noninstitutionalized population. Thus we need to develop a simulation of public insurance plans, of private insurance plans for the elderly, and of public and private plan interactions as they impact on net out-of-pocket costs. We also need to treat the uninsured in a different manner so that we can account for financial resources as a form of insurance.

2. Affordability

We need to extend the measure of affordability to take into account the available assets and income. Operationally, the concept of countable assets needs quantification. We need to determine which types of assets could be used to cover medical costs and, of those, how much can be available to cover costs without jeopardizing future well-being. Once defined, countable assets can be approximated based on information in the surveys. If the family's estimated countable assets exceed the predicted out-of-pocket cost of the catastrophic event for one of its members, then the person would not be at risk in the context of the MCRI. Furthermore, if the family's estimated countable assets did not exceed the predicted out-of-pocket costs but disposable income did, the person would not be at risk, as long as income, net of medical and other necessary expenses, is sufficient to cover the basic cost of living for the family. Other persons whose combined disposable income and countable assets were not sufficient to cover basic costs of living plus out-of-pocket expenses, would be at risk.

3. Income

We need to determine the appropriate income measure to use in the MCRI. The recommended change in economic poverty measurement includes a redefinition of income so that mandatory costs to the family (such as taxes) are excluded in determining income adequacy. Should we make the same change and define the inverted threshold as a function of the amount of net disposable income available to cover medical expenses?

4. Institutionalized

We could consider how such an index would be computed for institutionalized persons, given that asset, income, and expenditure data do exist from the MEPS nursing home surveys. However, the needed data do not exist for the institutionalized population outside the universe of nursing homes covered by MEPS. Furthermore, the one year accounting period may not be adequate given the extended stays in long term care facilities.

5. Total Expenditures

The industry-wide problem of lack of cost accounting by unit of service is a problem we cannot solve in the context of the MCRI. The solution needs to come from the health services research industry. We need to assume that health researchers will develop a measure of resource utilization or of expenditures, that can then be used to calculate plan value for services used. With the value thus determined, benefits can continue to be computed as the difference between expected plan value and household contributions to insurance premiums.

D. VALUATION OF BENEFITS

As noted, the SB approach lends itself to valuation of insurance plans held and the benefits to be gained under both subsidized and unsubsidized insurance policies. Such procedures may be important even if the government does not adopt the NAS recommendations for computing economic poverty and creating one or more versions of the MCRI. For example, in the debate over measuring economic poverty universal agreement has not been achieved on the treatment of health insurance benefits. There was one dissenter among the NAS panel who believed that the recommendations for the treatment of out-of-pocket medical costs in measuring family resources was "troubling" (Citro and Michael, 1995, Appendix A). As a result, some possibility exists that proposed revisions to the measurement of poverty may yet include some form of valuation of health insurance benefits.

Given the possibility that the research community may still want to value insurance plans held during a retrospective period over which poverty is measured, the SB approach is applicable as a tool for valuation of benefits, even if it is not used as the approach for computing the MCRI. Each insurance plan held during the reference period of economic poverty can be valued as an insurance plan, i.e., for its potential to provide benefits, rather than for the actual benefits received during the retrospective period. The valuation approach is the same as that described earlier. Total plan value represents the reduction in liability for medical care attributable to insurance (including reduction in the total cost of the health care attributable to insurance as well as the reduction in the amount due directly to the provider). The SB method bases this on the potential reduction in costs should a catastrophic illness occur. The cost of the insurance plan to the insured population is the

amount of money paid to achieve those benefits (i.e., the household share of the premium) and the value of the plan benefits are the total plan value minus the cost.

The plan and benefit values will vary depending on the accounting period used to value the plan and its benefits as discussed earlier. I assume a prospective period of one year for valuation of each plan held is reasonable for the same reasons it is reasonable for the MCRI. For persons having only one set of insurance plan characteristics throughout the retrospective period, this approach would directly yield the values used in the measurement of poverty. For persons changing their insurance status or plans during the year, the total plan values for the year would equal a weighted average of the prospective annual values estimated with the SB method. The weighting would be based on the number of months in each insurance status or holding each plan. The methodological issues do not become any easier to resolve with the valuation of retrospective insurance policies than they are with the MCRI but they are not any harder either. The main issue is that the surveys on which economic poverty is likely to be measured do not provide the needed detail on the characteristics of insurance plans held. Thus such characteristics would have to be imputed.

RECOMMENDATIONS

I recommend that the Federal government develop a Medical Care Risk Index based on the Short and Banthin method of defining underinsurance. That method is promising in its attention to risk of future liabilities for medical care, its potential for prospective valuation of benefits under subsidized plans, and its feasibility within the constraints of available data.

In addition, the methodology is amenable to expansion and modification along the four lines needed for the MCRI. First, the government can adapt an income definition consistent with either income definitions used for poverty measurement--cash money income under the current definition or disposable income under the proposed new method. Second, the government can expand it to apply to the full civilian noninstitutionalized population regardless of current insurance status, health status, and age. Third, the government can extend its scope to include all the major public insurance plans and their interactions among themselves and with private insurance. Finally, the government can adapt the measure to yield an index of affordability of medical care consistent with ability to pay and take into account available subsidized care and insurance provisions for destitute persons.

Three aspects of the recommendation--the data, the production and the evaluation--are discussed in detail below.

A. DATA

The official Medical Care Risk Index can be produced from the MEPS as soon as the household and follow-back survey data for 1996 are collected and processed (target date: fall 1998). Furthermore, the index can be created annually thereafter incorporating subsequent years of MEPS data. The 1996 sample is relatively small (approximately 22,000 people as of the end of round 3) but subsequent year samples will be larger (over 30,000 people) as multiple panels of the survey will be fielded simultaneously and can be combined for estimation.

MEPS is well-suited to support most aspects of the MCRI, particularly the prediction of out-of-pocket expenditures. It is too soon to tell for sure, but the survey will likely have a sufficient measure of cash income to replicate the income definition employed by the official definition of poverty. It will likely not fully support alternative definitions of disposable income, such as that proposed by the NAS. Some asset information is likely to be present in the survey as well but it may not be the full complement.

Given that MEPS will likely not support a full set of assets and does not support the NAS proposed definition of disposable income, a companion MCRI derived from the Survey of Income and Program Participation (SIPP) could be informative. SIPP provides the appropriate income and asset data but not the detailed expenditure and insurance information.⁽²³⁾ To facilitate research on this issue, the Census Bureau recently expanded the survey with questions designed to facilitate a statistical match with the health expenditure surveys (Doyle, 1997).

Although designed to facilitate the assignment of retrospective out-of-pocket costs to the SIPP observations, the Census Bureau can easily expand the match to impute detailed attributes of the insurance plans held to each SIPP observation. With the imputed insurance plan attributes, observed income and assets, and the application of a MEPS-based model to predict expenditures, the Census Bureau can produce preliminary estimates of the MCRI. Furthermore, with the use of imputed data, the Census Bureau can eventually time the production so that the MCRI and the poverty measure are announced concurrently.

Ideally, a measure of the MCRI based on the March Current Population Survey (CPS) and coincident with the current official poverty definition is a desirable addition to the Federal statistics on well-being. However, given the current content of the March CPS, considerable review of the quality of the outcome measures will be needed. The March CPS lacks some of the important information needed to do a good statistical match to the expenditure survey. Furthermore, the CPS lacks asset data and some aspects of the model to predict future expenditures.

B. IMPLEMENTATION

As implied, implementation could be focused in at least two agencies. The Census Bureau, as the agency which produces the official poverty measure, could produce a preliminary estimate of the Medical Care Risk Index

along with the official poverty measure. The department of Health and Human Services (HHS), which administers the underlying data, could produce an official MCRI.

I recommend that the Census Bureau produce preliminary rather than final estimates for two reasons--timing and quality. In terms of timing, the need to rely on follow-back surveys to collect some details needed for the MCRI means that final estimates of the MCRI cannot be produced at the same time as the official estimates of poverty unless imputed insurance data are used. The Census Bureau now routinely produces estimates of poverty within six months after collection of the data (nine months after the poverty measurement year) and well ahead of when the data on detailed attributes of insurance plans held at the end of the year can be collected and processed. SIPP-based estimates will take longer than CPS-based estimates because of the need to longitudinally link and edit the multiple survey waves, but even then the lag is not expected to be more than one year after data collection.

HHS can focus exclusively on producing the final estimate of underinsured on a schedule consistent with data availability, waiting for all necessary information to flow through the data collection, edit, and imputation phases. Clearly, we want to minimize the time it takes to produce the final MCRI. However, having the preliminary estimate available along with the poverty measure will relieve some of the pressure to publish the final number before it is ready; particularly, if some methodological research demonstrates that the preliminary measure is a reliable estimate.

Clearly more methodological work is needed before the MCRI can be produced by anyone either directly from medical expenditure surveys or indirectly from the income and poverty surveys. The highest priority work is the direct application and expansion of the methodology according to the recommendations discussed above. Hence, in the short term, prior to release of the 1996 MEPS with expenditure data, the two agencies (HHS and Census) can productively expand and adapt the SB methodology based on the 1987 NMES and SIPP data. The activities would include: adapting the SB methodology to public use data, and expanding it to include all major public plans and plan interactions.

C. EVALUATION

I think it is prudent to conduct an evaluation of the MCRI as it is tested on the NMES and SIPP data before it is formally adopted as an official statistic. The evaluation should include:

1. Analysis of the number and distribution of persons with inadequate insurance relative to the attributes of those persons with adequate insurance.
2. Experimentation with some aspects of the design to examine sensitivity of the results to various parameter settings discussed earlier. Candidates for exploration are the inverted threshold proposed to be 10 percent of income (we should at least consider a rate of 7.5% of income consistent with the tax system or a cutoff at the poverty threshold consistent with the standard allowance for out-of-pocket costs), the 99th percentile cutoff to define catastrophic illness, and the number of risk groups.
3. Comparison of the outcome of the medical care risk index to other estimates of the population with inadequate insurance
4. Comparison of the assigned plan benefits to the output of other plan valuation methods.

It is also important to study the differences between the preliminary and final estimates of MCRI. Of particular interest is to determine if there is a bias that may be introduced in the application of the methodology to an income survey where detailed attributes of insurance plans need to be imputed.

REFERENCES

Agency for Health Care Policy and Research (AHCPR). "HCUP-3 Pocket Guide: Statistics from the HCUP-3 Nationwide Inpatient Sample for 1993." Rockville, MD: Agency for Health Care Policy and Research, forthcoming, 1997.

Citro, Constance F. and Robert T. Michael, Editors. *Measuring Poverty: A New Approach*. Washington, DC: National Academy Press, 1995.

Doyle, Pat. "How Can We Deduct Something We Do Not Collect? The Case of Out-of-Pocket Medical Expenditures." In preparation for the Annual Meeting of the American Statistical Association, 1997.

Doyle, Pat, Karen Beauregard, and Enrique Lamas. "Health Benefits and Poverty: An Analysis Based on the National Medical Care Expenditure Survey." Presented to the annual meeting of the American Public Health Association, 1993.

Doyle, Pat and Meg Johantgen. "The New Poverty Measure: Administrative Data as a Source of Medical Expenses." 1996 Annual Research Conference Proceedings. Washington, DC: U.S. Bureau of the Census, 1996.

Edwards, W. Sherman and Martha Berlin. *Questionnaires and Data Collection Methods for the Household Survey and the Survey of American Indians and Alaska Natives*. DHHS Publication PHS 89-3450. Rockville, Md:

Public Health Service, National Medical Expenditure Survey Methods 2, National Center for Health Services Research and Health Care Technology Assessment, 1989.

Farley, Pamela J. "Who are the Underinsured?" *Milbank Quarterly*, 1985;63, pp.476-504.

Moon, Marilyn. "Incorporating Health Issues in the Measurement of Poverty." Washington, DC: The Urban Institute, July, 1993.

Short, Pamela Farley and Jessica S. Banthin. "New Estimates of the Underinsured Younger than 65 Years." *Journal of the American Medical Association*, October 25, 1995, Vol 274, No. 16, pp. 1302-1306.

ENDNOTES

/1 Note that, depending on the reference period for observation, "benefits" can be negative. In particular, some insurance plans require the patient to first pay for (some or all) health services in full and then submit a claim for reimbursement. For persons enrolled in such plans we can observe one of three possible scenarios: the full cycle of premium payment, bill payment and reimbursement (observing on average no benefits); the first part of the cycle of premium payments and bill payments but no reimbursements (generating negative benefits); or the last part of the cycle of premium payments and reimbursements but no bill payments (positive benefits).

/2 Benefits in this case referred to the removal of obligation to pay for expenses incurred. Payment of some expenses may be deferred but this only serves to increase liability and decrease assets.

/3 Refer to Citro and Michael (1995) and references noted therein.

/4 Health insurance benefits go to individuals, couples, or families, each referred to as health insurance units. However, health insurance units may consist of a proper subset of the Census family members, a superset of the Census family members or a combination of persons within and without the Census family. (The Census family is defined by the Census Bureau to be cohabitating persons related by blood, marriage, or adoption.) The classic inconsistency between the Census family and the health insurance unit is the ability of parents to include emancipated children older than age 18 under their health insurance plan or the ability of divorced parents to include children residing under their insurance plan.

/5 Note expenses for individuals can exceed their income, particularly in the event of catastrophic illness. Thus, the economic poverty measure captures sharing of income and benefits across family members and captures the net impact of the complex reimbursement policies of some (often more traditional) insurance plans.

/6 One question is included to capture the deduction for out-of-pocket medical care specified in the Food Stamp Program eligibility criteria.

/7 Many reviewers of the early drafts of this paper reacted to the notion of defining affordability based on basic needs. These needs, as defined for poverty, do not explicitly allow for reserves set aside to cover obligations such as college tuition for dependents.

/8 Note that premiums and actuarial values are related. Total premiums paid by or on behalf of a policyholder are established based on the actuarial value of the plan plus the cost of administering the plan and the profit.

/9 Note, however, Short and Banthin adapted plans that included copayments and deductibles.

/10 Rates of underinsurance reflect the percent of the population whose insurance was deemed inadequate based on the definition employed. These rates of underinsurance were limited to the population with private insurance and do not include the uninsured.

/11 There is also a provision directing the government to provide primary care services to migrant workers in medically underserved areas.

/12 The Bureau of Primary Health Care (BPHC) Fact sheet revised 12/96 states that 66 percent of the beneficiaries are poor. BPHC is part of the Health Resources Services Administration which is in the Public Health Service.

/13 The overall average hospital-based charges per hospital discharge in 1993 was \$8833. Furthermore, only 4 out of 231 categories of principal procedures had average hospitalization charges in excess of \$100,000 and each of these procedures was very rare, occurring in .16 percent or fewer of the hospital stays in the U.S. Note, nonhospital-based physician charges are excluded from these figures (AHCPR, 1997).

/14 There are exceptions of course as job changes can result in insurance policy changes outside the normal renewal cycle.

/15 The philosophy behind insurance is that at any given point in time the healthy subsidize the cost of health care of the sick. Individuals would like to think that, overall, they pay no more in premium than they receive in reduced medical costs but there is no guarantee.

/16 The one year accounting period is not perfect. For example, it is not adequate for illness requiring excessive expenses year after year.

/17 For example, some health maintenance organizations directly employ the physicians that provide the services covered under the insurance policy.

/18 This is based on a conversation with Short.

/19 NMES family income included capital gains and losses whereas the money income concept did not.

/20 Disposable income excludes income devoted to covering required expenditures such as taxes and work-related expenses.

/21 For example the 1996 annual meeting of the National Association of Health Data Organizations devoted one of the four tracks of sessions to health information--building the infrastructure--and two recurring themes of the conference were the impact of managed care on health data and its impact on the health.

/22 On a more positive note, Short indicates that the inability to capture total medical expenses may not be a problem for the SB method in general, as the out-of-pocket costs can be computed based on utilization of services under the managed care plans.

/23 It is also unlikely that SIPP would be expanded to include detailed insurance characteristics. A survey optimized to capture income and poverty cannot be easily expanded to collect detailed insurance and expenditure data without undo respondent burden and resource consumption. Similarly, data sets like MEPS which are appropriate for producing a MCRI are not ideally suited to creating an official measure of poverty under the current or proposed definitions at least in part because the detailed on the income collected will not be as rich.