

Using Survey Data to Allocate Federal Funds for the State Children's Health Insurance Program (SCHIP)

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We begin this article with a brief review of the basic elements of allocation formulas and issues that arise in using sample survey data to estimate their components. We then turn to the State Children's Health Insurance Program (SCHIP) to illustrate how some of these issues have developed and been addressed in the context of a relatively new U.S. federal government program. SCHIP is the largest new health care initiative since Medicaid, and its formula-based allocation of funds provides an excellent illustration of a range of issues. Following an overview of the SCHIP formula allocation process, we discuss several statistical issues that have emerged since the start of the program in 1997.

Key words: Allocation formulas; children's health insurance; data sources; estimation; household surveys.

1. Basic Elements of Formula Allocation Programs

Formula allocation programs support a wide variety of functions, such as health care, education, housing, transportation, and social services. Many of them, such as the State Children's Health Insurance Program (SCHIP), which is the subject of this article, target low-income families or individuals. Motivations for federal funding of state and local programs vary. A common one is to encourage recipient jurisdictions (usually states) to spend more of their own funds on specific functions (often this is done through inclusion of matching provisions) or to start new programs in specific areas. Another goal may be to equalize the fiscal capacities of state and local governments to address identified needs. Yet another goal may be to obtain some leverage to persuade recipients to include certain features in their programs, e.g., standard speed limits on interstate highways. The use of a statistical formula to determine the allocation permits informed discussion of objectives and gives legislators a credible basis for explaining the outcome of the process. Reaching agreement on a particular formula is, however, largely a political process, in which proposed alternatives are closely examined to determine how they will affect constituencies. Formulas that finally emerge may represent compromises between substantive program goals and the need to obtain the required number of votes at each stage of the legislative process.

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Allocation formula elements typically represent one or more of three factors: need, capacity, and effort. Need is often expressed as the size of the target population in each state, e.g., low-income uninsured children for SCHIP. To reflect geographic differences in the cost of program services, a cost factor is sometimes included. Capacity is a measure of a state or other area's ability to raise money in defined ways, mostly through various forms of taxation. The most frequently used measure of capacity is per capita income. Effort is a measure of resources currently being applied to the program by the state or other recipient, e.g., a state's expenditures for its SCHIP program.

Most formula-based programs are funded from general appropriations and allocate a fixed amount of appropriated funds each fiscal year. A major exception is the Medicaid program, which is called an open-ended entitlement program because it provides for open-ended matching, at rates which vary by state, of all eligible program expenditures by the states. SCHIP is a capped entitlement program. Like Medicaid, it matches states' eligible expenditures at varying rates, but only up to the point where each state's share of the total appropriation is exhausted.

Some formula-based programs place upper and lower limits on the amounts that can be received or the proportion of expenditures that can be reimbursed with federal funds. For SCHIP, the proportion reimbursed to a state is based on a formula that reflects its fiscal capacity, but is only allowed to vary between 0.65 and 0.85.

In the administration of formula allocation programs over time, there is an important tradeoff between targeting funds to the areas with the greatest need and maintaining some degree of stability in programs at the state level. Stable or at least predictable funding is particularly important for programs in which a state's costs are affected by factors that are largely outside of its control. Several programs have hold-harmless provisions, which specify either that no recipient shall receive less than a specified proportion of the prior year's amount or that its share of the total appropriation shall not decline by more than a specified proportion from the prior year's share. The interaction of these provisions with changes in annual program funding determines the extent to which funds can be shifted to areas whose needs are increasing more rapidly.

2. Issues in Using Survey Data for Formula Allocations

Development of an allocation formula requires consideration of what sources exist or can be developed to provide estimates of formula elements representing need, capacity, and effort. What kinds of census, survey, administrative, or program data might be best suited for this purpose? Are suitable data available from existing sources, or must new sources of data inputs be developed? What will it cost? Preferably, these questions should be asked before reaching a final decision on what formula to use. Legislators may choose to specify the data sources to be used, or they may leave it to program agencies to decide which sources are best suited.

Factors to be considered in deciding what data sources are most suitable include:

Conceptual fit. Are the program goals and target populations clearly defined? As compared with administrative and program records, surveys offer more flexibility in providing data for narrowly defined subsets of the population.

Level of geographic detail required. At a minimum, data will be needed for states. For

some programs, data are needed for very small areas, such as school districts (Citro and Kalton 2000). In such cases survey data are at a disadvantage relative to administrative data and census data. Administrative sources, such as income tax records, have the advantage since they normally have 100 per cent coverage, but the population covered may differ somewhat from the target population for the program. Decennial census data occupy an intermediate position. Reliable estimates of population by income are available for states, but for small counties and school districts there is substantial sampling variability.

Timeliness. Decennial census data are at an obvious disadvantage, compared with continuing or periodic surveys and administrative record sources.

Quality. We have mentioned sampling variability above, in connection with requirements for geographic detail. Bias and other kinds of nonsampling error must also be considered. For example, reporting of income in the Survey of Income and Program Participation (SIPP) might be more complete than in the Current Population Survey (CPS). Estimates based on income tax records, although not subject to sampling variability, would fail to include some members of the population, mostly with low income, who do not file tax returns. Also, under the heading of quality, one needs to ask whether the recipients of allocated funds are in a position to manipulate the inputs to their advantage. If data are from state sources, special efforts may be needed to ensure that all states use the same definitions and data compilation procedures to produce their inputs to the allocation process.

Cost. The data used for formula allocations are seldom entirely free, although in some instances the marginal costs of using existing data sources may be relatively small. Adding new items to a survey or even increasing sample sizes to meet formula allocation requirements can carry substantial costs. Modeling can provide a comparatively low-cost alternative to additional data collection. To evaluate such diverse alternatives a cost-benefit perspective is needed. How do the relative costs of alternatives compare with the relative gains in accuracy that they may afford? How would the effectiveness and the perceived equity of the fund allocation process be affected by the use of proxy variables or of estimates that are less timely and of lower quality? Or, to turn the question around, would improvements from collecting more directly targeted or more precise data in a survey justify their additional cost?

3. The SCHIP: An Overview

3.1. Program goals

The SCHIP was established by the Balanced Budget Act (BBA) of 1997 (Public Law 105–133), which amended the Social Security Act to create Title XXI, State Children’s Health Insurance Program. Its stated purpose was to enable states to initiate and expand health insurance coverage to uninsured, low-income children.³ SCHIP was designed to cover children in families with too much income to qualify for Medicaid but too little to afford private insurance coverage. States were given three options for meeting this

³ The program established by the BBA was originally identified as the Children’s Health Insurance Program (CHIP). Section 704 of the Medicare, Medicaid and SCHIP Balanced Budget Refinement Act (BBRA) of 1999 (P.L. 106–113) substituted “SCHIP” for “CHIP” and “state children’s health insurance program” for “children’s health insurance program.”

goal: creating separate health insurance programs to cover these children; expanding their Medicaid programs; or using a combination of these two methods.

SCHIP allows states to cover uninsured children in families that have income up to 200 per cent of the federal poverty level and are not eligible for their state's Medicaid program. States have flexibility to define what income is to be counted in determining if a family is at or below 200 per cent of poverty. In practice, then, states can elect to cover some uninsured children in families with gross income above 200 per cent of poverty. In addition, states can establish cost-sharing provisions that allow families with incomes above 200 per cent of poverty to obtain SCHIP coverage for their children by paying a portion of the cost.

Concern that SCHIP might crowd out private insurance among families that could afford such coverage underlies the eligibility requirement that children be currently uninsured. States are also allowed to design more substantial deterrents to crowd-out, such as limiting enrollment to children who have been uninsured for at least six months, and are asked to document, in their state plans, the procedures they have instituted to reduce potential crowd-out.

The initial development and subsequent changes to the SCHIP and its formula allocation process have been influenced by several factors:

1. There was substantial variation among the states in the eligibility requirements for coverage by their Medicaid programs. This complicated efforts to design an allocation process that would treat all states equitably.
2. There was uncertainty as to what incentives would be needed to persuade states and families to buy into the new program, particularly since states already had considerable flexibility to expand their Medicaid programs. For example, would it require higher matching rates than those provided by Medicaid? There was considerable reluctance by states to buy into a new open-ended entitlement program.
3. Although the number of uninsured children in poor families might be a good initial measure of need, it would become less suitable after states began to enroll children in their SCHIP programs.
4. It was uncertain how quickly states would be able to design their SCHIP programs, obtain the required approvals, and start operations.
5. The target population for SCHIP was likely to be unstable, in the sense that changes in family income would cause some children to become eligible for Medicaid and others to lose eligibility for either program. It was also a target population that would clearly be difficult to track accurately at the state level in a household survey.

Developing an allocation formula that would deal with these issues and uncertainties in a way that would ensure passage of the initial legislation was not a simple matter. It is not surprising that there have been several changes to the SCHIP legislation since its initial passage, and additional changes are likely as the program develops and matures.

3.2 The initial formula allocation process

The legislation authorizing SCHIP provided for an annual appropriation, to be divided among the 50 states and the District of Columbia (hereafter described collectively as

“the states”) according to a formula defined in the legislation.⁴ The federal allotment is used to match state expenditures at a rate that varies by state and is somewhat higher than the match rate used for the Medicaid program (see Section 3.2.2. below). Clearly, a fixed appropriation gives the allocation formula a more critical role than would an open-ended appropriation.

3.2.1. Allocation formula

The legislation that established SCHIP specified an allocation formula for determining each state’s share of the total SCHIP appropriation in each fiscal year. A state’s share of the total national allotment in a given year is calculated as a function of two quantities: a Number of Children factor and a State Cost factor. The Number of Children factor represents a measure of need and the State Cost factor represents one component of the relative cost of addressing that need.

For FY 1998 through FY 2000, the law defines the Number of Children to be equal to the number of uninsured children in families at or below 200 per cent of poverty. This number was to be calculated in each year as an arithmetic average of annual estimates obtained from the three most recent March supplements to the CPS.⁵ Table 1 reports the CPS estimates of the Number of Children component as derived from this specification for the calendar years 1993 to 1995 and 1994 to 1996. The table also reports the standard errors and the coefficients of variation (CVs) for these two sets of estimates. Table 2 shows how the CVs were distributed. In each year, the estimated CVs were below ten per cent for only four states. About half of the CVs for the years 1993 to 1995 were 20 per cent or larger.

The State Cost factor reflects the annual wage level in the health services industry (SIC code 8000) in the state, relative to the nation. It is calculated from the formula:

$$SCF_i = 0.15 + 0.85W_i/W_{\text{nat}} \quad (3.1)$$

where SCF_i is the State Cost factor for the i th state, W_i is the mean annual wage (per employee) in the health services industry in the i th state, and W_{nat} is the mean annual wage in the health services industry nationally. The legislation specifies that W_i is to be based on wage data reported by the U.S. Bureau of Labor Statistics (BLS) for the three most recent years available prior to the start of the fiscal year for which the State Cost factor is to be applied. We note that the inclusion of the constant term (0.15) attenuates the effects of state cost differentials on the allocation.

The state’s proportionate share of the total appropriation is calculated in two steps. First, the state’s Number of Children is multiplied by the State Cost factor to form a state product, which is then summed over all states to yield a national total. Second, the state product is divided by the national total to obtain the state share. The calculation is

⁴ The legislation assigns the territories a portion of the total appropriation and fixes each territory’s share of that portion of the appropriation.

⁵ The CPS March supplement is the source of the most widely used estimates of health insurance coverage in the United States. While there are significant concerns about the proper interpretation of CPS estimates of the number uninsured and what this may imply about their quality, their annual release just six months after the data are collected, and the consistency with which insurance coverage has been measured, have made them a valued social indicator.

Table 1. Three-year moving average estimates of low-income uninsured children, standard errors, and coefficients of variation: 1993 to 1995 and 1994 to 1996

State	Number of low-income uninsured children (1,000s)		Standard errors (1,000s)		Coefficients of variation (Percent)	
	Estimates for 1993 to 1995	Estimates for 1994 to 1996	Estimates for 1993 to 1995	Estimates for 1994 to 1996	Estimates for 1993 to 1995	Estimates for 1994 to 1996
Alabama	154	145	26.3	25.1	17.1	17.3
Alaska	11	12	2.4	2.7	21.8	22.5
Arizona	190	239	28.1	31.1	14.8	13.0
Arkansas	92	98	15.3	15.7	16.6	16.0
California	1,281	1,259	80.1	80.9	6.3	6.4
Colorado	72	92	17.1	19.1	23.8	20.8
Connecticut	53	55	15.3	15.6	28.9	28.4
Delaware	13	15	3.4	3.7	26.2	24.7
District of Columbia	16	12	3.7	3.0	23.1	25.0
Florida	444	421	40.2	40.8	9.1	9.7
Georgia	214	215	37.6	36.8	17.6	17.1
Hawaii	13	14	4.2	4.5	32.3	32.1
Idaho	31	31	5.7	5.8	18.4	18.7
Illinois	211	196	28.4	28.1	13.5	14.3
Indiana	131	121	28.9	27.5	22.1	22.7
Iowa	67	71	14.2	14.6	21.2	20.6
Kansas	60	52	12.3	12.0	20.5	23.1
Kentucky	93	116	19.4	21.5	20.9	18.5
Louisiana	194	180	29.9	27.8	15.4	15.4
Maine	24	27	5.9	6.5	24.6	24.1
Maryland	100	101	24.5	24.6	24.5	24.4
Massachusetts	69	75	12.7	15.2	18.4	20.3
Michigan	156	142	22.2	22.7	14.2	16.0
Minnesota	50	60	16.0	16.7	32.0	27.8
Mississippi	110	114	16.8	17.6	15.3	15.4
Missouri	97	104	24.0	24.8	24.7	23.8
Montana	24	19	4.5	4.1	18.8	21.6

described by the following formula:

$$A_i = C \times A \times (N(LU)_i \times SCF_i) / \{\sum_i \{[N(LU)_i \times SCF_i]\} \} \quad (3.2)$$

where A_i is the allotment to the i th state, C is the proportion of the total appropriation reserved for the states, A is the total federal appropriation for SCHIP, $N(LU)_i$ is the number of low-income uninsured children in the i th state, and SCF_i is the State Cost factor for the i th state.⁶

The law specified a minimum allotment of 2,000,000 USD to each state and included provision for proportionately reducing the allotments to the other states if the formula-based allotment to any state fell below this minimum and had to be increased. The law

⁶ The term C equals 1.00 minus the proportions reserved for the territories and certain other costs.

Table 1. *Contd.*

State	Number of low-income uninsured children (1,000s)		Standard errors (1,000s)		Coefficients of of variation (Percent)	
	Estimates for 1993 to 1995	Estimates for 1994 to 1996	Estimates for 1993 to 1995	Estimates for 1994 to 1996	Estimates for 1993 to 1995	Estimates for 1994 to 1996
Nebraska	30	28	7.1	6.8	23.7	24.3
Nevada	43	45	8.2	8.9	19.1	19.8
New Hampshire	20	18	5.7	5.1	28.5	28.3
New Jersey	134	159	19.1	22.5	14.3	14.2
New Mexico	117	109	13.8	13.6	11.8	12.5
New York	399	441	36.5	39.7	9.1	9.0
North Carolina	138	163	18.6	23.4	13.5	14.4
North Dakota	10	10	2.6	2.5	26.0	25.0
Ohio	205	210	27.1	28.9	13.2	13.8
Oklahoma	170	142	23.7	21.3	13.9	15.0
Oregon	67	82	15.9	17.2	23.7	21.0
Pennsylvania	200	192	27.1	27.5	13.6	14.3
Rhode Island	19	17	5.1	4.7	26.8	27.6
South Carolina	110	129	19.7	22.7	17.9	17.6
South Dakota	17	10	3.3	2.6	19.4	26.0
Tennessee	115	166	24.3	30.3	21.1	18.3
Texas	1,031	1,074	71.6	73.2	6.9	6.8
Utah	46	47	9.1	9.3	19.8	19.8
Vermont	7	6	2.3	2.3	32.9	38.3
Virginia	118	111	25.7	25.6	21.8	23.1
Washington	85	109	21.9	25.4	25.8	23.3
W. Virginia	45	29	9.2	7.2	20.4	24.8
Wisconsin	75	62	19.0	18.0	25.3	29.0
Wyoming	15	15	3.1	2.9	20.7	19.3
Total	7,186	7,360				

Source: U.S. Census Bureau estimates of low-income uninsured children by state.

contained no hold-harmless provision, however. Other than this minimum value, then, nothing limited the potential year-to-year decline in the size of a state's allotment. The law did allow states three years to spend each year's allocation, which afforded them the opportunity to offset the volatility of the funding flow by spreading relatively large allocations over a longer period of time than smaller allocations. Over time this may become an important tool for states, as expenditures grow to where more states are using up their allocations. But effective use of this flexibility may require exceptional fiscal management ability.

An obvious drawback of making the SCHIP allocation dependent on the number of uninsured children is that a state's success in reducing the number of low-income uninsured children by enrolling a larger fraction of them in SCHIP than other states produces a reduction in that state's allocation even though the number of children needing to be covered has not changed. At the same time, however, a reduction in the number

Table 2. Distribution of states by coefficient of variation (CV) of CPS three-year average estimate of number of uninsured children at or below 200 percent of poverty

Range of CV	Number of States by years	
	1993 to 1995	1994 to 1996
Less than 5%	0	0
5% to less than 10%	4	4
10% to less than 15%	9	7
15% to less than 20%	12	16
20% to less than 25%	16	14
25% to less than 30%	7	8
30% to less than 35%	3	1
35% or more	0	1
Total States	51	51

Source: Table 1.

of low-income uninsured children achieved by a growth in private insurance coverage *would* imply a reduction in the number of children needing coverage under SCHIP.

The framers of the original SCHIP legislation recognized this problem and addressed it by specifying that after three years the method of calculating the Number of Children component of the allocation formula would change. Why three years? This was not because they expected SCHIP to take three years to begin to have an effect but, rather, because the lag in data availability meant that three years would pass before CPS data reflecting the first full year of SCHIP experience were incorporated into the estimated number of uninsured children.⁷

Beginning in FY 2001, the Number of Children was to be calculated as a weighted sum of two quantities: the number of low-income uninsured children and the total number of low-income children. For FY 2001 the uninsured component was assigned a weight of 75 per cent while the low-income component received a weight of 25 per cent. Beginning in FY 2002 each component was to be weighted equally. After FY 2001, then, the calculation of each state's share of the total allocation is described by the revised formula:

$$A_i = C \times A \times [(0.5N(LU)_i + 0.5N(L)_i) \times SCF_i] / \{\sum_i \{ [0.5N(LU)_i + 0.5N(L)_i] \times [SCF_i] \} \} \quad (3.3)$$

where $N(L)_i$ refers to the number of low-income children in the i th state.

One might ask why the perceived solution to the problem was to incorporate into the Number of Children component the *total* number of low-income children – which includes those with private coverage and Medicaid coverage – rather than just those who formed the SCHIP target population. We will return to this issue in Section 5.2.2, but an interim answer is that adding to the number of uninsured children those who were enrolled in SCHIP was neither as straightforward as it might seem nor free of potentially undesirable effects.

⁷ With SCHIP being implemented in FY 1998, the March 1999 CPS – which measured insurance coverage in the 1998 calendar year – would be the first to reflect a full year of SCHIP experience. The March 1999 CPS data would be used for the first time to calculate the FY 2001 allocation but would account for only one-third of the estimated Number of Children.

3.2.2. Role of the enhanced FMAP

Qualifying state expenditures under Medicaid and SCHIP are matched by the federal government at rates that vary by state, depending on the ratio of state per capita income to the national per capita income, both averaged over a three-year period. States with relatively low per capita income receive a higher match rate than states with relatively high per capita income. The matching rate for Medicaid is determined by the Federal Medical Assistance Percentage (FMAP), which varies from a statutory minimum of 50 per cent to a statutory maximum of 83 per cent.⁸

The matching rate for SCHIP is higher than the matching rate for Medicaid, but the difference between the two rates declines as FMAP rises. The enhanced FMAP, used for SCHIP, is a direct function of the Medicaid FMAP:

$$FMAP(E)_i = FMAP_i + 0.3(1 - FMAP_i) \quad (3.4)$$

The enhanced FMAP varies from a minimum of 65 per cent, when FMAP is 50 per cent, to a statutory maximum of 85 per cent, which is achieved when FMAP reaches or exceeds 78.57 per cent.⁹ Thus the enhanced FMAP exceeds FMAP by 15 percentage points when FMAP is at its minimum value of 50 per cent, but exceeds FMAP by only 2 percentage points when FMAP is at its statutory maximum of 83 per cent. Through FY 2000, however, the enhanced FMAP has been at least 7 percentage points (approximately) higher than FMAP in every state, as no state has approached the 83 per cent statutory maximum for FMAP.

For a state that chose to use SCHIP funds to expand coverage of its Medicaid program, Medicaid expenditures for newly eligible children are matched at the enhanced FMAP rates until the state's SCHIP allotment is exhausted. Any additional expenditures are matched at the state's regular FMAP rate.

3.2.3. Legislative changes to the allocation process

Before the FY 1999 and FY 2000 allotments were published, legislation altered aspects of the methodology for calculating these allotments. The 1999 Appropriations Act for the Departments of Labor, Health, and Human Services, and Education and Related Agencies (PL 105-277) included a requirement that the FY 1999 SCHIP allotments be determined using the same data used to determine the FY 1998 SCHIP allotments. The effect was to maintain each state's share of the total appropriation (which was slightly smaller than the FY 1998 appropriation). The reason behind this intervention into the formula allocation process was that a preliminary calculation based on the average number of low-income uninsured children as measured in the 1995, 1996, and 1997 March supplements showed substantial variation from the estimates based on the 1994, 1995, and 1996 March supplements.

Table 3 compares the state estimates of low-income uninsured children for the two sets

⁸ Based on the formula presented in Section 1905(b) of the Social Security Act, a state would receive the minimum 50 per cent matching rate if its per capita personal income were at least 5.4 per cent above the national average, and a state would receive the maximum 83 per cent matching rate if its per capita personal income were no more than 61.5 per cent of the national average. Matching rates for DC and Alaska were limited to 50 percent, but the BBA permanently raised the matching rate for DC to 70 per cent and raised the matching rate for Alaska through FY 2000 to 59.8 per cent.

⁹ Since the implementation of SCHIP, no state has achieved an FMAP this high. Mississippi had an FMAP of 77.09 per cent for FY 1998.

Table 3. Percentage change in state SCHIP allotments between FY 1998 and FY 1999 based on data specified in original legislation

State	Number of Low-income Uninsured Children (1000s)		Percentage of National Total		Implied Percentage Change in Share of National Appropriation
	Estimates for 1993 to 1995	Estimates for 1994 to 1996	Estimates for 1993 to 1995	Estimates for 1994 to 1996	
Alabama	154	145	2.14	1.97	-7.9
Alaska	11	12	0.15	0.16	6.7
Arizona	190	239	2.64	3.25	23.1
Arkansas	92	98	1.28	1.33	3.9
California	1,281	1,259	17.83	17.11	-4.0
Colorado	72	92	1.00	1.25	25.0
Connecticut	53	55	0.74	0.75	1.4
Delaware	13	15	0.18	0.20	11.1
District of Columbia	16	12	0.22	0.16	-27.3
Florida	444	421	6.18	5.72	-7.4
Georgia	214	215	2.98	2.92	-2.0
Hawaii	13	14	0.18	0.19	5.6
Idaho	31	31	0.43	0.42	-2.3
Illinois	211	196	2.94	2.66	-9.5
Indiana	131	121	1.82	1.64	-9.9
Iowa	67	71	0.93	0.96	3.2
Kansas	60	52	0.83	0.71	-14.5
Kentucky	93	116	1.29	1.58	22.5
Louisiana	194	180	2.70	2.45	-9.3
Maine	24	27	0.33	0.37	12.1
Maryland	100	101	1.39	1.37	-1.4
Massachusetts	69	75	0.96	1.02	6.3
Michigan	156	142	2.17	1.93	-11.1
Minnesota	50	60	0.70	0.82	17.1
Mississippi	110	114	1.53	1.55	1.3
Missouri	97	104	1.35	1.41	4.4
Montana	24	19	0.33	0.26	-21.2

of years and the state shares of the national total. We have not included the State Cost factor because the three-year averages that would have been used for the FY 1999 allocations were not published. But the estimates of low-income uninsured children show how much the allocations would have changed on the basis of the Number of Children factor alone if the FY 1999 allotments had been calculated using the data implied in the original legislation. The final column reports the implied percentage change in each state's allocation between FY 1998 and FY 1999. Table 4 summarizes the distribution of potential changes. What is notable is that 23 of the 51 states would have had double-digit percentage changes in their shares of the national allocation, with one state's share falling by 41.7 per cent and another's rising by nearly the same amount. Seeing these results affecting such a highly visible program, it is no surprise that Congress acted.

A second piece of legislation changed the calculation of the state allotments effective

Table 3. *Contd.*

State	Number of low-income uninsured children (1000s)		Percentage of national total		Implied percentage change in share of national appropriation
	Estimates for 1993 to 1995	Estimates for 1994 to 1996	Estimates for 1993 to 1995	Estimates for 1994 to 1996	
Nebraska	30	28	0.42	0.38	-9.5
Nevada	43	45	0.60	0.61	1.7
New Hampshire	20	18	0.28	0.24	-14.3
New Jersey	134	159	1.86	2.16	16.1
New Mexico	117	109	1.63	1.48	-9.2
New York	399	441	5.55	5.99	7.9
North Carolina	138	163	1.92	2.21	15.1
North Dakota	10	10	0.14	0.14	0.0
Ohio	205	210	2.85	2.85	0.0
Oklahoma	170	142	2.37	1.93	-18.6
Oregon	67	82	0.93	1.11	19.4
Pennsylvania	200	192	2.78	2.61	-6.1
Rhode Island	19	17	0.26	0.23	-11.5
South Carolina	110	129	1.53	1.75	14.4
South Dakota	17	10	0.24	0.14	-41.7
Tennessee	115	166	1.60	2.26	41.3
Texas	1,031	1,074	14.35	14.59	1.7
Utah	46	47	0.64	0.64	0.0
Vermont	7	6	0.10	0.08	-20.0
Virginia	118	111	1.64	1.51	-7.9
Washington	85	109	1.18	1.48	25.4
W. Virginia	45	29	0.63	0.39	-38.1
Wisconsin	75	62	1.04	0.84	-19.2
Wyoming	15	15	0.21	0.20	-4.8
Total	7,186	7,360			

Source: U.S. Census Bureau estimates of low-income uninsured children by state.

with FY 2000. The Medicare, Medicaid and SCHIP Balanced Budget Refinement Act (BBRA) of 1999 (PL 106-113, enacted November 29, 1999) redefined which years of March CPS data should be used to calculate the Number of Children and State Cost factors in the allocation formula, accelerated by one year the phase-in of the blend of low-income uninsured children and all low-income children in determining the Number of Children factor, and introduced hold-harmless provisions and a cumulative ceiling affecting the state shares of the total fiscal year allotment to the states. These changes are described in more detail below.

March CPS Data. Beginning with FY 2000, the Number of Children factor is to be based on the three most recent March supplements to the CPS before the beginning of the calendar year in which the fiscal year begins. FY 2000 begins in 1999, so the latest March supplement prior to January 1, 1999, is the March 1998 supplement. Thus the FY 2000 Number of Children factor is to be based on the March 1996, 1997, and 1998

Table 4. Distribution of states by change in share of national appropriation between FY 1998 and FY 1999, based on data specified in original legislation

Change in share	Number of States
Decline in share	
40% or more	1
35% to less than 40%	1
30% to less than 35%	0
25% to less than 30%	1
20% to less than 25%	2
15% to less than 20%	2
10% to less than 15%	4
5% to less than 10%	9
Less than 5%	5
No change in share	3
Rise in share	
Less than 5%	7
5% to less than 10%	4
10% to less than 15%	3
15% to less than 20%	4
20% to less than 25%	2
25% to less than 30%	2
30% to less than 35%	0
35% to less than 40%	0
40% or more	1

Source: Table 3.

supplements. This change merely codified what had become official practice. The original legislation indicated that the estimates be based on the three most recent March supplements prior to the beginning of the fiscal year to which the allotment is to apply. Because the March supplement is released just before the start of the next fiscal year, a literal reading of the original specification implied that the allocation could not be completed in time to notify states of their allotments before the start of the year to which they applied. Furthermore, if the March CPS data were ever a few days late, this would affect which data could be used in the allocation. The first-year allocations, for FY 1998, were in fact calculated with data from the 1994, 1995, and 1996 March supplements, even though the 1997 data were available before FY 1998 began. The explanation offered in defense of this decision was that waiting for the 1997 data would have made it impossible to notify the states of their base-year allotments in advance of their effective date.

Blended Numbers of Children. The introduction of the alternative formula for calculating the Number of Children component was advanced by one year. For FY 2000, the Number of Children was calculated as the sum of 75 per cent of the number of low-income, uninsured children in the state and 25 per cent of the total number of low-income children in the state. For FY 2001 through FY 2007, the Number of Children is to be calculated as the sum of 50 per cent of the number of low-income, uninsured children in the state and 50 per cent of the number of low-income children in the state. Although the purpose of the blended estimate was to limit the reduction in the appropriation when the number of uninsured children declined, the intent behind advancing the phase in of

this new estimator appears to have been, in part, to introduce more stability into the Number of Children component sooner.

Hold-Harmless Provisions. The BBRA introduced both year-to-year and cumulative hold-harmless provisions into the formula allocation process. First, the new law specifies that no state's share can be less than 90 per cent of its share for the preceding fiscal year. Second, no state's share can be less than 70 per cent of its FY 1999 share.

Cumulative Ceiling. In addition to the limits on the annual and cumulative reduction in the allocation, the BBRA adds a restriction that no state's share can be more than 145 per cent of its FY 1999 share. If after application of the hold-harmless provisions and this cumulative ceiling the sum of the state shares is less than or greater than one, the state shares are to be adjusted so that they sum to exactly one.

3.2.4. Redistribution of funds

The combination of a federal allotment with a matching percentage means that some states may not qualify to receive their full allotment while other states spend funds over and above what the federal government will match. This is different from Medicaid, where there is no explicit allocation to underspend and no cap to exceed. The SCHIP legislation makes allowance for both possibilities. First, states are allowed up to three years to expend their allotment for a given fiscal year. Initially this gave states time to establish their new programs and raise enrollment to a level that would qualify for the full federal allotment. Second, funds that remain unused from a given fiscal year are to be reallocated to the states that exceed their allotments for that year.

Collectively, the states expended just over half (52 per cent) of the total FY 1998 appropriation within the three-year window (through FY 2000), and only eleven states used up their entire first year allocations. The Medicare, Medicaid and SCHIP Benefits Improvement and Protection Act of 2000 (BIPA; PL 106-554) extended the three-year period for expenditure of FY 1998 and FY 1999 allocations through FY 2002 but provided for a partial redistribution of the remaining FY 1998 funds in order to match the eleven states' excess expenditures. The funds that were redistributed represented 35 per cent of the unused allocations.

4. Expansion of the CPS Sample to Provide Improved Estimates of Need for SCHIP Allocation

The BBRA appropriated 10,000,000 USD annually, (beginning in FY 2000) to expand the CPS sample in order to improve the statistical reliability of state estimates of the number of uninsured children. The intent of the mandated sample expansion was not just to reduce the variability in the annual allocation of funds to the states but also to make the CPS a more effective vehicle for assessing the states' progress in reducing the number of uninsured children. The specific language in the legislation is as follows:

The Secretary of Commerce shall make appropriate adjustments to the annual (CPS) conducted by the Bureau of the Census in order to produce statistically reliable annual State data on the number of low-income children who do not have health insurance coverage, so that real changes in the uninsured rates of children can reasonably be detected. The (CPS) should produce data under

this subsection that categorizes such children by family income, age, and race or ethnicity. The adjustments made to produce such data shall include, where appropriate, expanding the sample size used in the State sampling units, expanding the number of sampling units in a State, and an appropriate verification element.

This last point is in reference to the addition of a question to verify whether respondents who have reported no health insurance coverage in response to questions about individual sources of coverage really did have no coverage during the previous calendar year (the reference period for the health insurance questions).

In response to this mandate the U.S. Census Bureau initiated a sample expansion that will be reflected for the first time in the results from the March 2001 supplement. Because of the difficulty of expanding the sample for just a single month, the sample expansion includes three components:

1. A modest expansion of the monthly CPS sample focused on states with high sampling errors for estimates of uninsured children.
2. The collection of March supplement data from the one-quarter of February and April sample households not included in the March sample, to be accomplished by adding the March supplement to their February and April interviews.
3. The selection of additional households from the previous November sample (which does not overlap the March sample) to receive the March supplement during February, March, or April.

The monthly sample expansion is a general sample expansion whereas the second and third components of the overall increase are restricted to households with a member of a minority group or with children under 19.

5. Statistical Issues in the SCHIP Allocations

The Medicaid and SCHIP programs have similar goals, and both programs use a federal match of state expenditures as the ultimate vehicle for distributing the funds to which each state is entitled. However, there are two key differences in their allocation procedures. First, the federal matching rates for SCHIP exceed the Medicaid match rates. Second, the Medicaid match is open-ended while the SCHIP match is capped. The fact that the SCHIP matching funds are capped nationally creates the need to determine an allocation of state shares. We consider some implications of the differences in the match rates next and come back to the issue of the cap at the end of this section.

5.1. Determination of the match rates

The establishment of federal matching rates for SCHIP required Congress to weigh several competing considerations. Applying the same matching rates to SCHIP and Medicaid would simplify some aspects of program administration. Children who moved between the two programs – as many would be expected to do – would not become subject to different match rates. Concerns about interstate equity also favored equal match rates for the two programs. States differed in the extent to which they had taken advantage

of earlier opportunities to expand Medicaid eligibility for children. Giving SCHIP a higher match rate would reward states for their earlier inaction because children they did not cover under Medicaid could be covered at a lower cost under SCHIP. At the same time, however, if SCHIP provided states no larger incentive than Medicaid, and states were free to participate or not, it was unlikely that many states would embrace the new program. Why would states cover children they had previously elected not to cover? This last argument appears to have weighed heavily in the final determination.

While the higher SCHIP match rates may have been a necessity, the mathematical relationship between the SCHIP and Medicaid match rates does not follow obviously from this rationale. States with the lowest Medicaid match rates (presumably those with the greatest fiscal capacity) are awarded the largest increases under SCHIP, while states with the highest Medicaid match rates receive only marginally higher match rates under SCHIP.

Another issue, which was raised for Medicaid but applies to SCHIP as well, concerns the use of per capita income as an indicator of state financial capacity. Per capita income is related to potential state revenue from a state personal income tax, but basing the match on per capita income alone leaves out the commercial tax base. The size of this additional tax base is potentially very different from that of the state personal income tax. A better measure of state fiscal capacity, some have suggested, is total taxable resources (U.S. General Accounting Office 2000).

5.2. *Measuring the number of children component*

5.2.1. Pre-SCHIP

Before children began enrolling in SCHIP, the number of uninsured children at or below 200 per cent of poverty provided a good approximation to the target population: children who had a need for SCHIP. Arguably, the only group that should be excluded from this population is uninsured children who are eligible for Medicaid but not enrolled. By law these children are not eligible for SCHIP and, therefore, do not contribute to SCHIP funding requirements. But because Medicaid eligibility and participation vary by state, estimating the size of this population would require state-specific simulations of Medicaid eligibility, or at least a crude approximation. Such estimates would be subject to considerable sampling error and potentially sizable bias as well. While there is little question that nontrivial numbers of Medicaid-eligible children are not enrolled at any one time, the potential magnitude of the error that would accompany state-specific estimates of this group makes it difficult to argue that estimates of these children should have been excluded from the Number of Children component.

5.2.2. Post-SCHIP

Once enrollment in SCHIP began, children who left the uninsured population by being enrolled in SCHIP were no longer included in the Number of Children component. Over time, states that enrolled proportionally more children in SCHIP than the average state would find their allocations diminishing. To address this problem, as we explained earlier, the original legislation specified that the calculation of the Number of Children component would change once the formula began to include post-SCHIP CPS data. Instead of being based solely on the number of low-income uninsured children, the

Number of Children component would be calculated as a weighted average of the number of low-income uninsured children and the total number of low-income children.

This is not an especially compelling solution, given that it changes the basis of the allocation. At best it can be said to reflect a recognition of data limitations at the time. The more obvious solution of adding the children enrolled in SCHIP to the estimated number of uninsured low-income children faced an immediate problem. Data on SCHIP enrollment, whether from the CPS or an administrative source, had yet to be developed, of course, and the date by which such data could be good enough to use for this purpose was uncertain. Furthermore, because of the close association of SCHIP with Medicaid, there was a widespread view that the prospects of the CPS being able to identify SCHIP enrollees as a distinct group and with similar reliability across states were not great. Indeed, the U.S. Census Bureau had given no indication that it would even produce separate estimates of SCHIP enrollment, meaning that it would report Medicaid and/or SCHIP enrollment with a single code.

Administrative statistics on SCHIP enrollment, which the states are required to produce, provide an alternative to survey estimates even if they have to be combined with survey data to estimate the target population. Given the problems presented by the sizable sampling error in the CPS state estimates of the number of low-income uninsured children, the outright absence of sampling error in the administrative numbers provides a strong reason for considering their use.

Even if the administrative numbers turn out to be perfectly accurate, there are problems that must be addressed. First, the number of children who qualify for and are enrolled in both Medicaid and SCHIP over the course of a year will not be trivial. How to handle such children in a combined CPS and administrative data estimate of the SCHIP target population must be resolved, or the use of administrative numbers will result in more children being added to the Number of Children component than SCHIP actually removed. But there is at least a strong possibility that states will be able to count the number of children who were enrolled in both Medicaid and SCHIP, providing the raw data for a suitable correction.¹⁰ That is not the case for children who may have been covered by private insurance for part of the year and SCHIP for another part of the year. Such children would not be identifiable in the administrative data; nor would children who were enrolled in SCHIP *instead* of private insurance, yet adding either group to the Number of Children component would overcompensate for the number SCHIP removed from the uninsured. Finally, states with particularly generous eligibility provisions will enroll children from families whose incomes exceed 200 per cent of poverty when family income is counted the way it is in the CPS. In these states, adding the total SCHIP enrollment to the CPS number of low-income uninsured children will further bias (upwardly) the estimate of the Number of Children component.

There are other concerns as well. Introducing administrative estimates into the allocation formula would place reliance on the fund recipients – the states – to estimate a component of need, which then affected the size of their allocations. Using administrative numbers would also reward states for crowding out private insurance, since children who

¹⁰ Counting such children in proportion to the number of months or fraction of the year that they were enrolled in SCHIP is clearly possible with the data produced by most states and might yield a satisfactory solution.

were enrolled in SCHIP instead of private insurance would be counted the same as those enrollees who could not afford private coverage. Finally, using administrative estimates as a component of need would introduce a degree of circularity in the allotments, with a current year allotment being based in part on the need in earlier years.

While the elimination of all these sources of potential bias might appear to pose an intractable problem, the appropriate standard for measuring success in this effort is the current formulation of the Number of Children component, not the perfect allocation. Against this standard it is possible that the sum of the number of low-income uninsured and an adjusted administrative estimate of children enrolled in SCHIP would yield a more satisfactory estimate of the Number of Children component than the weighted average of low-income uninsured and all low-income children. Certainly this possibility should be evaluated.

5.3. *The effect of floors and ceilings*

The legislation that advanced the use of the blended measure for the Number of Children component also introduced a floor on the year-to-year change in a state's allotment and both a floor and a ceiling on the cumulative change. These have important implications for the statistical properties of the allocations over time.

As Zaslavsky and Schirm (2000) have pointed out recently, the combination of significant variability in the annual estimates and a floor on the annual reduction in each state's allocation leads to a ratcheting up of allocations over time. When year-to-year reductions in allocations are constrained but increases are not, the asymmetry causes expected allotments to rise. The amount by which a state's expected allotment is increased depends on the variability of the annual allotment. States with highly variable allocations have the greatest potential for ratcheting up. If there is any benefit from a national perspective, it is the fact that the states that have to endure the greatest volatility in their annual allotments also get the greatest benefit from growth in their expected allotments.

More generally, floors and ceilings give continued weight to the base-year allocation in determining subsequent allocations. If the estimates of need that determined the base-year allocation were substantially more precise than the subsequent annual estimates, then limiting the year-to-year fluctuation – and the deviation from the base-year allotment – would be more desirable. Arguably we would want to give the later year estimates less weight in determining the annual allotment or constrain them in some way. But in fact the base year estimates of the Number of Children are no more precise than the estimates for subsequent years, and with the CPS expansion in place, the later year estimates will become *more* precise. Applying floors and a ceiling tends to lock in the randomness of the base-year results. As the more accurate CPS estimates are introduced, it would be appropriate to re-examine at least the cumulative floor and ceiling, which limit how much subsequent results can deviate from the base-year result, even when the deviation may be consistent with the actual trend.

5.4. *Model-based estimates as an alternative to survey estimates*

An alternative to survey estimates for states or smaller geographic areas is the use of model-based estimates, which may include survey estimates as components. Mathematica

Policy Research, Inc. develops such estimates, which are used to allocate funds for the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), and the U.S. Census Bureau prepares such estimates under its Small Area Income and Poverty Estimates program for use in allocating funds by the Department of Education under Title I of the Elementary and Secondary Education Act. Model-based methods rely on the availability of covariates of the quantity of interest that are measured with little or no sampling error. These variables are incorporated into a predictive model, which may use the survey estimate as a dependent variable. Model-based estimates are particularly appealing when sampling error in the survey estimates is very high.

Certainly prior to the CPS sample expansion and possibly even after, model-based procedures would appear to merit consideration for estimating the number of low-income uninsured children. However, while both of the efforts cited above have developed strong models for estimating the number of low-income children, and there are administrative statistics on public insurance coverage to help predict the number of uninsured children, the absence of comparable indicators of private insurance coverage has been an obstacle to the development of model-based procedures that could satisfy concerns about how well they could track change in the size of the uninsured population in the presence of growing or declining private coverage. Further research focused specifically on this problem is needed to determine whether or not there is a role for model-based methods in the estimation of the Number of Children component.

5.5. *Redistribution of funds*

The redistribution of a portion of the states' unexpended FY 1998 allotments to match the excess expenditures of states that exceeded their initial allotments provided a correction, in effect, for some of the error in the initial allocation. The states were also granted additional time to expend their base-year allotments, as we noted, which further affected the final FY 1998 federal match. But through the first three years, at least, the net result of this redistribution was to make the ultimate allocation more consistent with the methods used to allocate federal funds to the states for Medicaid, where the amount of state expenditures subject to a federal match is equivalent to each state's total qualifying expenditures. As long as the states continue to underspend the total federal SCHIP appropriation earmarked for them, this will continue to be true.

Most of the explanation for so many states underspending their initial allocations is the slow start-up of the new programs. Some states did not even have SCHIP plans submitted and approved until after the end of the first year, and enrollment nationally through the first year was low. But enrollment has grown steadily, and the underspending of the early years does not appear likely to continue for long.¹¹ Moreover, the federal appropriation actually drops by nearly 25 per cent in FY 2002 and remains at that level for three years – a result of long-term budget considerations reflected in the original legislation. While the redistribution of funds has gotten the formula allocation off the hook for a while, there should be no expectation that the problem of having to allocate limited funds based on formula estimates with both sampling error and measurement error will not have to be addressed more fully in the near future.

¹¹ All states had approved plans by September 1999. Estimates of the number of children ever enrolled during a fiscal year grew steadily from 1.0 million in FY 1998 to 4.6 million in FY 2001.

6. Conclusion

This review of the use of a formula-based method to allocate federal funds to the states for the SCHIP underscores the problems that arise from basing the allocation on survey estimates with considerable sampling error. The steps that have been taken by the federal government to address some of these problems illustrate the range of options that are available to those attempting to develop satisfactory fixes. In our discussion of the problem and these attempted solutions we have raised some additional issues surrounding the application of these approaches and suggested some alternatives, including the use of administrative data to estimate a component of the need for funds and the use of model-based procedures to improve the statistical properties of the state estimates that are so central to the funding allocation.

The prospect of further enrollment increases in state SCHIP programs, in combination with the planned reduction in federal funding for fiscal years 2002 through 2004 and the likelihood of declining state revenues, will undoubtedly lead to continuing close scrutiny of the results of the current allocation procedures. Proposals for further changes are likely. The best efforts of legislators, federal and state officials, and advocacy groups will be needed to make adjustments that will result in an allocation process that is equitable and effective in achieving the goals of SCHIP.

7. References

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