Severity of Need Core Services Project

Associated Costs Panel Final Report

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SEVERITY OF NEED CORE SERVICES PROJECT

ASSOCIATED COSTS PANEL FINAL REPORT

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I. Summary of Panel Recommendations

The Associated Cost panel recommended including three variables in the severity of need index at this point in time. The recommended variables include:

- Geographic wage index
- Geographic non-labor price index
- Substance abuse (IDU exposure category)

The geographic wage and the non-labor price indices are intended to compensate for regional variation in the cost of labor and facilities. The substance abuse risk category variable is intended to serve as a proxy for the incrementally higher costs of treating HIV infected individuals who are also substance abusers. The panel believed that the substance abuse exposure category is correlated with the prevalence of Hepatitis C among the HIV infected community and, thus, helps capture the costs of that comorbid condition as well. The panel agreed that these three variables are **significant and independent determinants** of per capita costs and can be **appropriately measured** with currently and publicly available data.[1]

Several other important variables were considered but were not recommended for inclusion in the severity of need index at this time. These variables were not recommended for inclusion on the basis that they were: (1) correlated with one the variables recommended for inclusion, (2) did not yet have a sufficient impact on per capita costs, or (3) could not yet be appropriately measured by the publicly available data. Variables considered but not recommended for inclusion at this point include:

- HIV disease stage*
- Health insurance premiums*
- Hepatitis C*
- Diabetes*
- Cardiovascular disease*
- Poverty*
- Race/ethnicity*
- Gender*
- Age*

The panel instead recommended that HRSA continue to monitor the cost associated with these variables. The panel also recommended that HRSA continue to address the limitations of available

[1] Throughout this report, the term 'per capita costs' is used to mean the annual cost of ambulatory HIV care under the CARE Act program, including prescription medications, for an infected individual. In practice, however, the per capita costs of CARE Act-funded programs are extremely hard to measure for a wide variety of reasons, including the lack of unduplicated patient counts and the difficulty assigning actual CARE Act expenditures to specific patients and services. Recent work under a separate contract to HAB attempted to identify the relative importance of client-, program- and market-level characteristics for per capita expenditures under Title III early intervention services (EIS) programs (Gilman, et al, 2006).

data surrounding some of the most important of these currently excluded variables (i.e., HIV disease stage) can be incorporate in the severity of need index in the future. Variables that the Associated Cost panel recommended for possible future inclusion in the severity of need index are indicated with an '*' in the above list.

Of special note is the recommendation not to include HIV disease stage at this time. The panel agreed that disease progression was one of the most important determinants of per capita costs of HIV primary care. But currently available surveillance data from the CDC are not able to capture the significant improvement in CD4 count that may occur following the introduction of antiretroviral (ARV) therapies. Nor are the surveillance data able to measure the prevalence of CD4<50, which the panel members also thought was a strong predictor of costs. AIDS diagnosis and CD4 count at the time of initial diagnosis was considered by most panel members to be insufficient for measuring actual resource needs, particularly with the availability of ARVs. Furthermore, data from the HIVRN survey indicate that the incremental costs associated with disease progression (i.e., CD4<50) were attributable largely to an increase in the use of inpatient services, which not covered under the CARE Act. Most panel members also believed that ARV use, independent from CD4 count, may be a more important cost driver than actual disease progression. But data to measure state and local area variation in ARV rates do not exist. In sum, the majority of the panel members agreed that an estimate of the *incidence* of AIDS or CD4<50 was not a good proxy for the *prevalence* of these disease stage markers. It should be noted that several panel members disagreed with this decision and argued that CD4 count at the time of initial diagnosis (or AIDS diagnosis) based on CDC surveillance data is in fact an appropriate proxy for measuring HIV disease stage and should be included in the severity of need index.

II. Introduction

A. Purpose of Panel

The Associated Cost panel had two primary responsibilities. First, it was responsible for developing a set of geographic price indices for labor and non-labor inputs for the delivery of HIV primary care services funded under Titles I and II. Second, it was responsible for developing and assigning cost weights to a group of patient attributes considered to be important and independent determinants of the cost of care under Titles I and II.

To accomplish these goals, the panel members identified and conducted three sequential tasks. The three major tasks performed by the panel members were as follows:

- First, the panel identified a set of core services funded under Titles I and II. The purpose of this task was to identify a limited set of the most important services for which cost drivers could be determined. The criteria for selecting core services included: (1) having a demonstrated impact on care, (2) having a demonstrated impact on costs; (3) accounting for a significant share of total Title I and II funds, and (4) exhibiting geographic cost variability.
- Second, the panel identified an initial set of variables that were thought to be important determinants of per capita program costs associated with the delivery of core services under Titles I and II. The purpose of this task was to ensure that the panel considered a comprehensive set of cost drivers prior to assessing their validity, feasibility, and interdependence.
- Third, the panel completed a template for each variable, summarizing: (1) the rationale for including it in a severity of need index; (2) the sources of data for measuring the variable; (3) its level of aggregation, frequency of update, and availability for use as part of the index; and (4) its reliability, validity, and bias from measurement error. The purpose of this task was to evaluate the value of each variable and to develop a final set of recommendations for inclusion in the severity of need index.

B. Conceptual Approach

The panel decided early in the process that its responsibility was not to derive a standardized national per capita cost amount that could then be scaled upward or downward by a set of indices representing local cost variability. The panel agreed that any average standardized amount should ultimately be determined by the level of appropriated funds for Titles I and II per client served. The panel instead focused its attention on measuring the incremental costs associated with selected inputs (such as the price of labor and facilities) and patient characteristics (such as disease progression and comorbidities). For example, the panel agreed that grantees operating in high wage markets should receive more per capita funding than grantees in low wage markets. Similarly, the panel believed that Title I and II grantees serving a disproportionate share of patients with comorbid conditions or on antiretroviral therapies should receive more per capita funding than those serving less sick patients. The incremental costs associated with inputs would be measured and applied at the state or EMA level based on regional wage and rent data. The incremental costs of patient characteristics would be measured nationally and applied at the state or EMA level, weighted by regional prevalence rates.

The panel also believed that it should focus on "incurred" costs rather than building in policy-driven incentives for target populations, health professional shortage areas or other capacity constraints, quality of care, new treatment protocols, or optimal staffing patterns. The panel decided that rewarding grantees for quality (by allocating more funds on a per capita basis to high quality providers than to lower quality providers) or using the severity of need index to promote certain standards of care (by allocating more funds to grantees meeting recommended treatment protocols) went beyond the purpose of the severity of need index. The panel further agreed that measuring quality and incorporating it into a severity of need index would be an extremely difficult task to accomplish. However, it was commonly accepted among panel members that any needs-based funding allocation system should not penalize high quality care. For example, a grantee that succeeds in lowering the rate of AIDS progression or the incidence of comorbid conditions (and thereby avoiding the higher costs associated with AIDS or comorbid diseases) should not be penalized by receiving fewer CARE Act dollars on a per capita basis.

Finally, the panel agreed that, if the incremental costs of a given variable affected only a subset of the core services discussed above, then those incremental costs should be weighted by the share of total Title I and II funding allocated to that core service. For example, if disease progression were associated only with the introduction of ARV therapies, then the incremental cost of an AIDS diagnosis would be weighted by the share of total funding allocated to prescription medications. Weighting incremental costs by the share of funding allocated to affected services ensures that the impact of that variable on total costs is accurately captured. The panel members agreed that the Associated Cost panel was responsible for deriving both the incremental costs and the service weights. But it was assumed that the prevalence rates for the patient attributes would be provided by the Patient Characteristics panel.

C. Identification of Core Services

As stated earlier, the first step for the Associated Cost panel was to identify a set of core services. The panel members acknowledged that, to identify costs, first it was essential to agree on the set of services that should be included. Further, the panel members believed that understanding the services that account for the majority of Title I and II funds would be useful for identifying the kinds of factors that ought to go into a severity of need index. For example, regional variation in the prevalence of injection drug users (IDUs) is germane in part because payment for substance abuse services constitutes a relatively important proportion of Title I and II funds. Further, including substance abuse services in the core set of services highlights the importance of factoring in regional differences in the wages of substance abuse counselors.

The four criteria used for selecting the core services are listed below. Services that satisfied several (though not necessarily all) of these criteria were considered for inclusion in the core set.

- ***Share of Title I and II Funding.*** Core services had to be covered under Titles I or II. Largely non-covered services (e.g., inpatient care) were not included.
- ***Impact on Costs.*** Core services had to have a significant impact on total costs, as measured by their share of total allocations. Services that account for a very small share of total CARE Act spending (e.g., outpatient rehabilitation services) were not included.
- ***Impact on Care.*** Core services had to have a significant impact on the quality of care and health outcomes for the average client.

- ***Variability in Costs.*** Core services had to exhibit significant variation in unit costs across grantees. A service that may not have a significant impact on costs or quality may have average costs that vary tremendously between regions. Panelists therefore decided that it should be included, even though it is not one of the major drivers of costs.

The recommended list of core services, along with their proportions of FY2004 Title I funding and their ranking by criteria, is presented in ***Table 1***. The list includes six medical services (ambulatory/outpatient medical care, specialty care, pharmaceuticals, substance abuse services, mental health services, and oral health care).[2] In addition, the list includes three social support services (housing assistance and services, transportation services, and food assistance). Finally, core services include case management services, which can be either medical or psychosocial case management. The medical services combined account for nearly half (48%) of total Title I and II funding. The social support services account for an additional 13% of total funding, and case management represents slightly over 10% of total funding.

Table 1: List of core services included in assessment of costs

Type of Service	% Title I Allocation*	Impact on Costs	Impact on Care	Cost Variability	Priority Ranking
Medical Services					
Ambulatory/outpatient medical care	23.5	1	1	1	1
Specialty care (e.g., dermatology, radiology)		2	1	1	1
Drug assistance or medication programs	10.1	1	1	3	1
Substance abuse services–outpatient	6.7	2	1	2	2
Mental health services	5.1	2	1	3	2
Oral health care	3.0	3	2	2	2
Support Services					
Housing assistance and services	6.1				
Transportation services	2.4				
Food bank/home-delivered meals	4.4				
Case Management					
Case management services	10.9	2	2	2	2

NOTES:
*** Title I allocations based on FY2004 expenditures as reported by HAB.**
KEY:
1=high importance, 2=moderate importance, 3=low importance

Not surprisingly, ambulatory/outpatient primary medical care constitutes nearly one-quarter (24%) of total Title I and II funding. The panelists agreed that primary medical care has an important impact on both cost and quality and exhibits significant variation in per capita spending across grantees. Drug assistance (over and above ADAP expenditures) also accounts for a significant share of total Title I and II allocations (10%) and has an important impact on cost and quality. But panel members agreed that, because grantees face a national drug market and have access to the national 340b drug pricing program, unit drug costs should not vary substantially by state or EMA. In slight contrast, oral health accounts for only 3% of total spending and has a moderate impact on cost and quality. The unit cost of oral health was also assumed by the panel members to exhibit relatively less

[2] The panel also reviewed the distribution of Title II funds. While overall Title II funds are heavily weighted toward drug assistance, the distribution of base (non-ADAP) Title II funds generally reflects the distribution of Title I funds.

variation than medical care. Nonetheless, the panel members concurred that these 10 core services represent the majority of Title I and II spending, are critical components of the HIV primary care delivery system, and exhibit sufficient variation in unit costs to warrant inclusion in the severity of need index.

The panel considered several other services important to the HIV primary care delivery system but decided that these services either did not have a major impact on costs or did not demonstrate sufficient variation between grantees to warrant inclusion. Two important examples include outreach, retention, and adherence programs, and testing and counseling programs. Both of these services are critical components of the primary health care system for people living with HIV and AIDS. But first, at this point they constitute a relatively small proportion of total Title I and II funding, and second, the cost of these services does not vary significantly across regions. Variations in labor costs for these services are likely to be correlated with the variation in wages for other, more fundamental labor categories such as physicians and nurses. However, the panel members agreed that, because the core set of services may change over time, HRSA should periodically re-evaluate all services covered under the CARE Act using these criteria. The panel also agreed to exclude the cost of administrative activities and those associated with data collection and reporting requirements from HRSA.

D. Identification of Variables

The second step was to identify the important determinants of cost variation for these core services. The panel identified three types of variables for consideration. The three broad categories identified and considered by the panel, and the individual variables within each category, were:

- Variables based on ***geographic cost differences***
  - Labor
  - Non-labor inputs such as rent and facilities
  - Health insurance premium
- Variables based on ***patient clinical characteristics***
  - HIV disease stage
  - Hepatitis C
  - Substance abuse (IDU exposure category)
  - Diabetes
  - Cardiovascular disease
- Variables based on ***patient sociodemographic characteristics***
  - Race/ethnicity
  - Gender
  - Age
  - Poverty

The first set of variables captures the impact of geographic variation in wage rates, non-labor input prices, and health insurance premiums on pre capita grantee costs. Labor accounts for the major share of total grantee expenditures and represents an important external source of variation in per capita spending that, the panel agreed, should be included in the severity of need index. The panel also agreed that building and facility costs vary by region and, thus, should also be considered in the

severity of need index. Similarly, several states use a proportion of their ADAP funds to cover the cost of health insurance with prescription medication coverage. Since the cost of health insurance also varies by region and state based on non-actuarial factors (which would be captured under the patient case mix variables), the panel agreed that health insurance premiums represent another important external source of per capita spending that should be considered for inclusion in the severity of need index. The ADAP Health Insurance Purchasing and Maintenance Program (HIP) is also a cost-saving initiative. Per capita ADAP expenditures in states with a HIP program are likely to be lower than in states without a HIP program, a cost differential that panelists believed should be considered in the severity of need index.

The second and third sets of variables measure the impact of patient characteristics on per capita expenditures among Title I and II grantees. The panel agreed that HIV disease progression and Hepatitis C are highly correlated with per capita expenditures: clients with low CD4 counts (generally less than 50) or a diagnosis of Hepatitis C have higher costs of care than those without such conditions. However, since CD4 counts can change over time after initial testing in ways that are not captured in the current data, the panel concurred that the prevalence of clients on antiretroviral (ARV) therapies was a more accurate indicator of costs. The IDU exposure category is an indirect measure of substance abuse, which was also considered an important and positive correlate with per capita spending. The panel members agreed that diabetes and cardiovascular disease were also important correlates with HIV infection, both as sequelae of HIV infection as well as age-related comorbidities among an aging HIV population. Finally, the panel agreed it was important to consider such sociodemographic characteristics as age, gender, race/ethnicity, and poverty. Certain age, sex, and race/ethnicity subgroups may have higher or lower resource needs than others, based in part on their access to health care services and their underlying health care needs. Poverty was considered an indicator of both resource needs and access to care. The panelists agreed that low-income people are less likely to be insured and, thus, less likely to seek and remain in ongoing care. While the short-term costs of low-income and disadvantaged populations may be lower, delays in seeking care initially and lack of continuity and adherence once in care lead to higher per capita expenditures over time. The inclusion of the poverty variable is based on the need of the poor who have HIV for CARE Act support once they seek care.

E. Completing the Templates

After identifying the variables to be considered, the Associated Cost panel then divided itself into three workgroups to discuss and evaluate the variables in each of the three categories in greater depth. Each workgroup was responsible for completing a template for each variable in its category. The purpose of the template was to define the variable; identify the rationale for its inclusion; identify the potential sources of data for measuring the variable; assess the validity, reliability and potential bias of each variable; and suggest ways to address any underlying bias. Based on the results of the small group discussions, each workgroup then forwarded to the larger panel a list of recommended variables to be included in the severity of need index. The full members of the Associated Cost panel then discussed the small group recommendations and identified the variables to be included in the panel's final recommendation to the larger severity of need expert panel.

A description of the variables, the potential sources of data, and the final recommendation from the Associated Cost panel are summarized in ***Table 2***. Most variables require data on both the incremental costs and the prevalence of the variable. Incremental costs are usually measured at the

national level and prevalence rates are measured at the EMA or state level. (A more complete discussion of the variables, sources of data, and panel recommendations are presented in ***Section II***.)

Table 2: Description of variables, sources of data, and panel recommendations

Variable	Description	Data Source(s)
Geographic Variables		
Labor	Geographic wage index for health care professionals	Bureau of Labor Statistics, Occupational Employment Statistics Survey, 2004. Provides costs by state and MSA.
Non-labor inputs	Geographic index for rent and facilities	Practice expense component of Medicare Geographic Practice Cost Index or HUD Fair Market Rent Index, 2004. Provides costs by state and MSA.
Health insurance premium	Per capita expenditures for health insurance under ADAP	ADAP Health Insurance Program, 2004. Provides costs by state.
Clinical Variables		
HIV disease stage	CD4 count	HIV Research Network (HIVRN) Survey for incremental costs of AIDS nationally. CDC surveillance data for AIDS prevalence based on initial diagnosis (HARS) by state and EMA.
Hepatitis C	Hepatitis C diagnosis	Medicaid claims for fee-for-service population from Medicaid Analytic eXtract (MAX) 2001, all States. Provides cost and prevalence by state and EMA.
Substance abuse	IDU exposure category	HIV Research Network Survey for incremental costs of IDU. CDC surveillance data for IDU prevalence among those diagnosed with HIV. Provides cost and prevalence by state and EMA.
Diabetes	Diabetes diagnosis	Medicaid claims for fee-for-service population from Medicaid Analytic eXtract (MAX) 2001, all States. Provides cost and prevalence by state and EMA.
CVD	Diagnosis of cardiovascular disease	Medicaid claims for fee-for-service population from Medicaid Analytic eXtract (MAX) 2001, all States. Provides cost and prevalence by state and EMA.
Sociodemographic Variables		
Age	Age categories	Medicaid claims for fee-for-service population from Medicaid Analytic eXtract (MAX) 2001, all States or HIV Research Network Survey. MAX provides cost and prevalence by state and EMA. HIVRN provides costs nationally.
Sex	Gender categories	Medicaid claims for fee-for-service population from Medicaid Analytic eXtract (MAX) 2001, all States or HIV Research Network Survey. MAX provides cost and prevalence by state and EMA. HIVRN provides costs nationally.
Race/ethnicity	Race/ethnicity categories	Medicaid claims for fee-for-service population from Medicaid Analytic eXtract (MAX) 2001, all States or HIV Research Network Survey. MAX provides cost and prevalence by state and EMA. HIVRN provides costs nationally.
Poverty	Federal poverty level	US decennial census data. Provides prevalence by state and EMA. Cost data not available.

The main sources of data for the cost variables are the HIV Research Network and Medicaid claims data. The HIV Research Network (HIVRN) survey collects annual clinical and health resource utilization data for about 15,000 patients a year across 17 non-representative sites across the country; data have been collected for some 38,000 unique patients over a 5-year period. Data elements are individual-level and include inpatient and outpatient utilization, prescribed medications, some substance abuse and mental health visits, and other information. The Network also conducted a client interview (sample size = 951) to collect information on additional services and services received at other sites. Costs were assigned to the reported utilization rates for each service category based on HCSUS estimates trended forward. The survey was conducted with a stratified random sample of those in care at 14 institutions receiving IRB approval. The sample included those with public, private, and no insurance.

The Medicaid claims are obtained from the Medicaid Analytic eXtract (MAX) files. The MAX files are a standardized Medicaid claims database containing fee-for-service claims from all 50 states and the District of Columbia and are available from the Centers for Medicare & Medicaid Services (CMS). The MAX database includes an enrollment file with demographic characteristics and dates of enrollment and a set of claims for inpatient, outpatient, prescription drug, and long-term care services. The MAX suffers from several weaknesses. First, there is a serious lag between the date of service and the availability of the MAX database. The most currently available MAX file is for services rendered in CY2001. Second, the MAX database contains only claims paid under Medicaid fee-for-service; encounter data for enrollees covered under Medicaid managed care plans are not included. Third, the Medicaid population may not be representative of the CARE Act population. Fourth, the MAX database contains only claims for Medicaid-covered services; the costs of services not covered under Medicaid are not included. Other sources of data include the Bureau of Labor Statistics' Occupational Employment Statistical Survey (OESS), the Medicare Geographic Practice Cost Index (GPCI), and the Department of Housing and Urban Development's Fair Market Rent (FMR).

F. Panel Recommendations

After completion of the variable templates and a thorough discussion by the full panel members, the Associated Cost panel agreed to recommend only three variables for inclusion in the severity of need index at this point. The variables recommended for inclusion are:

- Geographic wage index
- Geographic non-labor price index
- Substance abuse (IDU risk factor)

These three variables were considered to be major and independent determinants of per capita costs. The panel also agreed that the existing data for measuring these variables also supported their inclusion. Several variables, such as disease progression and health insurance premiums, were also considered very important and independent determinants of severity of need, but the majority of the panel members argued that the data necessary for capturing their true impact on costs do not yet exist. (See ***Section II*** for a more complete discussion of the rationale for not including selected variables in the initial severity of need index.) Hepatitis C was considered important, but the panel members felt it was closely correlated with variables already included in the model (especially the substance abuse exposure category) and, thus, should not be included as a separate indicator. In

contrast, age-related comorbidities were considered important and independent but do not yet have a sufficient impact on costs (and also lack appropriate data to measure) to warrant inclusion. Thus, they should be considered in the future as the infected population continues to age and the prevalence of these diseases increases, and better data for measuring the impact of age and age-related comorbidities become available. The panel also agreed that the inability to differentiate the impact of age-related comorbidities on HIV-related service use further complicates the issue. The panelists agreed that CARE Act funds should only be used to cover the cost of comorbidities as they affect HIV-related care. Panel members also agreed that impact of gender on the cost of HIV care is difficult to ascertain with currently available data. While women have higher costs of medical care than men in general (because of ob/gyn-related care and a greater propensity to seek care), studies have not yet been able to demonstrate that they have higher HIV-related costs. Finally, the panelists agreed that poverty was a better measure of access and service use than race/ethnicity, but patient-level data on income do not yet exist.[3]

The panel recommended that HAB continue to monitor the impact of HIV disease progression, age and age-related comorbidities, poverty and gender on the resource needs and continue to address the data limitations that hinder their inclusion in the severity of need index at this time.

A summary of the significance of each variable for capturing the variation in local resource needs, as well as the availability of appropriate data that can be used to measure each indicator at this time are presented in ***Table 3***. The availability of data includes both cost estimates and prevalence estimates. The panel agreed that all three geographic variables had a moderately significant impact on per capita cost variation among Title I and II providers, but only labor and non-labor input prices had data that supported their inclusion at this time. The non-age-related clinical variables were considered to have a high significance on per capita cost variation, but the panel believed that only the substance abuse variable could be measured in an appropriate manner to justify its inclusion at this time. HIV disease stage was considered extremely important to severity of need, but neither the prevalence of CD4<50 or of ARV use could yet be measured in a way to warrant inclusion. The age-related comorbid conditions were considered to have a low impact on cost variation at this point in time, but could be measured with currently available data with some degree of accuracy with Medicaid or Medicare claims once the prevalence of these diseases increases among the infected population. The panel agreed that age and gender could not be measured with current data. While age is likely to have a significant impact on HIV costs in the future, the impact of gender on HIV-related costs is difficult to ascertain with currently available data. Neither age nor gender should be included until better data become available and a demonstrated and generalizable impact on HIV-related costs of care can be measured. Race/ethnicity had a potentially more significant impact on costs, but the reasons for including the variable in a severity of need index (i.e., inferior access to care and the additional costs associated with recruitment and retention of hard-to-reach populations) were more accurately captured through the poverty variable. Unfortunately, state and local prevalence estimates of poverty among those with HIV infection are not available.

[3] The Area Characteristics panel has recommended including poverty in the severity of need index, but from a community need perspective rather than on an individual cost basis.

Table 3: Significance and Availability of Data for Measuring Variables

Variable	Significance	Data	Include
Geographic Variables			
Labor	High	Good	Yes
Non-labor inputs	Moderate	Good	Yes
Health insurance premium	Moderate	Fair	No
Clinical Variables			
HIV disease stage	High	Fair	No
Hepatitis C	High	Fair	No
Substance abuse (IDU risk factor)	High	Good	Yes
Diabetes	Moderate	Fair	No
CVD	Moderate	Fair	No
Sociodemographic Variables			
Age	Moderate	Poor	No
Sex	Unknown	Poor	No
Race/ethnicity	Moderate	Fair	No
Poverty	High	Fair	No

Table 4 presents the panel's primary reasons for recommending the inclusion or exclusion of each variable at this point in time. Those variables characterized by a good rationale and supported by adequate data have been recommended for inclusion. Those variables characterized by a good rationale but not supported by adequate data have been recommended for exclusion ***at this point in time only***, but are accompanied by a recommendation that HAB continue to monitor their impact on costs and to address the data limitations that preclude their current inclusion. Those variables that are characterized by a weak rationale are recommended for exclusion from the severity of need index more generally. As the table makes clear, there are many variables that the Associated Cost panel viewed as important determinants of per capita costs, but could not recommend for inclusion at this point in time solely because of the inadequacy of the available data.

Table 4: Variables considered and forwarded for possible inclusion in the SON index by the Associated Costs Panel

	Variables Forwarded for Further Consideration for Use in an SON Index	Variables Excluded Due to Insufficient Data	Variables Excluded Due to Insufficient Rationale for Inclusion
Geographic Variables	• Labor • Non-labor inputs	• Health insurance premium	
Clinical Variables	• Substance abuse (IDU risk factor)	• HIV disease stage • Hepatitis C • Diabetes • Cardiovascular disease	
Sociodemographic Variables		• Poverty • Age • Gender	• Race/ethnicity

G. Issues for Discussion

As stated above, the panel recommended inclusion of only three cost-related variables at this time: two for capturing geographic differences in input prices and one for the incremental costs associated with the substance abusing population. The panel agreed that several other variables were important determinants of per capita costs but decided that additional information was required before they could be measured in an accurate and meaningful way for the severity of need index. Some of the limitations of the variables not included in the panel's recommendations, as well as several remaining issues that need to be considered in the development of a severity of need index, are discussed below.

- **HIV disease progression**. The panel agreed that HIV disease progression is one of the most important determinants of per capita cost variation. However, the panel acknowledged that both AIDS diagnosis and CD4 counts, with treatment, could improve over time such that even AIDS patients could have a CD4 count above 200. In fact, the state and local prevalence estimates of a CD4 count of less than 50 (found to be a highly significant predictor of per capita costs in the HIVRN survey) are currently not available. The panel also noted that the HIVRN survey data show that most of the incremental costs associated with a low CD4 count are incurred in the inpatient setting and the CARE Act does not cover the cost of inpatient care. The panel concurred that the true cost-driver associated with disease progression was not AIDS diagnosis or CD4 count, but rather whether an individual was receiving ARV therapies. Clients on ARV drugs, independent of their diagnosis or CD4 counts, are more expensive to care for than those not on ARV medications. Further, the incremental costs associated with ARV use are likely be incurred on an outpatient basis and thus eligible for CARE Act funding.

  The panel then determined that there is no consistent and current information on ARV prevalence at the state or local level. The rate of ARV use from the annual CARE Act Data Reports (CADRs) is duplicated and inconsistently reported among CARE Act providers. One panel member pointed out that ADAP reports submitted annually by each Title II grantee may be useful for estimating ARV rates at the state level. Others argued that CDC surveillance data on AIDS as a percent of new HIV cases may be a sufficient indicator of the relative burden of people who are in need of ARVs, especially given current standards of when to start prescription drug therapy. However, after much discussion, the panel decided that indicators of HIV disease progression should not be included in the severity of need index until consistent and unduplicated state-level prevalence estimates of either CD4<50 or ARV use are available.

  A minority of panelists disagreed with this decision and advocated using AIDS incidence as reported by the CDC as a proxy for HIV disease progression. However, one concern with this recommendation is that the CDC surveillance data are not yet mature enough across all states to identify unduplicated cases of newly diagnosed AIDS. Using surveillance data to measure AIDS incidence is likely to result in an undercounting of true cases in states with an immature data reporting system and, thus, an under funding of those Title I and II grantees.

- **Age-related comorbidities**. The panel agreed that age-related comorbidities of HIV infection will become an increasingly important component of the total cost of care as the infected population continues to age. Particularly important are cardiovascular disease (CVD) and diabetes, both of which can become complicated to treat because of the HIV virus. Nonetheless, the panel decided that the incremental costs of age-related comorbidities were not yet sufficiently large to warrant their inclusion in the severity of need index. The panel recommended that HRSA continue to monitor the cost of these comorbidities and consider including them in the severity of need index in the future.

- **Demographic characteristics**. The panel also decided that while health care costs are likely to be positively correlated with age and being female, the incremental costs of HIV care associated with these demographic subgroups may not be sufficiently large to warrant inclusion in the severity of need index. This conclusion was supported by the results of the HIVRN survey, which showed no statistically significant association between costs and age or gender. Again, the panel agreed that HRSA should continue monitoring the impact of age and gender on HIV care costs and consider including them in the future if the evidence suggests they are important and independent determinants. The panel expressed less consensus on race/ethnicity. Several members argued that racial and ethnic minorities have higher long-term costs of care because they are more likely to enter care later in their disease progression, are less likely to remain in care on a consistent basis once they initially seek care, and are less likely to remain adherent to treatment protocols. As a result of inadequacy of care, they have poorer health status and greater health care needs in the long run. Providers also incur additional costs identifying HIV infected people and conducting outreach, retention and adherence programs among communities of color. However, the panel agreed that the underlying rationale for including race/ethnicity in the severity of need index is better captured by poverty.

- **Socioeconomc characteristics.** Again, the panel identified two reasons for considering poverty. The first reason had to do with measuring the burden on care by low income subpopulations eligible for CARE Act services. Some regions serve a disproportionately lower income subpopulation than others and should be appropriately compensated for this additional burden. However, the group agreed that this reason is unrelated to costs per case and, thus, not appropriate for the Associated Cost Panel. Rather, the panelists agreed that issues related to burden associated with poverty are better handled by the Area Characteristics Panel. The second reason for including poverty is the extent to which low income people are inherently more costly to serve than those in higher income groups. Costs may be higher for low income populations for several reasons, including the costs of program activities related to identification, outreach and retention in care, as well as the higher treatment costs associated with delays in seeking care and lack of continuity in care or adherence to treatment. The panel agreed that these incremental costs are probably not sufficient (relative to overall treatment costs) to warrant inclusion in the SON index at this time. The panel also agreed that it would be difficult to obtain data on the costs and incidence related to timing of initial treatment and lack of continuity and adherence. Nor are there good estimates of the incremental costs of HIV care for people with incomes below the federal poverty level. Thus, the Associated Cost panel decided to defer a decision on poverty until better data are available.

- **Drug prices**. In addition to labor and non-labor inputs, the panel also considered geographic variation in drug prices. The panel acknowledged that prescription medications account for a major and growing share of total CARE Act spending, and thus, even minor variations in drug prices could have an important impact on total spending. The panel members also reported that CARE Act grantees differ in their ability to obtain negotiated discounts from drug companies. However, after further consideration, the panel agreed that regardless of their ability to negotiate drug price discounts, all states have access to the same level of discounts under Section 340B of the Public Health Service Act of 1992. The 340B drug pricing discount program requires pharmaceutical manufacturers participating in the Medicaid program to provide front-end discounts on covered outpatient drugs purchased by 'covered entities.' State-operated AIDS Drug Assistance Programs and the Ryan White CARE Act Title I, Title II, and Title III programs qualified as covered entities. Because of states' eligibility to participate in the 340B drug pricing program, the panel decided that grantees should not be compensated for any observed differences in drug prices.

- **ADAP health insurance purchasing and maintenance program**. One panel member noted that under the CARE Act Health Insurance Purchasing and Maintenance Program (HIP), 26 states use a portion of their ADAP funds to underwrite the cost of health insurance for eligible enrollees that includes prescription medications. The panel believed that the per-enrollee cost of the HIP program could vary for reasons other than client case mix, such as health insurance regulations, market competition, and coverage policies. For this reason, the panelists agreed that the geographic variation in the per-enrollee costs of the program (or the 'premium') is a legitimate factor to consider in the severity of need index. The panel also agreed that, because the HIP program is intended to be cost-saving, per enrollee costs under ADAP are likely to be lower in states with a health insurance purchasing/maintenance initiative than in states that rely solely on the direct purchase of drugs. However, several problems with this variable were noted. First, some programs rely on state-only funds to supplement the expenditures, leading to inconsistencies in data reporting. Second, enrollment and expenditure reports exhibited a large and unexplained variation in per capita HIP costs. Third, and most importantly, panelists were concerned that states operating HIP programs not be penalized by receiving fewer Title I and II funds. As a result, the panel agreed that adjustments for per-enrollee HIP expenditures should be deferred until more states implement the program and more consistent data are available.

- **Medicaid generosity**. The panel spent some time discussing Medicaid generosity and ways to ensure that states with more generous Medicaid benefit and coverage policies would not be penalized by receiving fewer CARE Act dollars. The panelists were in agreement that the severity of need index should not create a disincentive to expand Medicaid eligibility and enhance covered services. It was also recognized that the way in which Medicaid coverage was incorporated into the model would affect how certain cost-related variables, such as poverty, were measured. The panel agreed to defer this issue until the recommendations of the Patient Coverage panel were available.

- **CARE Act Data Reports (CADR) data**. The panel recognized that many of the variables considered for inclusion in the severity of need index were reported on the CADRs. All CARE Act grant recipients are required to submit a CADR annually to HRSA. The CADR contains provider-level summary data on the number of unduplicated clients served by

demographic and clinical characteristics, and the number of services used by type of service. For instance, the CADR contains counts of unduplicated clients by age categories, gender, race/ethnicity, income, insurance status, living arrangements, and risk factor. The CADR also includes counts of unduplicated HIV-infected clients newly in care, the number with an AIDS diagnosis, the number on ARVs, and the number receiving certain procedures and screenings. While the CADR provides a potentially important source of data at the local level that could be used to measure severity of needs, inconsistencies in reporting practices among grantees make this database unusable in its current form. In addition, the panelists further pointed out that the CADRs often exclude the cost of contracted services or services not paid for by CARE Act dollars and thus in general underreport the actual costs of care. Finally, individuals receiving care at multiple CARE Act providers are counted separately in each CADR.

- **Budget neutrality**. As stated earlier, the panel agreed that, rather than deriving a national annualized cost for HIV care, the base rate should be determined by the appropriated funding amount divided by the number of qualifying individuals who need care. Adjustments would then be made to this per capita allocated funding amount for such factors as input prices and client casemix. For example, grantees treating a disproportionate share of clients with substance abuse problems would receive more on average than those serving patient populations with fewer comorbidities and/or greater adherence with both medical appointments and drug regimens. Similarly, grantees in areas with more people below the federal poverty level would receive more per capita funding than those in areas where more people have insurance and resources. However, the per capita allocation adjustments would have to be budget neutral (i.e., total spending under the program could not exceed the total Title I and II budget allocations). Therefore, the panelists noted that per capita allocations to grantees with a severity of need index above the national average would be higher than under the previous case-based system, while those with a severity of need index below the national average would receive less funding than before. Similarly, providers in high wage markets would presumably see their per capita funding increase, while those in low wage markets would experience a decline in per capita funding compared to what they received under the case-based system.

III. Subgroup Reports

A. Geographic Variables

1. Overview of Key Issues

The first set of variables was intended to capture geographic variation in input prices, including wages and rent and facility costs, as well as regional differences in health insurance premiums. The panel agreed that wages and rent and facility costs are important components of total program expenditures and exhibit substantial variation across markets. In fact, a recent evaluation of Title III Early Intervention Services (EIS) program spending concluded that personnel costs accounts for over half of total program expenditures. Thus, even minor differences in regional wages can have a substantial impact on per capita expenditures. Further, it was recognized that other federal payment systems, such as the Medicare physician fee schedule, adjust reimbursement rates for regional differences in wages and other practice expenses. In addition to input prices, the panel agreed that Title I and II grantees also face regional health insurance markets and that, as a result of the ADAP Health Insurance Purchasing and Maintenance Program (HIP), any need-based funding allocation system consider differences in per enrollee costs as well.

The three geographic variables, along with their source of data and their recommendation for inclusion, are summarized in ***Table 5***. Each individual variable is discussed in greater detail in the following section.

Table 5: Description of geographic variables

Variable	Inclusion	Data Source(s)
Geographic labor adjustment factor	Yes	Bureau of Labor Statistics, Occupational Employment Statistics Survey, 2004. Provides wages for selected labor category by state and MSA.
Non-labor input price adjustment factor	Yes	Practice expense component of Medicare Geographic Practice Cost Index or HUD Fair Market Rent Index, 2004. Provides rents by state and MSA.
Health insurance premium adjustment factor	No	ADAP Health Insurance Program, 2004. Provides per enrollee HIP costs by state.

2. Description of Variables

The ***Geographic Labor Adjustment Factor*** is summarized in ***Template 1***. The purpose of this variable is to adjust per capita funding allocations for state and EMA-level differences in the wages of health care professionals common to HIV primary care programs. The panel recommends using wage data from the Occupational Employment Statistical Survey (OESS) conducted every six months by the Bureau of Labor Statistics (BLS). The survey collects employment and wage data for a wide range of labor categories using Standard Occupational Classification (SOC) system in all regions and states. This information is free and publicly available on the BLS website. The panel recommended using selected labor categories specific to HIV primary care programs and weighting each category by its share of total CARE Act funding. The weighted average will be calculated at

both the state and EMA levels and divided by the national average to create an index normalized to one.

Given that the geographic labor adjustment is based on a large national employment and wage survey, the wage index should be reliable, valid and unbiased. However, its application to the severity of need index poses several potential challenges. First, the panel recommended identifying the labor categories that are most relevant for Title I and II programs and weighting them by the share of CARE Act funds allocated to each category. Each grantee makes two submissions of allocations: one prospective at the beginning of the year and the other retrospective at the end of the year. The retrospective data are presumably reliable and valid. The HRSA project officers make an attempt to standardize the way in which grantees report their data. The panel also recommended assessing the correlation between labor categories and selecting only those that are independently appropriate and significant for CARE Act grantees. Second, the panel recommended deriving wage indices at the state and EMA levels only. (The EMA wage index will be based on the average of the MSAs within an EMA.) Variation in wages within a state (Title II) and within an EMA (Title I) will not be captured in the aggregate index. Thus, for example, urban providers in predominantly rural states may be under-compensated for their local wage burden. However, states are free to make whatever additional adjustments to their Title II award allocations they feel are important for reflecting local area wage variation.

Recommendation: The Associated Cost panel recommends including the Geographic Labor Adjustment Factor in the severity of need index.

Template 1: Geographic Labor Adjustment Factor

Group	Item	Example
Descriptive Characteristics	Variable Name	Geographic labor adjustment factor
	Data Element	Variation in area wages for selected labor categories specific to Title I and II programs. Wages will be weighted by the share of CARE Act expenditures for each labor category. Wage variation will be expressed as an index with a value of 1 representing the national average. The index for states and EMAs with above (below) average wages nationally will be greater (less) than 1.
	Source	Occupational Employment Statistics Survey, Bureau of Labor Statistics
	Rationale	The cost of delivering a unit of service varies in terms of the cost of labor around the country. Wage differences are likely to exist at the state or regional levels, as well as between urban and rural locations.
	Type of measure	Direct
	Level of Aggregation	The OESS supports wage estimates at both the MSA and state levels. An EMA-level wage index will be derived from a composite of the MSAs within each area.
	Frequency of Updates	The OESS survey is conducted every 6 months
	Cost	The OESS data are free. The wage data are available on the BLS website.
	Availability	Public domain
	Limitations	See below

Quality and Fidelity	Reliability	Yes. The geographic wage adjustment variable is derived from a large amount of nationally collected data. The OESS wage data are reliable and widely used for similar purposes.
	Validity	Yes. The geographic wage adjustment variable directly captures state and MSA-level variation in wages for selected labor categories. The data source is a valid and widely used measure of wage variation.
	Bias from Measurement Error	No. The data are unbiased. However, bias may be introduced when weighting wages by the occupational categories. The OESS wage data are collected for a wide range of occupational categories. The challenge is to choose the most appropriate labor categories for the Title I and II grantees and weight them to reflect the mix of labor within HIV primary care programs. There is an additional potential source of bias caused by state-level aggregation. The panel recommends using state-level wage indices to adjust the allocation of Title II funds. Wage differences within a given state will not be reflected in the state-level estimates. Thus predominantly rural states may be biased upward by the presence of a large urban market. This is less of a problem for EMS-level aggregation since most providers operate in the same large metropolitan area and its surrounding communities.
	Adjustments Possible	One way to adjust the OESS wage data for labor mix is to choose the labor categories that receive the largest share of CARE Act funding and then weight each category by its proportion of total CARE Act funding. This solution will depend on the quality of the HRSA data on CARE Act funding allocations. Expected allocations are derived from CARE Act grant applications with end-of-year reconciliation of actual expenditures. The data should be aggregated to the EMA or state level. Differences in labor mix between grantees will not be captured.
	Usability	Yes. This variable is readily useable.
	Burden	No. This variable poses no burden on grantees. The geographic wage adjustments will have to be calculated annually by HAB staff.
Worth	Inclusion	Yes
	Weight	The wage index for each labor category should be weighted by the proportion of Title I funding going to that type of service.

To calculate the wage indices, the RTI analyst first divided the relevant labor categories into seven groups using the Standard Occupational Codes (SOCs) listed on the OES survey (http://www.bls.gov/oes/.) We then weighted the average wage rate for each of these labor groups by the group's share of Title I allocations for medical services to derive a composite wage rate for each state and EMA. The EMA-level composite wages represent a further weighted average of the reported wage for each PMSA or MSA within the EMA weighted by their share of the jurisdiction's total population using a mapping algorithm provided by HAB. Finally, a composite wage index was derived by dividing each jurisdiction's composite wage rate by the average wage rate across all jurisdictions. The labor categories and weights for each of the seven groups are presented in ***Table 6***. The composite wage rates and wage indices for both Title II states and Title I EMAs are provided in ***Section IV***.

Table 6: Labor groups and weights used to create wage index

Labor Group	SOC Definitions	SOC Codes	Weight
Physicians	• General practitioner • Internist	• 29-1062 • 29-1063	20%
Nurses	• Licensed practical nurse • Registered nurse	• 29-2061 • 29-1111	20%
Clinical and Social Case Managers	• Medical & public health social worker	• 21-1022	20%
Pharmacists	• Pharmacist	• 29-1051	15%
Mental Health Counselors	• Clinical psychologist • Mental health counselor • Mental health social worker	• 19-3031 • 21-1014 • 32-1023	10%
Substance Abuse Counselors	• Substance abuse counselor • Substance abuse social worker	• 21-1011 • 21-1023	10%
Oral Health Providers	• Dentist • Dental hygienist • Dental assistant	• 29-1021 • 29-2021 • 29-9091	5%

The ***Geographic Non-Labor Input Price Adjustment Factor*** is summarized in ***Template 2***. The purpose of the geographic non-labor input price variable is to adjust for regional variation in the cost non-labor inputs, most notably, rent and facility costs. The panel agreed that rent and facility costs also account for a significant portion of total expenditures among Title I and II grant recipients and that, as with labor costs, the costs of rent and facilities vary substantially across markets. It was also noted that other federal payers such as Medicare adjust health care provider reimbursement rates for regional differences in rent and facilities. The panel considered various sources of data, including the Department of Housing and Urban Development's (HUD) Fair Market Rent (FMR) index and the Practice Expense (PE) component of the Geographic Practice Cost Index (GPCI) under Medicare's Physician Fee Schedule (MFS). In fact, the PE component of the GPCI is based in part on the FMR index, plus wages for non-physician professionals in a physician practice setting (clerical workers, nursing, and medical technicians). If these non-physician professional labor categories are included in the weighted average wage index defined above, then the panel recommended using only the FMR index to adjust for regional differences in the cost of clinical space. The RTI technical staff agreed to assess the correlations between labor categories and make a final recommendation to the panel.

The geographic non-labor input price adjustment factor should be reliable, valid and unbiased. However, the level of aggregation of the data poses a potential challenge. The PE component of the GPCI is available for only 81 localities nationally based on several large MSAs, plus all other areas in a state combined. (Large states such as California have two non-MSA areas.) Thus, mapping the PE component of the GPCI into the Title I EMAs and Title II states may create some measurement error. The degree and direction of potential bias caused by the mapping is difficult to assess a priori.

The FMR index, however, is available at the MSA and non-MSA county levels and can be aggregated and mapped into EMAs and states. Because of the challenges of mapping the PE component of the GPCI into the EMAs and states, it may make further sense to use the OES data to adjust for wage differences across all pertinent labor categories (including clerical, nursing, and medical technicians) and the FMR index to adjust for differences in the cost of clinical space.

Recommendation: The Associated Cost panel recommends including the Geographic Non-Labor Input Price Adjustment Factor in the severity of need index.

Template 2: Geographic Non-Labor Input Price Adjustment Factor

Group	Item	Example
Descriptive Characteristics	Variable Name	Geographic Non-Labor Input Price Adjustment Factor
	Data Element	Variation in area professional non-physician wages and rent
	Source	The Practice Expense (PE) component of the Geographic Practice Cost Index (GPCI) from Medicare Physician Fee Schedule. The PE component consists of the four most common labor categories in a physician's private practice: administrative support, RNs, LPNs, and medical technicians.
	Rationale	The cost of delivering the same unit of service varies geographically in terms of professional (non-physician) wages and rent for clinic space.
	Type of measure	Direct
	Level of Aggregation	81 GPCI localities defined at the MSA-level or the 'rest of state' non-MSA area. Some states contain two non-MSA 'rest of state' localities.
	Frequency of Updates	Annually
	Cost	Free
	Availability	Public domain
	Limitations	See below
Quality and Fidelity	Reliability	Yes. The geographic non-labor input price adjustment factor is derived from a large amount of reported data. The PE values have been compared by RTI under contract with CMS with other sources of data (BLS and hospital wage data) and the results have been consistent.
	Validity	Yes. The geographic non-labor input price adjustment factor directly captures area variation in non-physician professional wages and rent. It has been developed and extensively used by Medicare to compensate physicians for local area variation in office expenses.
	Bias from Measurement Error	Possible bias based on the aggregation of the index. The PE index is available for 81 localities only. The existing index cannot be mapped into the EMAs or aggregated to the state level. Rural non-MSA areas will receive a lower value. Some rural states complain that, by including MSAs, the system is biased against non-metropolitan areas within a state.
	Adjustments Possible	RTI will assess the correlation between the PE component and the OESS wage data. If the OESS and GPCI variables are highly correlated, then the panel recommends using the OESS data to adjust for wage variation and the FMR index to control for geographic variation in the cost of clinic space.

	Usability	Yes. This variable is readily useable.
	Burden	No
Worth	Inclusion	Yes. The panel recommends using the PE component to adjust for regional variation in practice expenses. However, if the PE index is highly correlated with the OESS wage index, then the panel recommends using the OESS wage index to adjust for geographic variation in wages and the FMR index to adjust for geographic variation in the cost of clinic space.
	Weight	No

After examining the available sources, the RTI analyst decided to use the HUD FMR data to adjust costs for area variation in non-labor inputs (http://www.huduser.org/datasets/fmr.html.) We used rents for a 2-bedroom apartment as reported on the final 2006 file. The FMRs are reported at the county or town level. To derive the EMA-level index, we mapped each county/town jurisdiction into an EMA and weighted the county/town rent value by its share of the total population. A similar method was used to derive state-level average rent values. The average rents and rent indices for both Title II states and Title I EMAs are provided in ***Section IV***.

The ***Health Insurance Premium Adjustment Factor*** is summarized in ***Template 3***. The purpose of the health insurance premium adjustment factor was to adjust for geographic differences in the per enrollee cost of the ADAP Health Insurance Purchasing and Maintenance Program (HIP). The HIP program allows states to use a portion or all of its ADAP funds to pay for the cost of health insurance that includes a prescription drug benefit for patients who would otherwise qualify for direct reimbursement. The panel agreed that per enrollee costs may vary by region based on a state's health insurance regulations, market competition, and plan coverage policies. Differences in per enrollee costs based on patient health status are expected to be captured directly through the casemix adjusters (such as disease progression, comorbidities, etc.) and would not be included in the health insurance premium adjustment factor. The health insurance premium adjustment factor is intended to control for differences related to market forces only, including government regulation of the industry. The panel decided that states with higher (lower) per enrollee costs because their grantees face a more competitive health insurance industry or because health insurance premiums are publicly regulated should receive more (fewer) per capita Title I and II funds than other states. Because the HIP program is intended to be cost-savings, per enrollee costs of ADPA will also vary between states with a health insurance insurance/purchasing initiative and those that rely solely on direct purchasing of drugs. The panel concurred that the severity of need index should attempt to control for the differences in per enrollee costs under ADAP.

However, the inclusion of a health insurance premium adjustment factor poses several challenges at this point. First, only half of the states offer such a program and it is unclear how to treat those states that do not participate. Second, several states supplement their ADAP HIP program with state-only dollars and may not report the full amount to HRSA. Third, HIP programs may include non-drug benefits as well which may vary between participating states. Fourth, an analysis of the HIP program expenditure and enrollment data submitted to HRSA revealed large unexplained variation in per enrollee costs. The data cannot be used for adjustment purposes until the enrollment and expenditure data are more consistently reported. Fifth, eligibility for ADAP varies

by state according to Medicaid eligibility and coverage policies, an issue that is already being covered under the Patient Coverage panel. Finally, and most importantly, the panel agreed that including a health insurance adjustment factor could unfairly penalize states that maintain relatively low per enrollee expenditures because of effective management and quality care by paying them less on a per capita basis than states with less effective programs. Adjusting per capita allocations for per enrollee HIP expenditures would create a disincentive for cost-saving initiatives.

Recommendation: The Associated Cost panel recommends not including the Health Insurance Premium Adjustment factor in the severity of need index at this time. The panel recommends considering it in the future once more consistent data are available.

Template 3: Health Insurance Premium Adjustment Factor

Group	Item	Example
Descriptive Characteristics	Variable Name	Health insurance premium adjustment factor
	Data Element	Per enrollee spending under ADAP Health Insurance Purchasing and Maintenance Program (HIP)
	Source	Expenditure and enrollment data from HAB (FY2005) or National ADAP Monitoring Project Annual Report (FY2004)
	Rationale	26 states currently elect to use some or all of their ADAP funds to pay for the cost of health insurance that includes drug benefits to eligible enrollees. The per capita costs of the programs (i.e., premiums) may vary between states. This variable is intended to measure the state-level variation in the cost of health insurance premiums for prescription medications and other services. The group agreed that the intent of the adjustment factor was to compensate for per enrollee HIP expenditures stemming from geographic differences in market forces, rather than from differences in client casemix. The number of competing plans in a market and state regulation of the health insurance industry will govern per enrollee costs. In addition, the health insurance variable is intended to adjust for potential savings under the program. The per capita cost of the insurance sponsorship program may be lower than the per capita cost of direct purchasing of drugs under ADAP.
	Type of measure	Indirect measure of health insurance premium. Health insurance premium measured by dividing annual HIP expenditures by total program enrollment during the same year.
	Level of Aggregation	State
	Frequency of Updates	Annual
	Cost	Free
	Availability	Public. Internally reported expenditure and enrollment data to HAB.
Quality and Fidelity	Reliability	Currently unreliable due to major differences in reporting between states. Because of current differences in reporting HIP expenditures and enrollment, per capita costs between states are currently not comparable.

Quality and Fidelity	Validity	Currently invalid due to the impact of non-market forces on health insurance expenditures, such as differences in patient health status and plan benefits. A valid measure of per capita HIP expenditures would be based on the same type of patient and the same set of covered services and adjust only for externally driven differences in premiums such as number of participating plans and state regulation of the health insurance industry.
	Bias from Measurement Error	(1) Some states supplement HIP program funds with state-only dollars. Inconsistencies in reporting ADAP versus state-only funds vary across states. (2) Enrollment and expenditures vary over time and we only have point-in-time estimates lagged by one or two years. (3) Insurance purchase and continuation programs must cover the same formulary as ADAP, but can also cover other medical services and may also charge copayments. These benefits may vary over time and between states. (4) Adjusting for per capita health insurance cost creates penalizes states with lower costs and creates a disincentive to implement cost-saving programs.
	Adjustments Possible	Obtain more current data from HAB. Obtain information on AIDS insurance continuation programs for non-participating states from alternative sources.
	Usability	No
	Burden	No
Worth	Inclusion	No
	Weight	N/A

B. Clinical Variables

1. Overview of Key Issues

The second set of variables was intended to capture per capita cost differences based on patient clinical characteristics. The panel agreed that the clinical characteristics of the clients served are a major cost driver among Title I and II grantee recipients and should be considered in a needs-based funding allocation system. The challenge was to identify clinical characteristics that have an important and independent impact on per capita costs and can be measured in a meaningful way with currently available data. Variables considered in this category included HIV disease stage, injection drug use, Hepatitis C, diabetes and cardiovascular disease.

The five variables based on patient clinical characteristics, along with their source of data and their recommendation for inclusion, are summarized in ***Table 7***. Each individual variable is discussed in greater detail in the following section.

Table 7: Variables based on patient clinical characteristics

Clinical Variables	Inclusion	Source(s) of Data
HIV disease stage	No	HIV Research Network (HIVRN) Survey for incremental costs of AIDS nationally. CDC surveillance data for AIDS prevalence based on initial diagnosis (HARS) by state and EMA.
Hepatitis C	No	Medicaid claims for fee-for-service population from Medicaid Analytic eXtract (MAX) 2001, all States. Provides cost and prevalence by state and EMA.
Substance abuse (IDU exposure category)	Yes	HIV Research Network Survey for incremental costs of IDU. CDC surveillance data for IDU prevalence among those diagnosed with HIV. Provides cost and prevalence by state and EMA.
Diabetes	No	Medicaid claims for fee-for-service population from Medicaid Analytic eXtract (MAX) 2001, all States. Provides cost and prevalence by state and EMA.
Cardiovascular disease	No	Medicaid claims for fee-for-service population from Medicaid Analytic eXtract (MAX) 2001, all States. Provides cost and prevalence by state and EMA.

2. Description of Variables

The ***HIV Disease Stage Adjustment Factor*** is summarized in the ***Template 4***. The panel considered disease stage to be one of the most important determinants of per capita costs of care for people with HIV/AIDS. Clients with low CD4 counts or with an AIDS diagnosis are more likely to be on ARV therapies and to suffer from comorbid conditions than those at a less advanced stage of the disease, both of which contribute to higher treatment costs. The panel considered several ways to measure disease stage, including AIDS diagnosis, CD4 count, and ARV prevalence. While the first two indicators might be useful markers of costs, CD4 counts are likely to change over time as patients begin ARV therapy and become adherent to treatment protocol. In fact, with proper care and adherence, a patient's CD4 count can recover above the AIDS-defining threshold. The panel agreed that CD4 counts are only useful measures of costs if they capture improvements in health status. In addition, most of the incremental costs associated with a low CD4 count are incurred in the inpatient setting and inpatient services are not covered under the CARE Act. The panel also agreed that the most important determinant of costs relating to a client's disease stage is whether that person is on ARV therapies. Patients on ARV drugs, regardless of their AIDS diagnosis or CD4 count, will be more expensive to treat than clients not on ARV medications. However, it was also pointed out that many HIV patients cannot tolerate ARV drugs. Lack of tolerance or resistance to ARV medications may cause a patient's health status to worsen and, thus, lead to higher medical costs.

The panel considered several sources of data for disease stage, including CDC surveillance data on AIDS prevalence, HIVRN survey data for the incremental cost estimates associated with CD4 strata, Medicaid claims data, the HIV Cost and Services Utilization Survey (HCSUS) data, the CARE Act Data Reports (CADRs), and the Veterans Administration's AIDS registry data. The most current, representative and robust sources of data were the CDC surveillance data (for measuring AIDS prevalence by state) and the HIVRN survey data (for measuring the incremental costs by CD4 strata). However, the CDC surveillance data measure AIDS prevalence at the time of initial

diagnosis only and, therefore, do not capture improvements in disease stage over time. The panel agreed that the incidence of AIDS should decline as more patients are tested earlier and introduced to ARV therapies earlier in their disease stage. Further, not all states have mature systems for reporting HIV and AIDS cases by name, essential for ensuring cases are unduplicated. Nor does the CDC surveillance data collect information on the number of infected people on ARV therapies. The CADRs report the number of patients for a given grantee recipient on ARV therapies, but the self-reported provider-level data are considered incomplete and unreliable. Relying on CDC-reported newly diagnosed AIDS cases would also undercount states with immature reporting systems. Thus, because of the lack of updated and names-based AIDS prevalence data, as well as the lack of information on CD4 counts and ARV rates, the panel recommended not adjusting for cost variation by disease stage until better data are available.

As stated earlier, a minority of the Associated Cost panel members argued for using newly diagnosed AIDS cases with adjustments for potential duplication as an interim measure of disease progression until better state and local data on CD4 count and/or ARV use are available.

Recommendation: The Associated Cost panel recommends not including the HIV Disease Stage Adjustment Factor based on AIDS diagnosis in the severity of need index at this time. The panel recommends including an adjustment factor based on the prevalence of HIV cases with a CD4 count below 50 or the rate of ARV use when such information is available.

Template 4: HIV Disease Stage Adjustment Factor

Group	Item	Example
Descriptive Characteristics	Variable Name	HIV Disease Stage Adjustment Factor
	Data Element	AIDS diagnosis or CD4 count (<50, 50-200, 200-500, >500)
	Source	HIV Research Network Survey for incremental costs by CD4 strata and CDC surveillance data for AIDS prevalence based on initial diagnosis
	Rationale	Average cost per patient per year depends on patient's stage of disease as measured by AIDS diagnosis or CD4 count
	Type of measure	Direct measure of disease stage
	Level of Aggregation	Cost data collected at individual level, but estimated across survey sample (N=951 adults across 17 sites). Surveillance data available by state.
	Frequency of Updates	Cost estimates based on single cross-sectional interviews in 2003. No scheduled update. Surveillance data reports on-going AIDS prevalence based on initial diagnosis, but does not reflect improvements in CD4 count above AIDS threshold over time.
	Cost	Cost and prevalence data are free
	Availability	Cost and prevalence data are publicly available
	Limitations	(1) Cost estimates collected only once. No scheduled update. (2) Cost estimates based on convenience sample of patients in care. Results may not be generalizable. Are consistent with results based on HCSUS survey. (3) CDC surveillance prevalence data based initial diagnosis and are not adjusted to reflect improvements in CD4 counts above the AIDS threshold over time. (4) Lack of names-based reporting by all states means that AIDS cases in those states and localities may be underreported on CDC surveillance data.

Quality and Fidelity	Reliability	No. CDC surveillance data measure AIDS prevalence at initial diagnosis only. Improvements in CD4 counts above AIDS threshold are not reflected in CDC surveillance data. Thus, CDC AIDS prevalence data may not accurately capture clients' current disease stage. Further, CDC surveillance data include states without names-based reporting systems and, thus, HIV and AIDS cases may not be consistently reported across states. Finally, incremental cost estimates by CD4 strata are based on small sample and, thus, may not be replicated with larger number of observations.
	Validity	No. For reasons stated above, CDC surveillance data on AIDS diagnosis are based on initial diagnosis and does not reflect changes in CD4 counts over time. If CD4 count recovers above the AIDS threshold, the AIDS diagnosis will not be re-reported to CDC.
	Bias from Measurement Error	The variable will overestimate the number of clients with AIDS in areas with a larger proportion of patients who are on and adherent to ARV therapies. Patients with an AIDS diagnosis on ARVs are more likely to recover than those not on ARVs. Also, ARV treatment is a more important determinant of costs than AIDS diagnosis or CD4 count. Patients on ARVs, regardless of their AIDS diagnosis or CDC count, will have higher costs than those not on ARVs. The introduction of ARV therapies earlier in a patient's disease stage means that many of the costs of care will not be captured by a variable based on AIDS diagnosis or CD4 count. In addition, the number of cases in states without names-based reporting may be underreported.
	Adjustments Possible	None
	Usability	No
	Burden	No
Worth	Inclusion	No
	Weight	N/A

The ***Injection Drug Use (IDU) Exposure Category Adjustment Factor*** variable is summarized in ***Template 5***.

The purpose of the injection drug use (IDU) exposure category adjustment factor is to compensate for the incremental treatment costs associated with substance abuse as a comorbid condition. The panel agreed that substance abuse contributes to higher per capita costs because of the greater prevalence of comorbid conditions among the HIV population, such as Hepatitis C, and the need to expend additional resources keeping this less stable population in care and adherent to treatment.

Two sources of data were considered: the HIVRN for incremental cost estimates and the CDC AIDS surveillance data for IDU prevalence among the infected population. The HIVRN survey results showed a strong and positive correlation between IDU and per capita costs. The cost differential occurred mainly in the CD4 strata above a count of 50. Once a patient's CD4 count falls below a count of 50, the IDU cost differential disappears. While the cost of IDU is highly correlated with the cost of Hepatitis C, the CDC's AIDS surveillance data provide a better measure

of IDU prevalence among the infected population. State-level data on Hepatitis C prevalence are unavailable. It should also be noted that the CDC surveillance data are based on self-reported exposure category at the time of initial diagnosis. The CDC surveillance data may underestimate the prevalence of IDU for people with multiple risk factors. Further, as stated above, the surveillance data do not reflect changes in risk categories over time.

Recommendation: The Associated Cost panel recommends including the IDU Exposure Category Adjustment Factor in the severity of need index.

Template 5: IDU Exposure Category Adjustment Factor

Group	Item	Example
Descriptive Characteristics	Variable Name	Injection drug use (IDU) exposure category adjustment factor
	Data Element	Measures injection drug use as the mode of HIV transmission
	Source	HIVRN for incremental costs of IDU risk factor and CDC surveillance data for prevalence of IDU exposure category among HIV population
	Rationale	Substance abuse as a comorbid condition among the infected population leads to higher per capita costs of care
	Type of measure	Direct report from patient for cost estimates. State-level prevalence rates for IDU as an exposure category among the infected population from the CDC.
	Level of Aggregation	HIVRN is a person level survey. CDC prevalence rates estimated at the state level.
	Frequency of Updates	HIVRN is a one-time report. No anticipated updates at this time. The CDC surveillance data are updated with new diagnoses.
	Cost	Free
	Availability	Both sources of data are publicly available
	Limitations	See below
Quality and Fidelity	Reliability	Uncertain. Incremental cost estimates are based on 17 sites only. The HIVRN survey sample was not intended to be representative of the HIV population. But results are highly statistically significant. The prevalence rates for IDU as a risk factor among the HIV population should be reliable.
	Validity	The prevalence rate is based on a self-report of HIV transmission risk. Gold-standard for this measure.
	Bias from Measurement Error	HIVRN not representative. Includes only those in care. Magnitude and direction of bias based on HIVRN sample is unknown. CDC surveillance data based on self-reported risk factor at time of initial diagnosis. Risk factor may not underestimate substance abuse prevalence for clients with multiple risk factors.
	Adjustments Possible	N/A
	Usability	NA
	Burden	No, routinely measured
Worth	Inclusion	Yes
	Weight	Incremental costs of IDU risk factor will be weighted by percentage of HIV clients in IDU exposure category based on CDC surveillance data.

The ***Hepatitis C Adjustment Factor*** is summarized in the ***Template 6***. The panel agreed that Hepatitis C was an important determinant of per capita cost variation among Title I and II grant recipients. The prevalence of Hepatitis C is among the HIV infected population is increasing and the cost of treating the chronic disease with new interferon therapies over an extended period of time can be extremely expensive to individual providers. The panel measured the prevalence and cost of the comorbid condition among the HIV population using 2001 Medicaid claims data, but the panel believed that the state-level estimates exhibited a wide degree of unexplained variation and did not include the costs of the newer medications. The panel also viewed Hepatitis C infection to be highly correlated with the prevalence of substance abuse among people with HIV and AIDS. Since the IDU prevalence rates (measured as an exposure category) among the HIV population were more stable and less susceptible to changes in treatment protocols and hence costs, the panel decided to recommend not including Hepatitis C in the severity of need index at this time and to rely solely on the IDU adjustment factor to capture the variation in costs associated with the chronic disease.

Recommendation: The Associated Cost panel recommends <u>not</u> including the Hepatitis C Adjustment Factor in the severity of need index because of its close correlation with the IDU exposure category factor.

Template 6: Hepatitis C Adjustment Factor

Group	Item	Example
Descriptive Characteristics	Variable Name	Hepatitis C adjustment factor
	Data Element	The cost of Medicaid-covered services (excluding inpatient) for Hepatitis C
	Source	2001 Medicaid Analytic eXtract (MAX) claims files for incremental costs and prevalence of Hepatitis C among Medicaid enrollees with HIV, all States reporting
	Rationale	Hepatitis C has a high and increasing prevalence rate among the HIV infected population and, with the introduction of new interferon medications, can be extremely costly to treat over an extended period of time. Hepatitis C prevalence rates may vary by location and region of provider.
	Type of measure	Directly measures prevalence and costs of Medicaid-covered services for HIV infected population using 2001 claims. Services include hospital outpatient, physician and ambulatory, long-term care and pharmaceuticals. Inpatient services are excluded.
	Level of Aggregation	Individual level
	Frequency of Updates	Annual releases
	Cost	Free (but requires approval from CMS and programming assistance from staff at Agency)
	Availability	Interagency agreement or DUA required
	Limitations	See below

Quality and Fidelity	Reliability	Yes. Reliability differs across states depending on such factors as Medicaid managed care enrollment (Medicaid claims do NOT include managed care encounter data); Medicaid eligibility and benefit polities (which may vary by state); Medicaid payment rates (which also vary by state). MAX files have been standardized, but providers may differ in the completeness of coding individual diagnoses. State rules for covering the dually eligible (elderly and disabled) population may also differ.
	Validity	Yes. For those covered, the claims provide a valid measure of the true costs of Hepatitis C to state Medicaid programs.
	Bias from Measurement Error	Yes. MAX claims file may be biased due to: (1) not representative of Ryan White CARE Act population; (2) excludes managed care enrollees; (3) includes only people who are have health insurance coverage (Medicaid); (4) includes only people who are seeking care; (5) includes only the cost of Medicaid-covered services; (6) most of the costs of care for the dually eligible population will be under Medicare and not included in the Medicaid claims; (7) enrollees consistently come in and out of eligibility and MAX will not include claims during periods of disenrollment.
	Adjustments Possible	Some can be addressed, but not all. Can adjust for partial year enrollment by annualizing the costs. Can do some sensitivity testing to assess stability of results across different types of eligibility categories. Can base estimates on subset of states with high prevalence of HIV and Hepatitis C and with low Medicaid managed care enrollment. Can try to merge Medicare claims for dually eligible population.
	Usability	No
	Burden	No
Worth	Inclusion	No. MAX claims are lagged by five years and, thus, miss many of the costs of treating Hepatitis C currently. Also highly correlated with IDU exposure category.
	Weight	N/A

The ***Age-Related Chronic Disease Adjustment Factors*** are summarized in the ***Template 7***. The panel agreed that age-related chronic diseases were potentially important contributors to per capita costs of HIV care, particularly as the infected population continues to age. Two of the most common age-related chronic diseases are diabetes and cardiovascular disease, both of which can be triggered and complicated by HIV infection. The panel measured the prevalence and cost of diabetes and cardiovascular disease among the HIV population using 2001 Medicaid claims data. But, as with Hepatitis C, the panel believed that the state-level cost estimates exhibited a wide degree of unexplained variation. The panel also examined the relationship between costs and age using the HIVRN survey and found no statistically significant association, although the survey data are of limited value because of the small sample size and the narrow age cohort of respondents. The panel also believed that, given the current age distribution of the infected population, the prevalence of diabetes and cardiovascular disease among people living with HIV and AIDS was still fairly low relative to other important comorbid conditions such as substance abuse and Hepatitis C. More generally, the panel further decided that difficulties isolating the component of age-related chronic disease costs that is related to HIV infection adds to the challenge of incorporating this variable in a

SON index. Because of the relatively low prevalence rates among the infected population and lack of appropriate data, the panel decide to recommend that diabetes and cardiovascular disease not be included in the severity of need index at this time. Instead, they recommended that HAB continue to monitor the prevalence and cost of these and other age-related chronic diseases among the HIV infected population for possible inclusion in the future.

Recommendation: The Associated Cost panel recommends not including the Age-Related Chronic Disease Adjustment Factor in the severity of need index at this time. The panel recommends considering adjustments for diabetes and cardiovascular disease as the age-related conditions become more prevalent among the infected population.

Template 7: Age-Related Chronic Condition Adjustment Factor

Group	Item	Example
Descriptive Characteristics	Variable Name	Age-related chronic condition adjustment factor: diabetes and cardiovascular disease
	Data Element	The cost of Medicaid-covered services (excluding inpatient) for diabetes and cardiovascular disease
	Source	2001 Medicaid Analytic eXtract (MAX) claims files for incremental costs and prevalence rates of diabetes and cardiovascular disease among Medicaid enrollees with HIV, all States reporting
	Rationale	The incidence of diabetes and cardiovascular disease among those living with HIV and AIDS will continue to increase as the infected population in the US ages. HIV infection can lead to and complicate the treatment of both chronic diseases. As chronic diseases requiring constant treatment over an extended period of time, diabetes and cardiovascular disease can pose a significant financial burden on providers.
	Type of measure	Directly measures prevalence and costs of Medicaid-covered services for HIV infected population using 2001 claims. Services include hospital outpatient, physician and ambulatory, long-term care and pharmaceuticals. Inpatient services are excluded.
	Level of Aggregation	Individual level
	Frequency of Updates	Annual releases
	Cost	Free (but requires approval from CMS and programming assistance from staff at Agency)
	Availability	Interagency agreement or DUA required
	Limitations	See below
Quality and Fidelity	Reliability	Yes. Reliability differs across states depending on such factors as Medicaid managed care enrollment (Medicaid claims do NOT include managed care encounter data); Medicaid eligibility and benefit polities (which may vary by state); Medicaid payment rates (which also vary by state). MAX files have been standardized, but providers may differ in the completeness of coding individual diagnoses. State rules for covering the dually eligible (elderly and disabled) population may also differ.

	Validity	Yes. For those covered, the claims provide a valid measure of the true costs of diabetes and cardiovascular disease to state Medicaid programs.
	Bias from Measurement Error	Yes. MAX claims file may be biased due to: (1) not representative of Ryan White CARE Act population; (2) excludes managed care enrollees; (3) includes only people who are have health insurance coverage (Medicaid); (4) includes only people who are seeking care; (5) includes only the cost of Medicaid-covered services; (6) most of the costs of care for the dually eligible population will be under Medicare and not included in the Medicaid claims; (7) enrollees consistently come in and out of eligibility and MAX will not include claims during periods of disenrollment.
	Adjustments Possible	Some can be addressed, but not all. Can adjust for partial year enrollment by annualizing the costs. Can do some sensitivity testing to assess stability of results across different types of eligibility categories. Can base estimates on subset of states with high prevalence of HIV and diabetes/cardiovascular disease and with low Medicaid managed care enrollment. Can try to merge Medicare claims for dually eligible population.
	Usability	No
	Burden	No
Worth	Inclusion	No. HAB should continue to monitor the impact of diabetes and cardiovascular disease on the cost of care as the incidence of the diseases continues to increase among the HIV infected population.
	Weight	N/A

C. Sociodemographic Variables

1. Overview of Key Issues

The final set of variables was intended to capture per capita cost differences based on patient sociodemographic characteristics. The panel agreed that the sociodemographic characteristics of the patients served at Title I and II grant recipients may have an important impact on per capita program costs and should be considered under a needs-based funding allocation system. The issues for consideration under this category of variables included the underlying health needs of selected subpopulations, as well as differences in access, continuity and adherence between subgroups that can lead to incremental program expenditures for outreach, education and adherence programs and ultimately influence the long-term cost of care. Variables in this category included age, sex, race/ethnicity and poverty.

The four variables based on patient sociodemographic characteristics, along with their source of data and their recommendation for inclusion, are summarized in ***Table 8***. The variables are discussed in greater detail in the following section. The panel considered various sources of data for these variables, including Medicaid claims and the HIVRN survey. But, because none of the variables was ultimately recommended for inclusion in the SON index at this time, the panel did not complete templates for them.

Table 8: Variables based on patient sociodemographic characteristics

Variable	Inclusion	Data Source(s)
Race/ethnicity	No	Medicaid claims for fee-for-service population from Medicaid Analytic eXtract (MAX) 2001, all States or HIV Research Network Survey. MAX provides cost and prevalence by state and EMA. HIVRN provides costs nationally.
Gender	No	Medicaid claims for fee-for-service population from Medicaid Analytic eXtract (MAX) 2001, all States or HIV Research Network Survey. MAX provides cost and prevalence by state and EMA. HIVRN provides costs nationally.
Age	No	Medicaid claims for fee-for-service population from Medicaid Analytic eXtract (MAX) 2001, all States or HIV Research Network Survey. MAX provides cost and prevalence by state and EMA. HIVRN provides costs nationally.
Poverty	No	US decennial census data. Provides prevalence by state and EMA. Cost data not available.

2. Description of Variables

Race/ethnicity: The Patient Characteristics panel forwarded this variable because members felt that racial and ethnic minorities have greater medical costs because of poorer health outcomes. Further, greater variation in access to care has been documented in a number of settings among racial and ethnic underserved populations (see the 2003 Institute of Medicine (IOM) report, *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*). Some Associated Cost panelists agreed with this assessment, and also suggested the impact on the cost of care occurred when people, particularly those within racial and ethnic underserved populations, experienced barriers and were delayed in accessing care. They felt that race/ethnicity has an independent impact on costs.

However, as noted by the Patient Characteristics panel, the results of studies looking at the impact of race/ethnicity on HIV-related costs are mixed. Several studies indicate that the unfavorable patterns of service use among underserved racial and ethnic populations may have been diminishing over time. In some studies, observed disparities among racial and ethnic minorities disappeared entirely after adjusting for socioeconomic status. As a result, some members of the Associated Cost Panel suggested that poverty could potentially serve as a proxy for race/ethnicity because of the high correlation between the variables.

In addition, panelists discussed the limitations of current data (e.g., HARS) on race/ethnicity due to the tendency to combine distinct racial or ethnic groups into one category. For example, American-born and foreign-born blacks may all be counted within the category "African American," resulting in data that may mask critical differences related to health status and access to care across populations.

The panel did feel that race/ethnicity might have a moderate impact on cost, but that the current data were not strong enough to support inclusion in the SON model. They also suggested that the CARE Act currently has funds set aside specifically to address racial and ethnic disparities—the Minority AIDS Initiative (MAI)—that will be important to factor into the SON model.

Recommendation: The Associated Cost panel recommends not including the Race/Ethnicity Adjustment Factor at this time, but does recommend HRSA investigate the incremental impact on patient cost and regional variations for race/ethnicity in the future (using data from Medicaid and the HIVRN).

Gender: The panel agreed with the Patient Characteristic panel's belief that a woman's care would be more complex than a man's care, probably because the majority of women living with HIV are within child-bearing age and require more support services due to the complexity of taking care of their families. However, the panel also doubted that a differential in the actual cost of care for a woman exists, in part, because the cost of HIV care (e.g., HAART) remains constant, regardless of gender. They also stressed that women are more likely to be on Medicaid than men and that their costs are more likely to be hospital costs (which are not covered by the CARE Act). The panel also pointed out that appropriate data to test the hypothesis that the cost of HIV-related ambulatory services is higher for females than males do not yet exist. Data from the HIVRN survey did not show a statistically significant association between gender and cost of care.

The panel felt that gender would probably have a moderate impact on cost, and that the current data were not strong enough to support inclusion in the SON model.

Recommendation: The Associated Cost panel recommends not including the Gender Adjustment Factor at this time, but does recommend HRSA investigate the incremental impact on patient cost and regional variations for gender in the future (using data from Medicaid and the HIVRN).

Age: The panel agreed with the Patient Characteristic panel that age is an important consideration because older people tend to have more comorbidities that are not necessarily related to HIV, such as diabetes, cardiovascular disease, and high blood pressure. As discussed earlier, these age-related chronic conditions lead to higher medical costs among the elderly. However, the group again looked to the data from the HIVRN that suggested age does not significantly impact on patient resource needs once you control for CD4, though the significance of the result may constrained by the small sample size and narrow age cohort of respondents.

The panel felt that age would probably have a moderate impact on cost, and that the current data were not strong enough to support inclusion in the SON model.

Recommendation: The Associated Cost panel recommends not including the Age Adjustment Factor at this time, but does recommend HRSA investigate the incremental impact on patient cost and regional variations for age in the future (using data from Medicaid and the HIVRN).

***Poverty*:** The panel identified two reasons for considering poverty. The first reason has to do with measuring the burden on care by low income subpopulations eligible for CARE Act services. Some regions serve a disproportionately lower income subpopulation than others and should be appropriately compensated for this additional burden. However, the panel agreed that this reason is unrelated to costs per case and, thus, not appropriate for the Associated Cost Panel. Rather, the panel agreed that issues related to burden associated with poverty are better handled by the Area Characteristics Panel. The second reason for including poverty is the extent to which low income people are inherently more costly to serve than those in higher income groups. Costs may be higher for low income populations for several reasons, including underlying health status and the need for additional program activities related to identification, outreach and retention in care, as well as the higher treatment costs associated with delays in seeking care and lack of continuity in care or adherence to treatment. The panel agreed that these incremental costs are probably not sufficient (relative to overall treatment costs) to warrant inclusion in the SON index at this time. The panel also agreed that it would be difficult to obtain data on the costs and incidence related to timing of initial treatment and lack of continuity and adherence.

The panel did feel that, in terms of the incremental costs per client served, poverty might have a moderate impact on cost, but that the current data were not strong enough to support inclusion in the SON model. The panelists believed that the variation in the demand for CARE-Act funded services based on the prevalence of poverty should be addressed by the Area Characteristics Panel.

Recommendation: The Associated Cost panel recommends <u>not</u> including the Poverty Adjustment Factor at this time, but does recommend HRSA investigate the incremental impact on patient cost and regional variations for poverty in the future (using data from Medicaid and the HIVRN).

IV. Wage and Rent Indices for Titles I and II Grantees

Table 9 presents the average composite wage rate and wage index and average rent and rent index for each state based on the methodology discussed in Section II. The distribution of the wage index is fairly concentrated around the value of 1.00 with all but five of the states falling between 0.90 and 1.10. The state-level rent index exhibits considerably greater variation. Only 11 states have a rent index value between 0.90 and 1.10, 22 have a value between 0.80 and 1.20, and 38 have an index value between 0.70 and 1.30. These indices should be used to adjust the allocation of Title II funds for differences in the cost of labor and non-labor input across Title II grantees. It should be noted that, because the wage and rent indices for the Title II allocations are averaged over the entire state, they do not capture variation between urban and rural areas within the grantee jurisdiction. However, after allocating Title II funds across the state and territorial grantees, each jurisdiction is free to distribute their own funds in a way that they believe reflects local resource needs. Based on discussions with CARE Act providers under a previous evaluation conducted for HAB, when creating the SON index we recommend weighting the wage index by 0.80 and the non-labor input index by 0.20. These weighted represent a rough approximation of the average costs between personnel and rent and facilities among CARE Act grantees.

Table 9: State-level wage and rent indices for Title II Grantees

State	Average Composite Wage	State-Level Wage Index	Average Rent	State-Level Rent Index
Alabama	$33.06	0.97	$522	0.67
Alaska	35.09	1.03	899	1.16
Arizona	36.34	1.07	515	0.66
Arkansas	34.50	1.02	746	0.96
California	36.58	1.08	1,109	1.43
Colorado	34.12	1.01	822	1.06
Connecticut	35.45	1.04	1,008	1.30
Delaware	36.03	1.06	803	1.03
District of Columbia	29.17	0.86	1,225	1.58
Florida	35.27	1.04	777	1.00
Georgia	33.24	0.98	654	0.84
Hawaii	35.78	1.05	1,154	1.48
Idaho	34.35	1.01	601	0.77
Illinois	32.41	0.95	788	1.01
Indiana	32.81	0.97	616	0.79
Iowa	33.30	0.98	569	0.73
Kansas	32.98	0.97	591	0.76
Kentucky	32.12	0.95	526	0.68
Louisiana	34.61	1.02	661	0.85
Maine	33.53	0.99	681	0.88
Maryland	36.97	1.09	1,028	1.32
Massachusetts	35.65	1.05	1,122	1.44
Michigan	33.38	0.98	685	0.88

Minnesota	35.52	1.05	730	0.94
Mississippi	31.73	0.93	525	0.67
Missouri	33.62	0.99	592	0.76
Montana	30.31	0.89	567	0.73
Nebraska	33.71	0.99	585	0.75
Nevada	39.27	1.16	846	1.09
New Hampshire	36.76	1.08	912	1.17
New Jersey	37.08	1.09	1,044	1.34
New Mexico	34.90	1.03	616	0.79
New York	36.36	1.07	988	1.27
North Carolina	34.96	1.03	622	0.80
North Dakota	34.57	1.02	514	0.66
Ohio	34.75	1.02	615	0.79
Oklahoma	30.15	0.89	528	0.68
Oregon	34.95	1.03	678	0.87
Pennsylvania	31.33	0.92	716	0.92
Puerto Rico	20.04	0.59	386	0.50
Rhode Island	37.50	1.10	957	1.23
South Carolina	33.16	0.98	584	0.75
South Dakota	33.46	0.99	549	0.71
Tennessee	31.55	0.93	570	0.73
Texas	33.69	0.99	664	0.85
Utah	35.21	1.04	651	0.84
Vermont	34.76	1.02	754	0.97
Virginia	33.48	0.99	839	1.08
Washington	34.80	1.02	748	0.96
West Virginia	32.97	0.97	504	0.65
Wisconsin	37.32	1.10	632	0.81
Wyoming	30.84	0.91	542	0.70

Notes:
Composite wage based in wages for physicians, nurses, pharmacists, oral health workers, mental health and substance abuse counselors, and case managers weighted by their share of 2004 Title I allocations. Rent index based on weighted average of each county/town in a state or EMA weighted by its share of total population. OES survey does not include sufficient data to calculate wage index for Virgin Islands and Guam. Wage and rent indices should receive SON weights of 0.80 of 0.20, respectively.

Source:
RTI analysis of data from OES survey, BLS, 2004 and FMR survey, HUD, 2006.

Table 10 presents the average composite wage rate and wage index and the average rent and rent index for each EMA based on the methodologies discussed in Section III. The distribution of the wage index is fairly concentrated around the value of 1.00 with all but six of the EMAs falling between 0.90 and 1.10. Again, the distribution of the EMA-level rent index exhibits greater variation. A total of 17 EMAs have a rent index value between 0.90 and 1.10, 29 have a value between 0.80 and 1.20, and 41 have a value between 0.70 and 1.30. These indices should be used to

adjust the allocation of Title I funds for differences in the cost of labor and non-labor input across Title I grantees. Given that the EMA-level indices are calculated over smaller and more homogeneously urban areas, the wage and rent indices for Title I likely capture meaningful variation in the cost of labor and non-labor inputs across grantees. Based on discussions with CARE Act providers under a previous evaluation conducted for HAB, when creating the SON index we recommend weighting the wage index by 0.80 and the non-labor input index by 0.20. These weighted represent a rough approximation of the average costs between personnel and rent and facilities among CARE Act grantees.

Table 10: EMA-level wage and rent indices for Title I Grantees

EMA	Average Composite Wage	EMA-Level Wage Index	Average Rent	EMA-Level Rent Index
Atlanta, GA	$34.03	0.97	$763	0.83
Austin, TX	33.13	0.94	804	0.88
Baltimore, MD	36.26	1.03	950	1.04
Bergen-Passaic, NJ	38.83	1.10	--	--
Boston, MA	36.30	1.03	1,267	1.38
Caguas, PR	18.58	0.53	362	0.40
Chicago, IL	32.10	0.91	901	0.98
Cleveland, OH	34.46	0.98	682	0.74
Dallas, TX	36.07	1.03	733	0.80
Denver, CO	34.48	0.98	889	0.97
Detroit, MI	32.44	0.92	770	0.84
Dutchess County, NY	35.89	1.02	998	1.09
Fort Lauderdale, FL	37.12	1.06	911	0.99
Fort Worth, TX	37.20	1.06	725	0.79
Hartford, CT	34.82	0.99	979	1.07
Houston, TX	32.56	0.93	743	0.81
Jacksonville, FL	36.58	1.04	749	0.82
Jersey City, NJ	35.56	1.01	1,090	1.19
Kansas City, MO	34.00	0.97	703	0.77
Las Vegas, NV	38.71	1.10	861	0.94
Los Angeles, CA	34.63	0.98	1,189	1.30
Miami, FL	35.62	1.01	911	0.99
Middlesex, NJ	37.07	1.05	1,187	1.30
Minneapolis, MN	35.69	1.02	855	0.93
Nassau-Suffolk, NY	37.15	1.06	1,280	1.40
New Haven, CT	36.12	1.03	1,166	1.27
New Orleans, LA	34.61	0.98	940	1.03
New York, NY	37.51	1.07	1,133	1.24
Newark, NJ	37.07	1.05	1,004	1.10
Norfolk, VA	35.70	1.02	811	0.88
Oakland, CA	41.29	1.17	1,238	1.35
Orange County, CA	38.94	1.11	1,392	1.52

Orlando, FL	31.84	0.91	782	0.85
Philadelphia, PA	32.62	0.93	886	0.97
Phoenix, AZ	36.49	1.04	770	0.84
Ponce, PR	19.38	0.55	423	0.46
Portland, OR	36.38	1.03	723	0.79
Riverside-San Bernardino, CA	37.50	1.07	911	0.99
Sacramento, CA	36.03	1.02	959	1.05
San Antonio, TX	37.80	1.08	687	0.75
San Diego, CA	36.70	1.04	1,065	1.16
San Francisco, CA	39.08	1.11	1,536	1.68
San Jose, CA	38.41	1.09	1,273	1.39
San Juan, PR	22.94	0.65	403	0.44
Santa Rosa, CA	37.34	1.06	1,151	1.26
Seattle, WA	36.60	1.04	840	0.92
St. Louis, MO	32.68	0.93	654	0.71
Tampa-St. Petersburg, FL	32.47	0.92	785	0.86
Vineland-Millville-Bridgeton, NJ	37.71	1.07	852	0.93
Washington, DC	34.97	0.99	1,225	1.34
West Palm Beach, FL	36.74	1.04	911	0.99

Notes:
Composite wage based in wages for physicians, nurses, pharmacists, oral health workers, mental health and substance abuse counselors, and case managers weighted by their share of 2004 Title I allocations. Rent index based on weighted average of each county/town in a state or EMA weighted by its share of total population. OES survey does not include sufficient data to calculate wage index for Virgin Islands and Guam. Wage and rent indices should receive SON weights of 0.80 of 0.20, respectively.

Source:
RTI analysis of data from OES survey, BLS, 2004 and FMR survey, HUD, 2006.

V. History of the Panel

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