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GAO

Report to the Chairman, Committee on Finance, U.S. Senate

April 1992

MATERNAL AND CHILD HEALTH

Block Grant Funds Should Be Distributed More Equitably

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GAO

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Human Resources Division

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April 2, 1992

The Honorable Lloyd Bentsen
Chairman, Committee on Finance
United States Senate

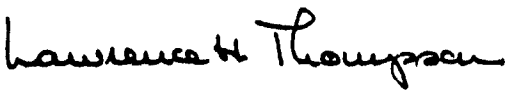
Dear Mr. Chairman:

At your request, we analyzed the Maternal and Child Health (MCH) Services Block Grant allocation formula. This report examines the current distribution of federal MCH funds and various equity-based alternative formulas. It contains recommendations for improving the equity of the distribution of grants. We also provide suggestions for your consideration for phasing in future MCH grants to a new formula.

Copies of the report are being sent to the Secretary of Health and Human Services, other congressional committees and subcommittees, and other interested parties.

The report was prepared under the direction of Linda G. Morra, Director, Human Services Policy and Management Issues, who may be reached on (202) 512-7014 if you or your staff have any questions. Other major contributors are listed in appendix VII.

Sincerely yours,



Lawrence H. Thompson
Assistant Comptroller General

Executive Summary

Purpose

Securing basic health care for low- and moderate-income expectant mothers, their infants, and children with special health-care needs poses difficult problems. These three groups are the intended beneficiaries of the Maternal and Child Health (MCH) Services block grant, an important federal program that provides funding to the states. MCH funds help them provide basic health-care services—such as prenatal and postpartum care—to those who might otherwise be at risk of not receiving them.

GAO was asked by the Chairman of the Senate Finance Committee to examine the current formula under which MCH funding ($453 million in fiscal year 1990) is allocated among the 50 states and the District of Columbia (referred to in this report as "the states"). Concerned that current MCH allocations do not adequately reflect differences in states' populations of children at risk, health care costs, or their ability to pay for health care, the Chairman asked GAO to

1. develop equity standards that reflect the states' comparative needs, as measured by the number of potential beneficiaries, the costs of health care in each state, and the comparative abilities of the states (that is, their taxpayers) to help fund maternal and child health programs;

2. assess the extent to which the present MCH funding allocation adheres to these standards;

3. create alternative formulas under which MCH funds might be distributed more equitably among the states and assess the potential effects if these formulas were applied; and

4. explore ways of phasing in these formulas while keeping the disruption of services to a minimum.

Background

The MCH block grant program was created when 10 categorical grant programs were consolidated in the Omnibus Budget Reconciliation Act of 1981. Federal funding was allocated in the proportions originally established under these 10 programs. Today, 90 percent of all MCH funds is still allocated this way; the remaining 10 percent is distributed in proportion to state shares of low-income children. The result has been a decade's worth of economic and demographic changes that have not been factored into the current distribution of MCH funding.

The question that arises is one of equity. A more equitable allocation of MCH dollars could be based on either of two approaches. The first approach would determine the level of need among the states—defined as a function of the size of each state's at-risk population and the cost of providing health services in each state—and allocate funds accordingly. The second approach would determine the comparative abilities of the taxpayers in the states to shoulder the burden of providing health care.

GAO developed separate indices by which each state's need and each state's ability to pay can be reliably portrayed, and then fashioned allocation standards that would achieve equity in one area or the other. The first standard, which GAO calls "beneficiary equity," would give the states an equal amount of money per child at risk, adjusted for variations in health care costs from state to state. The second standard, which GAO calls "taxpayer equity," would allow MCH beneficiaries throughout the nation to receive a more consistent level of maternal and child health care assistance, while ensuring that taxpayers in poorer states would not be more heavily burdened than those in wealthier ones.

Results in Brief

It is possible to develop a formula for distributing MCH funds that would meet either the beneficiary equity standard or the taxpayer equity standard. No formula could completely satisfy both standards simultaneously. GAO believes, however, that through the adoption of a formula that strikes a balance between the two standards, the overall equity of the MCH program could be improved substantially. GAO developed one such formula that would redistribute $80.4 million, or 17.7 percent of the fiscal year 1990 appropriation, increase grants for 26 states, and decrease grants for the remaining states.

The current MCH allocation method is not well grounded in the equity standards for beneficiaries and taxpayers. Per capita MCH grants vary from a low of $.99 in California to a high of $3.30 in Mississippi. However, approximately 60 percent of these differences are unrelated to either the number of beneficiaries or taxpayers' ability to pay. In some cases, MCH funding actually runs counter to the two equity standards. For instance, the current method of distributing funds directs more aid to states with lower concentrations of low-birthweight babies than to those with higher concentrations. Similarly, more aid is directed to some states with lower health care costs than to those with higher costs.

GAO developed an MCH formula by which equity is improved for both beneficiaries and taxpayers. In addition, GAO presents two alternative methods for phasing in a new formula. Under the first alternative, the overall MCH appropriation remains at its current level and the portion of MCH funds distributed under the existing allocation method is reduced. Under the second alternative, the Congress would increase the overall MCH appropriation so that the new formula may be phased in without reducing the funds now going to individual states.

GAO's Analysis

States Differ With Respect to Children at Risk, Costs, and Ability to Pay

The concentration of children at risk differs from state to state—from 28 percent below the national average in New Hampshire to 59 percent above the national average in Mississippi. A similar disparity exists in the costs of health care services—ranging from 23 percent below the national average in South Dakota to 52 percent above in Alaska. Finally, the states' ability to pay for maternal and child health services varies widely—from 30 percent below the national average in Mississippi to 71 percent above in Alaska. However, these differences are not reflected in the current distribution of MCH funds. Almost 60 percent of the differences in state per capita MCH funds cannot be explained by these factors. It is as if 60 percent of the allocation were distributed randomly.

Current MCH Funding Allocations Are Not Equitable

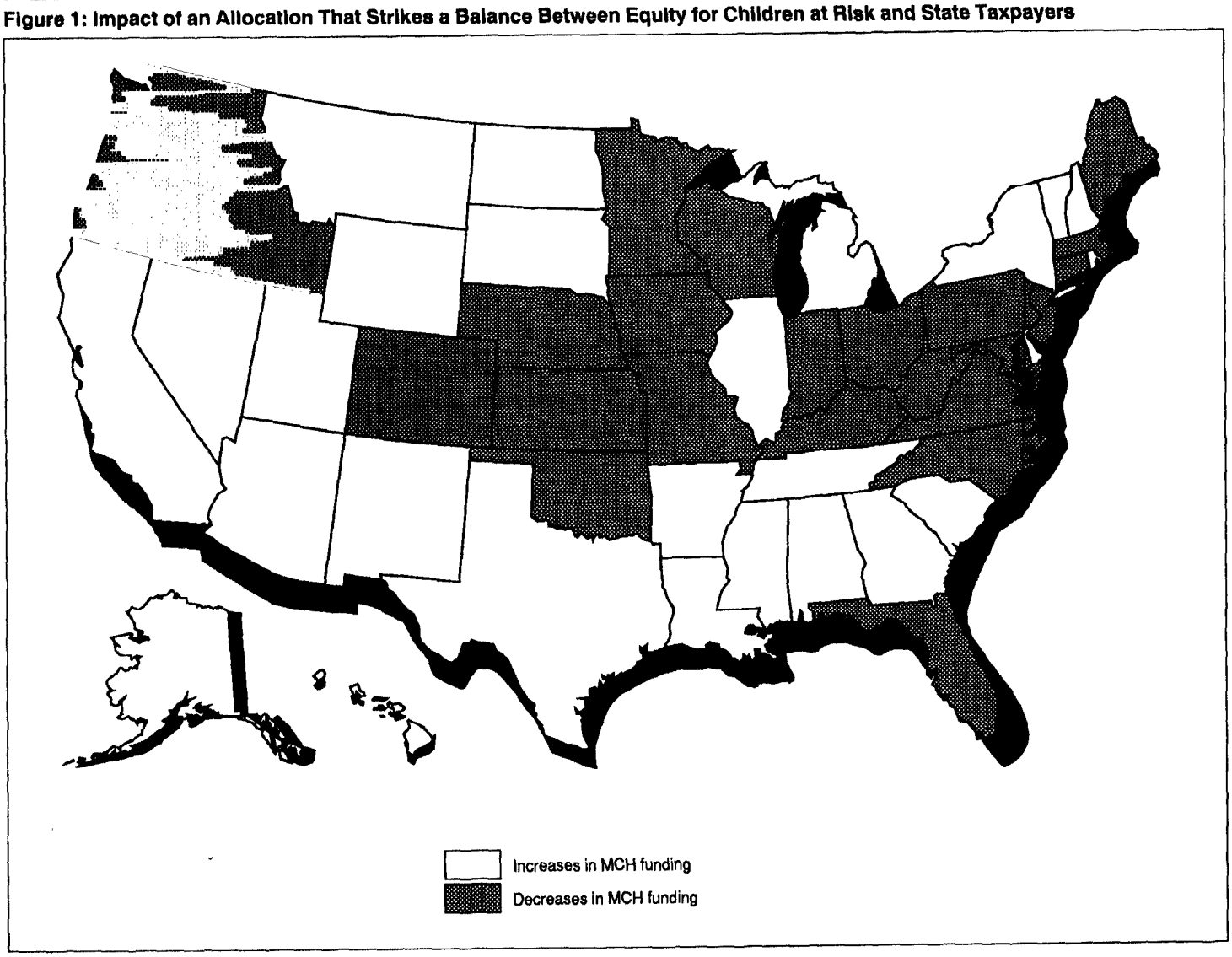
The current method of distributing MCH funding does not compensate states for their varying concentrations of children at risk, especially low-birthweight infants. For example, Nevada's proportion of low-weight births is 12 percent above the national average, yet its MCH funding is 44 percent below the national average. Nor does the MCH funding method take into account the differences in health-care costs from state to state. Illinois, for example, received the same per capita MCH funding during fiscal year 1990 as Kansas, yet its health care costs were estimated to be 28 percent higher.

Balancing Equity for Beneficiaries and Taxpayers

GAO believes that an appropriately redesigned MCH formula would improve equity both for beneficiaries and for state taxpayers. To demonstrate the range of possible equity approaches, GAO designed formulas that maximized equity for children at risk, adjusting for service costs (the beneficiary equity model) or for state taxpayers' ability to pay (the

taxpayer equity model). Then, because equity for the two groups could not be fully satisfied simultaneously, GAO developed an example of a new allocation formula to demonstrate one way that a balance could be struck (see ch. 3 and app. IV). Under this example, a total of $80.4 million dollars would be redistributed, increasing grants in 26 states and decreasing them in the remaining 25 states (see fig. 1). State grants would increase by more than 50 percent in 8 states and by less than 25 percent in 13 states. Similarly, state grants would decline by less than 25 percent in 5 states and more than 50 percent in 4 states.

Figure 1: Impact of an Allocation That Strikes a Balance Between Equity for Children at Risk and State Taxpayers



Providing a Transition

GAO devised two methods for phasing in a new MCH formula. One maintains MCH appropriations at the existing level, and bases the allocation of funds partly on the current method of distribution and partly on the redesigned formula. The other approach increases MCH appropriations so that as the new formula is phased in, no state experiences a reduction from its existing MCH funding level. The latter method would require that MCH funding levels be raised from $553.6 million to $1.6 billion for the new formula to be fully implemented.

Recommendation to the Congress

GAO recommends that the Congress adopt an MCH formula that improves equity for both intended beneficiaries and state taxpayers by distributing funding among the states according to three factors: concentration of children at risk, costs of providing health care services, and states' ability to finance maternal and child health services from state resources. In adopting a redesigned MCH formula, the Congress will need to strike a balance between equity for beneficiaries and for state taxpayers. GAO's weighing of these two concerns in its example of a new allocation formula demonstrates one way the Congress's preferences could be implemented.

Matters for Congressional Consideration

A redesigned MCH formula would mean changes for the states, both in the standards for receiving MCH funding and in the amounts received. The Congress would need to determine the rate and the way in which those changes would be implemented. Central to this issue would be a choice between holding MCH appropriations at the current level or raising them so that no state experienced a reduction in its present level of funding. The Congress would also need to determine the way in which the MCH formula would calculate grants to the U.S. insular areas.

Agency Comments

HHS agreed that it is appropriate to consider formula alternatives that yield a more equitable distribution of MCH grants. However, it concluded that the current distribution method should not be changed until indicators of state need can be further improved and until a broader range of formula alternatives can be considered. HHS also expressed concern that without additional funding, some states may reduce services in response to their receiving less federal funding.

GAO disagrees. Substantial improvement can be made with currently available indicators, and our report presents alternative equity-based formulas that reflect a full range of possible alternatives. While GAO agrees

that better indicators probably can be developed, and would support their consideration should they become available, GAO believes this should not prevent feasible improvements from being made now.

GAO also disagrees that additional alternatives need to be considered. The equity standards GAO used are commonly accepted criteria with which neither the Department nor other experts that GAO consulted took issue. The formula alternatives GAO presented reflect the full range of possible equity-based distributions for the Congress's consideration.

Finally, although a number of states could receive less federal funding under a new formula, GAO suggests a number of implementation strategies that would guard against making large disruptive changes.

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Abbreviations

ADMS	Alcohol, Drug Abuse, and Mental Health Block Grant
GSP	Gross State Product
HER	Health Economics Research, Inc.
HHS	U.S. Department of Health and Human Services
MCH	Maternal and Child Health Services Block Grant
OBRA	Omnibus Budget Reconciliation Act
PCPI	Per Capita Personal Income
RTS	Representative Tax System
TTR	Total Taxable Resources

Introduction

Background

Basic maternal and child health is a serious problem in the United States. For example, the United States, ranked 19th in infant mortality among industrialized nations in 1988, has an 6.9-percent average incidence of low-birthweight babies in 1988. These statistics gain significance from the fact that low birthweight is strongly linked to infant mortality, serious childhood illness, and lifelong handicaps. The Office of Technology Assessment estimates that health care costs resulting from low birthweight (including long-term care for children with special health care needs) range from $14,040 to $30,525 per child, nationwide.

The federal government has provided funding for maternal and child health care services for many years. In 1921, the Sheppard-Towner Act marked the passage of the first federal grant to the states for child health services. Maternal and Child Health and Crippled Children services have been continuously funded since the enactment of title V of the Social Security Act in 1935. In addition, the Congress established a number of more narrowly defined programs, notably for maternity and infant care, early and periodic screening, diagnosis, treatment, family planning, and nutrition.

The Maternal and Child Health (MCH) Services Block Grant was established when 10 categorical grant programs were folded together in the Omnibus Budget Reconciliation Act (OBRA) of 1981. The 50 states and the District of Columbia (referred to in this report as "the states") can use MCH funds for a variety of purposes, such as health education and prenatal and aftercare. In 1989, the Congress modified the act to provide that states must use at least 30 percent for services to children, and at least 30 percent for children with special health care needs.

In accordance with the block grant, MCH allocations to states were originally based on the proportions provided under the prior categorical programs. These proportions were held "harmless"—no state would receive a lesser percentage of funds under the block grant than they did under the previous programs. Also, MCH funds available to states in excess of the fiscal year 1983 amount—$422 million—are distributed in proportion to their populations of low-income children. Ninety percent of the 1990 MCH block grants to states was still allocated based on the "hold harmless" provision.

Figure 1.1: Maternal and Child Health Care

Source: Uniphoto, Inc.

Figure 1.2: Children With Special Health Care Needs

Source: Uniphoto, Inc.

Problems Foreseen With MCH Allocation Method

Since OBRA of 1981, the Congress has been concerned that the existing allocation method may not distribute funds equitably. Thus, it called on the Secretary of Health and Human Services (HHS) to examine alternative formulas that could improve funding equity for the MCH program. As set forth in the 1981 legislation, a redesigned formula should take into account such factors as differences in state populations and financial resources, as

well as differences in the incidence of live births, children with special health care needs, and low-income mothers and children.

The resulting 1982 HHS study[1] set forth six principles for reviewing formula allocation systems: (1) simplicity of conception and mathematics; (2) timeliness of data; (3) stability and predictability in funding levels; (4) transition periods for phasing-in changes; (5) equity and fairness among states; and (6) appropriateness (that is, formula factors should bear a reasonable relationship to program purposes). The HHS report questioned the current distribution method. It indicated that the assessments of states' needs under the previous programs might be much narrower than the needs covered by the block grant.

Additional problems have developed since the 1982 HHS study. Most importantly, the data used to estimate states' needs has not been updated since at least 1981. A decade's worth of economic and demographic changes has not been factored into the current distribution of MCH funding.

State Differences Affect MCH Funding Equity

Differences among the states in their populations of at-risk children, costs of health-care services, and state taxpayers' ability to pay for services are major factors affecting the equitable distribution of MCH funds. When grant funding does not reflect such differences, it results in unequal levels of maternal and child health spending. Equity is reduced for mothers and children located in states that receive comparatively less funding. Similarly, when such differences cause taxpayers in some states to bear greater financial burdens to provide a comparable level of services than taxpayers in other states, equity is reduced for state taxpayers.

A more equitable allocation of federal MCH dollars could be based on either of two approaches. The first approach would allocate MCH funding by the comparative size of state beneficiaries of MCH services. That is, by allocating federal funds on the basis of equal funding per child at risk[2] while adjusting for cost differences across states. This approach is an application of a commonly accepted standard of equity for program

[1]HHS, Report to the Congress on the Study of Equitable Formulas for the Allocation of Block Grant Funds for Preventive Health and Health Services, Alcohol and Drug Abuse and Mental Health Services, Maternal and Child Health Services, Sept. 1982.

[2]For the purposes of this report, the term "children at risk" is the target population of at-risk mothers and children the MCH program is intended to serve. For a detailed description of how this population was operationally defined, see app. I.

beneficiaries. Alternatively, MCH funds could be allocated to equalize states' ability to finance maternal and child health services—an application of the same standard for taxpayers. Or a balance between these two approaches could be struck.

Objectives, Scope, and Methodology

The Senate Finance Committee Chairman requested that we identify formula factors that could be used to target MCH funds more equitably. The Committee specifically asked us to

1. identify and develop equity standards that represent states' comparative needs, as measured by the number of potential beneficiaries along with the costs of health care services in each state, and the comparative abilities of the states (that is, their taxpayers) to help fund maternal and child health programs;

2. examine the extent to which the present allocation of federal assistance is targeted to (a) equalize MCH funding based on states' beneficiaries and (b) offset differences in the burden state taxpayers would have to bear to support comparable levels of MCH spending per child at risk;

3. identify how the MCH formula could be redesigned to reduce differences in MCH funding for beneficiaries and state taxpayers, and describe the implications of redesigning the MCH formula for the allocation of federal MCH grants among the states; and

4. explore ways to phase in an equitable formula.

To accomplish the first objective, we analyzed the MCH block grant legislation, relevant public finance literature, and the 1982 HHS report. That report identified appropriate measures and data sources to represent populations of intended beneficiaries (children at risk), the cost of health services across states, and the comparative abilities of taxpayers in the states to shoulder the burden of providing health care. From this review, we identified two equity standards: equity for beneficiaries, defined as equal funding per child at risk adjusted for the cost of providing health services; and equity for taxpayers, defined as equalizing the comparative abilities of state taxpayers to pay for these services.

To measure the incidence of children at risk, we combined three statistical indicators to produce a proxy figure of each state's children-at-risk population. This figure consists of equally weighted indicators of (1) the

number of low-birthweight babies in 1988, (2) the 1980 census count of children below the poverty level, and (3) the population under 21 years of age in 1989. We used the number of children under 21 because it is the best available substitute for the number of children with special health care needs. This indicator was used to allocate funding for programs prior to the creation of the block grant, and it is the proxy HHS identified in its study of more equitable formulas for allocating MCH funding in 1982. The number of low-birthweight babies was selected because health professionals generally agree that it is the single best predictor of a child's health status. We used the number of children living below the poverty level because this group was identified as a key component of the target population, and because it is used to allocate a portion of MCH funding.[3] (See app. I for a more detailed discussion of our children-at-risk measure.)

We could not find a fully satisfactory measure for the cost of providing MCH services. The best available proxy for a cost measure was an index developed by Health Economics Research, Inc. (HER). The HER index serves as a proxy for state differences in wages paid for providers of MCH services. Additionally, it has a component that is a proxy for differences in the cost of office space necessary for providing MCH services. (See app. II for a detailed discussion.)

To measure states' ability to pay for services from their own resources we used an indicator known as Total Taxable Resources (TTR), calculated by the Department of the Treasury. TTR estimates state taxpayers' ability to pay taxes according to estimates of economic income. (See app. III for a more detailed description of this measure.)

To accomplish our second objective, we examined the current distribution of MCH funding to assess the extent to which grants are targeted to states on the basis of children at risk, costs, and ability to pay. We performed regression analyses to determine the relationships between the current distribution and our equity standards. Regression analysis is a common statistical technique for estimating the extent to which two variables are linearly related. (See ch. 2 and app. V for detailed discussions.)

To accomplish our third objective, we designed formulas that improved equity for children at risk—the beneficiary equity model—or for state taxpayers—the taxpayer equity model. Then, because equity for these two

[3]See 42 U.S.C., sect. 701 (c)(1) and 701 (b)(2).

groups could not be satisfied simultaneously, we designed a formula to demonstrate one way that a balance between the two equity standards could be struck. We also assessed the funding consequences of the three alternatives by comparing the allocations with the present distribution of MCH funds. (See ch. 3 and app. IV for detailed discussions.)

To accomplish our fourth objective, we identified methods of phasing in a new formula. This could be done by either reducing the portion of MCH funds allocated by the existing formula or increasing MCH appropriations to allow states a transition into a new formula without reductions in existing grant levels.

We asked outside experts in the fields of public health statistics and economic analysis to review our development of the statistical indicators used to measure our equity standards, as well as our development of equity-based allocation formulas.

Our analysis was limited to examining MCH program expenditures and federal grants relative to funding equity, along with developing approaches for more equitable distributions of these funds. As a result, we did not examine the characteristics of populations that states serve with MCH funds or the specific kinds of services provided. Also, we did not assess the efficiency or effectiveness of state MCH delivery systems.

We limited our formula analysis to the 50 states and the District of Columbia. Our analysis of new formula alternatives did not include U.S. insular areas and Indian tribes because data are not available to determine their population of children at risk, cost of health care service, and ability to pay for these services. For our analysis of equity-based formulas, we assigned to them MCH grants based on the percentage of funding they currently receive.

We carried out our work between June 1990 and February 1991, in accordance with generally accepted government auditing standards.

MCH Funding Is Not Allocated Equitably

Maternal and Child Health Services block grant funds are not allocated in a way that accords equity to beneficiaries or state taxpayers. The current MCH distribution does not reflect differences with respect to those factors making up our equity standards—population of children at risk, costs of providing maternal and child health services, and ability to pay for these services. We found that no one of these factors is strongly related to the way MCH funds are distributed. Taking all three factors together we could explain only 41 percent of the differences in relative MCH grants to states,[1] suggesting that the current distribution method is not well grounded in either equity standard.

Current Distribution Does Not Compensate States for Varying Concentrations of Children At Risk, Costs, and Ability to Pay

The number of children at risk, the costs of providing maternal and child health services, and the states' ability to pay for these services vary from state to state. For example, differences in children at risk range from 28 percent below the national average in New Hampshire to 59 percent above in Mississippi. A similar disparity exists in the costs of health care services—ranging from 23 percent below the national average in South Dakota to 52 percent above in Alaska. Finally, states' comparative abilities to pay for maternal and child health services also vary widely. Differences range from 30 percent below the national average in Mississippi to 71 percent above in Alaska.

Not All Children at Risk Treated Equally

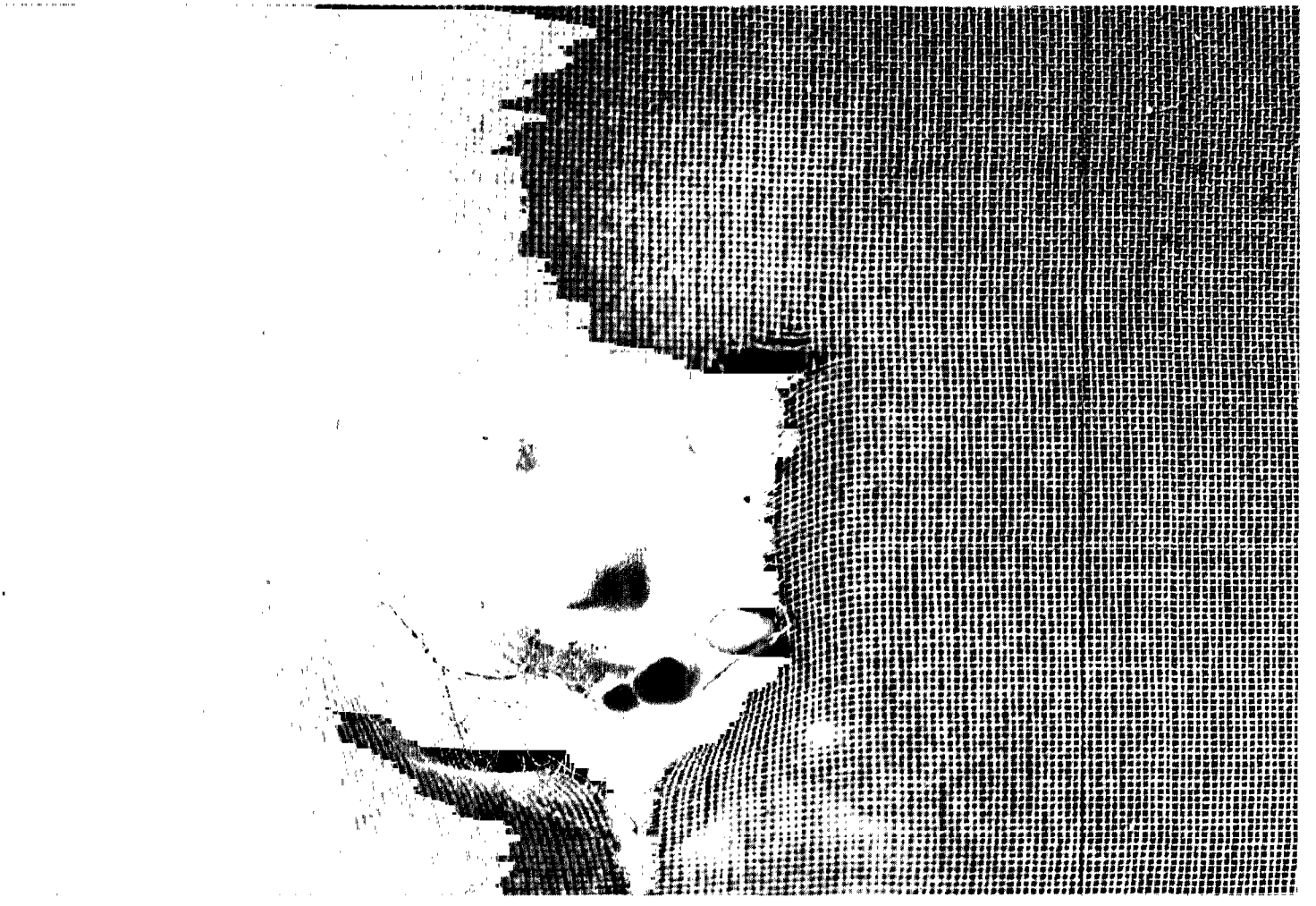
The present allocation of MCH funds does not compensate states for differences in their concentrations of children at risk. For example, Louisiana—with the second highest proportion of children at risk—ranks only 14th in per capita grant funding. The current method of distributing MCH funding also does not compensate for states' differences in low-birthweight infant populations. For example, Nevada's proportion of low-weight births is 12 percent above the national average, yet its MCH funding is 44 percent below.

To assess the extent of funding differences, we compared each state's share of children at risk with its share of fiscal year 1990 MCH funds. We used regression analysis, a common statistical technique for estimating the extent to which two variables are linearly related. The very wide spread of

[1]More precisely, differences here refers to the coefficient of determination. Thus, the three factors explain 41 percent of the total variation in per capita MCH funding.

points in figure 2.2 indicates a near-random relationship between MCH funding and concentrations of children at risk.[2] Overall, this factor accounts for at most 22 percent of the differences in fiscal year 1990 MCH funding across the states.

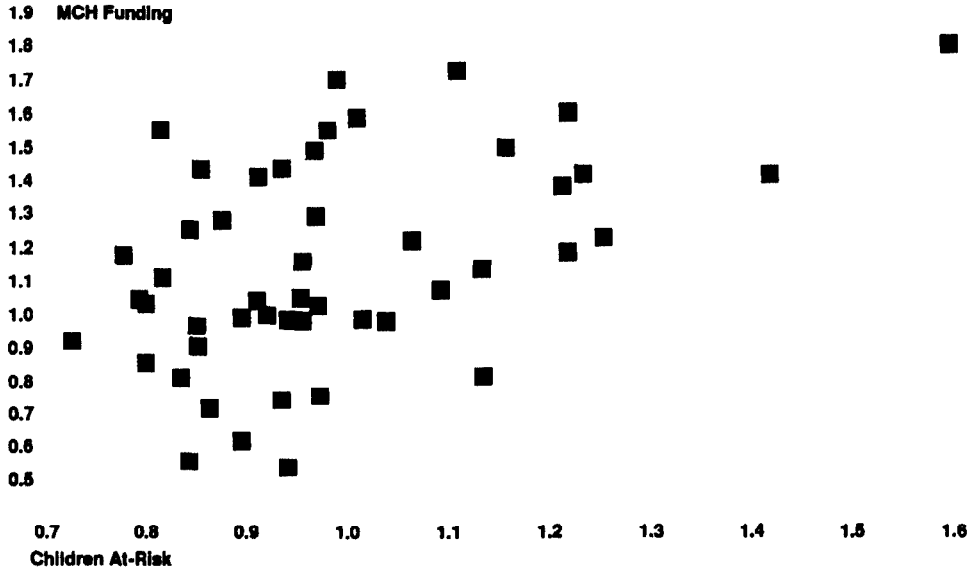
Figure 2.1: Children At Risk



Source: Uniphoto, Inc.

[2]If percentage of children at risk explained all of the variation in MCH funding, MCH funds would be entirely allocated according to this factor. In such a circumstance, each of the 50 state observations would fall on a straight line in fig. 2.2. However, the figure clearly shows that they do not. Instead, the very large dispersion illustrates that states' shares of children at risk is largely unrelated to how much MCH funding states receive under the present allocation system.

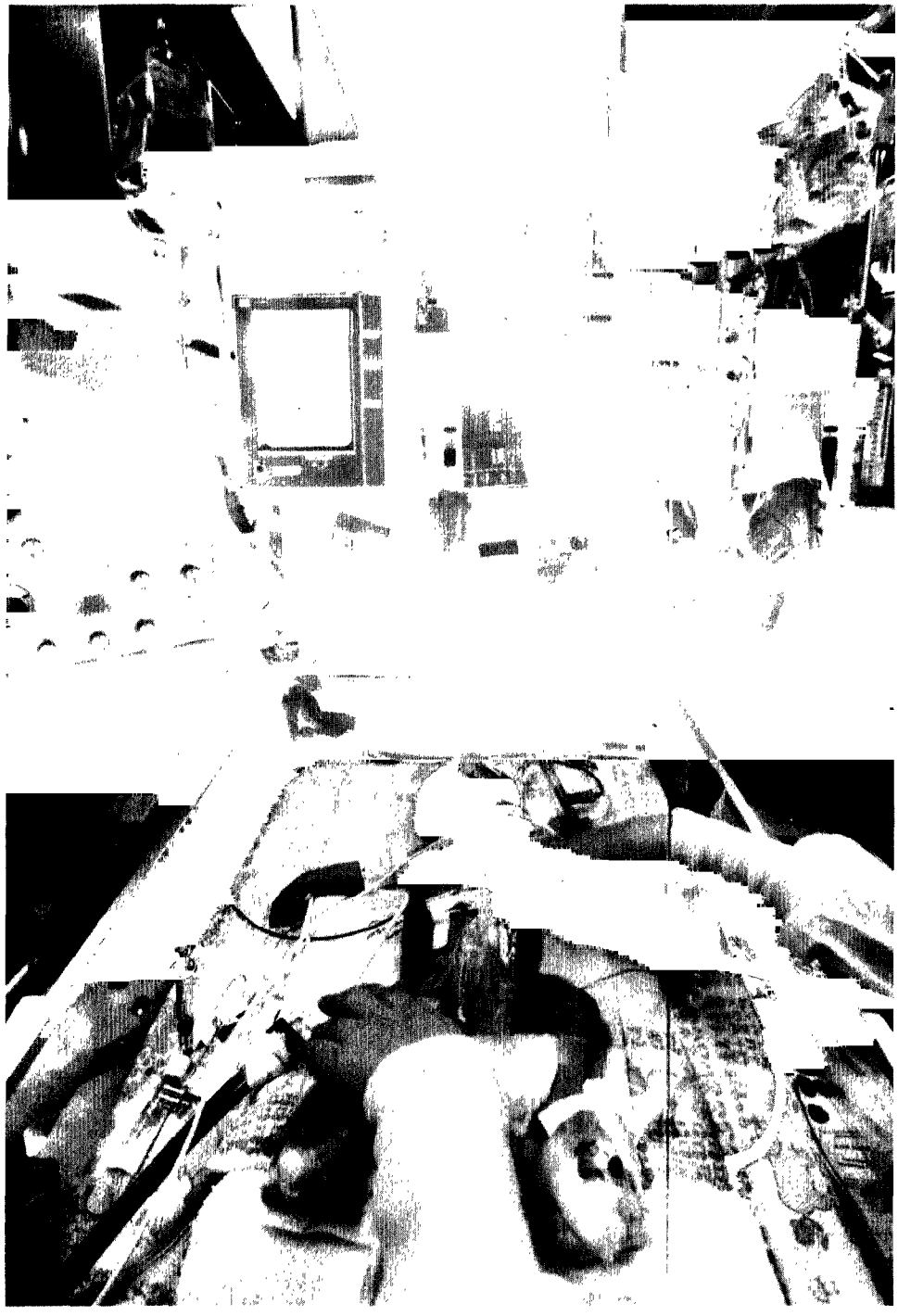
Figure 2.2: State Shares of MCH Funds Compared With State Shares of Children at Risk



Note: All figures are indexed to the national average.

If we compare the actual allocation of MCH funds with a distribution based solely on states' share of children at risk, 31 states would receive more than they receive under the current formula. This approach would redistribute $137 million, or 30 percent of total 1990 funding. To illustrate, Mississippi would receive $14.2 million based on its share of at-risk children, instead of the $8.6 million it actually received in fiscal year 1990. Because the current formula is not based on numbers of at-risk children, federal aid finances a smaller proportion of Mississippi's needs.

Figure 2.3: Costs of Health Care Services



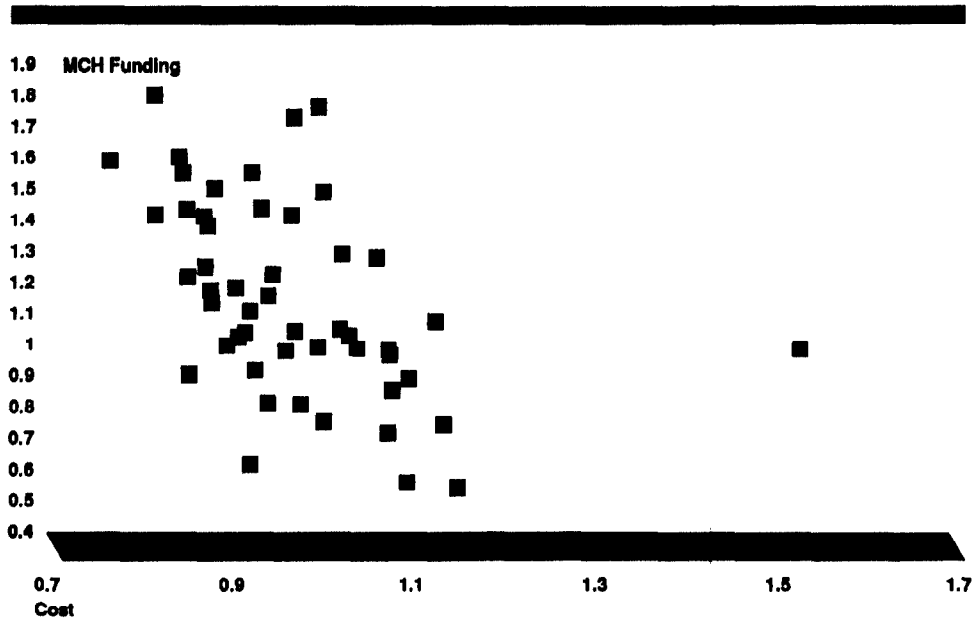
Source: Uniphoto, Inc.

MCH Does Not Adjust for Differences in Health Care Service Costs

The current allocation of MCH funds does not compensate states for differences in health care service costs. Yet, our index estimates a substantial variation in these costs—ranging from 52 percent above national average costs to 23 percent below.[3] In practical terms, Alaska consumers must spend an estimated $1.52 to buy the same health care services that South Dakotans can buy for 77 cents.

Our analysis showed little relationship between service costs and fiscal year 1990 MCH funding (see fig. 2.4). At most, 23 percent of the differences in MCH grants can be explained by differences in these costs. For example, Kansas and Illinois receive nearly equal per capita grants, even though Illinois has about 28 percent higher health care costs.

Figure 2.4: State Shares of MCH Funding Compared With State Costs of Health Care Services



Note: All figures are indexed to the national average.

If we compare fiscal year 1990 MCH funding with a distribution predicated solely on differences in state health care costs, 18 states would receive more than they receive currently. We estimated that the dollar difference would be about $65 million, or 14 percent of total funding. For example,

[3]For a more detailed description of this index, see app. II.

California would receive $61.1 million if differences in health service costs were taken into account, instead of the $28.8 million it received in 1990. The shortfall illustrates the disadvantage for high-cost states in funding services for its needy mothers and children.

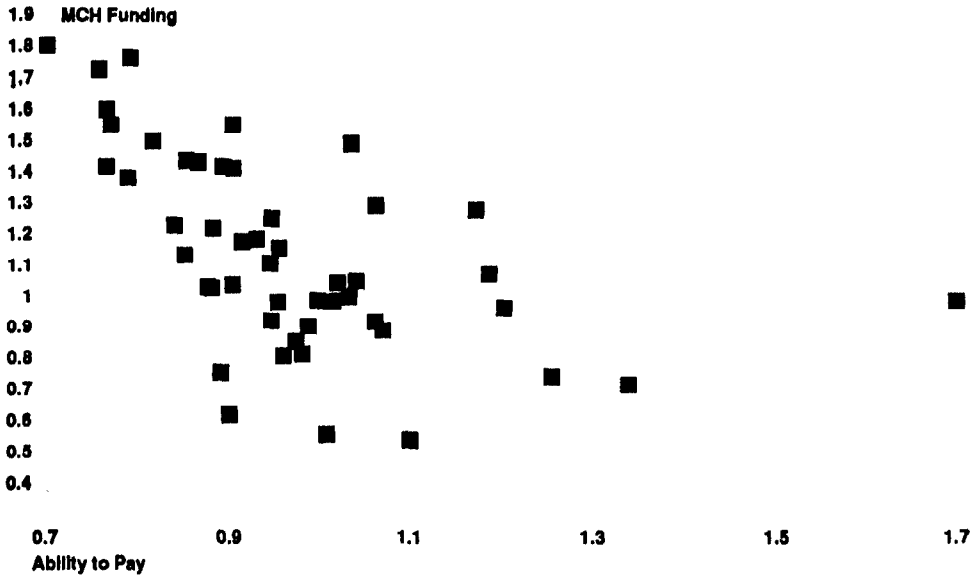
Figure 2.5: Ability to Pay

Source: Uniphoto, Inc.

MCH Treats Rich and Poor States Alike

Current MCH grant allocations do not take into account the differences in the ability of states to pay for maternal and child health programs.[4] In other words, the current distribution does not recognize that some states are less wealthy than others. Differences across states in their resources to pay for services account for at most 29 percent of the differences in MCH funding. For example, Arkansas was the third poorest state, yet it ranked 12th in per capita MCH funding.

Figure 2.6: State Shares of MCH Funding Compared With States' Ability To Pay



Note: All figures are indexed to the national average.

When comparing the current allocation system with a distribution based on ability to pay, we found that 18 states would receive more than they received under the current formula. A formula based on ability to pay would redistribute $45 million, or 10 percent of MCH funding. For example, Florida would have received $25.2 million if MCH funds were allocated in accordance with ability to pay, instead of the $14.4 million it received in program funding in 1990—a 75-percent difference.

[4]As described in app. IV of this report, funding formulas that offset differences in states' ability to pay serve to reduce disparities in state taxpayer burdens.

MCH Funding Not Allocated Equitably

Taking the factors we used to measure funding equity together, we found that the current allocation method is not well grounded in either of our equity standards. Nearly 60 percent of all MCH funding is distributed virtually at random or in a way unrelated to our equity standards.[5] Especially notable was our finding that current allocations are actually contrary to our standard of equal funding per child at risk when measured by the incidence of low-birthweight babies. More aid is directed to states with relatively lower concentrations of low-weight births than with relatively higher concentrations, other factors being equal.

Also significant was the fact that the relationship between MCH allocations and differences in service costs were inversely correlated. More aid is directed to states with lower services costs compared with states with higher costs, other factors being equal.

[5]App. V presents the regression models and statistical results upon which the findings in this chapter are based.

Redesigning the MCH Formula

The MCH formula could be redesigned to improve equity for beneficiaries and state taxpayers. At one end of the range of alternatives, grants could be allocated entirely on the basis of equal funding for beneficiaries—defined as funding per child at risk, while adjusting for the state's cost of service. At the other end, MCH funds could be allocated to equalize states' ability to finance MCH services to the maximum possible extent. While these two equity standards cannot be fully satisfied simultaneously, we provide a third allocation model that weights the two standards, demonstrating one way the Congress's preferences could be implemented.

Equity for Beneficiaries

MCH funding could be distributed according to a beneficiary equity formula—allocating aid entirely on an equal funding per child at risk basis while adjusting for the costs of providing services. Using a beneficiary equity model to distribute fiscal year 1990 MCH grants, $62 million, or 14 percent, would shift from lower to higher need states. Grants would decrease in 37 states and increase in 14. The average reduction would be $.62 per capita and the average increase $.11 per capita.[1]

Ranking states according to percentage changes in MCH funds, grants would decline by less than 25 percent in 16 states, and more than 50 percent in 3 states. For states that gain funding, grants would increase by more than 50 percent in 2 states, while they would rise by less than 25 percent in 5 states. (See app. IV for a detailed discussion of the beneficiary equity model).

While this beneficiary equity model fully equalizes MCH funding among states with respect to the standard for serving its intended beneficiaries, it falls short on our standard of equity for state taxpayers. The beneficiary equity model does not consider that states' ability to pay for these services differs. To illustrate, if all states were able to finance the same level of services with the same tax effort—if all states were equally wealthy—there would be no problem of taxpayer equity. However, their ability to pay for

[1]Currently, grants range from $3.30 per capita in Mississippi to $.99 in California. This range would be reduced 36 percent—to a range of from $2.63 per capita in Alaska to $1.24 in New Hampshire.

services on their own varies substantially, ranging from 36 percent below the national average to 85 percent above,[2] with an average difference—a standard deviation—of ±26 percent.[3]

As expected, taxpayer disparities are not reduced under a system predicated on equity for children. In fact, allocating funds solely on the basis of equal funding per child at risk causes the range of taxpayer burdens to widen—from 37 percent below to 85 percent above the national average. Equally significant, however, the standard deviation is virtually unchanged at ±.23. This indicates that states with vastly different abilities to pay would continue to receive similar per capita grants, given similar shares of the target population. To illustrate, Kansas would receive the same per capita grant as Illinois—even though Illinois' tax burden is 44 percent higher under this formula alternative.

Equity for State Taxpayers

MCH funding could be distributed according to a taxpayer equity formula—allocating aid to reduce differences in state taxpayers' ability to shoulder the burdens of providing health care to the maximum possible extent.[4] The taxpayer equity model is at the other end in the range of possibilities for improving funding equity. Using this model, $103.7 million, or 23 percent of fiscal year 1990 funding, would shift from higher to lower ability states. These disparities in burdens are dramatically altered as the standard deviation in tax burdens—±26 percent under the current system—is reduced to ±.05 percent.[5] Thus, while one-third of the states fall more than 26 percent above or below the national average under the current MCH allocation system, two-thirds fall within 5 percent of the

[2]Standardizing state scores to a national average (set at 1.00) makes it possible to express state tax effort, or burdens, as percentage differences from the national average. States falling below the national average are represented as less than 1.00 (such as, 0.75), whereas higher than average states are represented as greater than 1.00 (such as, 1.25).

[3]Standard deviation is used to measure variability or differences. We use the standard deviation to describe the average difference among the 50 states. In technical terms, the standard deviation is the square root of the average of the squared deviations of scores about the mean.

[4]The model we use falls somewhat short of this standard to insure that no state incurs the phenomenon of "negative grants." If MCH grants were allocated so that they fully equalized taxpayers' ability to pay across the 50 states, a few very wealthy states would technically "owe" the federal government money. To remedy this problem, we incorporated a minimum grant amount of zero (see app. IV for further details).

[5]Reducing tax burden disparities to the maximum possible extent substantially widens the range of per capita MCH grants. Thus, for example a very low-capacity state such as Mississippi experiences a relatively large increase—from $3.30 to $5.62 per capita—while New Hampshire experiences the opposite, a loss of all federal funding—from $1.68 per capita to zero.

average under this alternative formula (see app. IV for a detailed discussion on the taxpayer equity model).

Grants would be reduced in 33 states and increased in 18 under this approach. We estimate that the average reduction would be $.80 per capita and the average increase would be $.30 per capita. Ranking states according to percentage changes in MCH funds, we found that grants would decline by less than 25 percent in 5 states and by more than 50 percent in 15 states. Similarly, grants would increase by more than 50 percent in 7 states, while they would rise by less than 25 percent in 7 states.

Just as improving equity for beneficiaries fell short on the standard of taxpayer equity, improving taxpayer equity falls short on the standard of beneficiary equity. Under a taxpayer equity formula, at-risk children in four states with very high fiscal capacities and/or very small populations would not receive federal funds and could not be served by the federal MCH program.[6]

Balancing Equity Between Beneficiaries and State Taxpayers

Equity for state taxpayers and equity for children cannot be fully satisfied simultaneously. If they could, the distribution of per capita grants under our beneficiary equity and taxpayer equity models would be identical—but they are not. Nonetheless, through the adoption of a formula that strikes a balance between the two standards, the overall equity of the MCH program could be improved substantially. By adjusting the weights attached to each equity factor and placing technical constraints on the formula so that children at risk in all states are covered by program funds, our example demonstrates how such a balance can be struck.

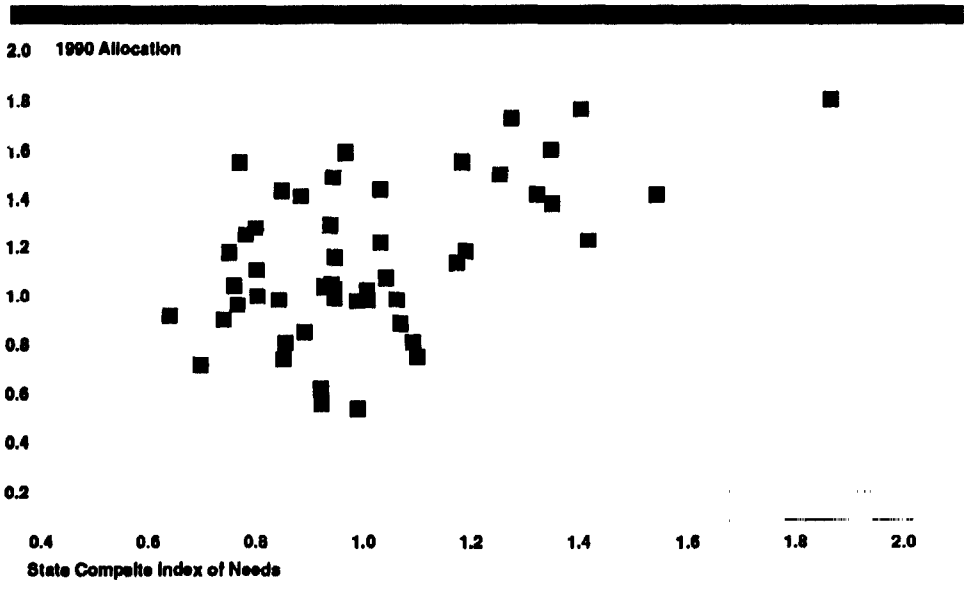
In our opinion, a balanced equity model is an improvement over developing an allocation formula based on only one equity standard. Our example improves equity for beneficiaries, and reduces differences in state tax burdens nearly as well as the allocation system predicated entirely on taxpayer equity. Our balanced equity formula alternative reduces differences in taxpayer burdens to $\pm .21$, a modest improvement. This represents an overall improvement in equity because it assures a minimum grant so that children in all states can be served, and because state grants are adjusted to better reflect differences in states' share of the target population. The minimum does, however, enable some states to provide an average level of benefits with relatively low tax burdens.

[6]Connecticut, Iowa, Kansas, and New Hampshire.

Progress on both equity standards can be measured through a composite need index that ranks states' needs by the three factors we used—concentration of children at risk, ability to pay, and health care service costs.[7] By comparing states' composite rankings of needs with the existing distribution of MCH funds and the balanced equity model, we can illustrate the improvement to funding equity (see figs. 3.1 and 3.2). There is virtually no relationship between a state's score on our equity index and its current level of MCH funding, as indicated by the spread of points in figure 3.1. In sharp contrast, the tight linear clustering of points in figure 3.2 indicates that the relationship between our simulated distribution and the needs index is nearly perfect.

The balanced equity model accomplishes what it is designed to do: it demonstrates one way that the MCH allocation system can strike a balance between equity for beneficiaries and state taxpayers (see fig. 3.2). Our example is better-grounded in the two equity standards; almost 81 percent of the MCH grant allocation can be explained by differences among states in their at-risk populations, costs of services, or the capacity to pay for these services. But we found that only 41 percent of federal MCH funds distributed under the existing allocation formula can be explained by the factors making up our equity standards.

Figure 3.1: MCH Grants Under Current Formula Compared With State Composite Index of Needs



[7]We calculated an index of states' needs under the MCH program by using equally weighted measures of per capita children at risk populations, state service costs, and ability to pay. (For a further explanation, see app. IV.)

Balancing Equity for Beneficiaries and State Taxpayers

Choosing a particular formula requires policymakers to decide which equity standard, or combination of standards, should govern the distribution to federal funding. Beneficiary equity will result in taxpayers in different states having to bear significantly different tax burdens in providing comparable benefits to their needy population, as was shown in table IV.2. Alternatively, taxpayer equity will result in some states receiving no federal aid (Connecticut, Iowa, Kansas, and New Hampshire as shown in table IV.3) or relatively small amounts (Nebraska, Vermont, and Wyoming for example).

To avoid the extremes inherent in either a pure beneficiary equity or a pure taxpayer equity formula, policymakers may wish to consider a compromise formula whose goal is to improve taxpayer equity yet avoid a formula that provides little or no funding for some states. One such possibility, referred to as a balanced equity model, was presented in chapter 3 and its distributional implications in figure 3.3.

The balanced equity formula is identical to the taxpayer equity formula with two changes designed to insure that all states receive at least some minimum level of funding. First, to ensure that high-income states such as Alaska and Connecticut receive a minimum funding amount we set a floor for the federal share component of the formula represented in equation IV.4. In this particular formula, we set the minimum federal percentage at 15 percent. In other words, the formula will fund at least 15 percent of each state's expenditure needs. Second, to ensure that small states like Wyoming and Vermont receive some minimum funding amount we included a provision that guarantees that no state receives an amount less than 0.5 percent of the total appropriation. This minimum guarantees all states at least $2.27 million at the $53.4 million appropriation level used in our analysis. The state-by-state distribution of funding under these assumptions is shown in table IV.5. Grant amounts with different floors and minimums also could be easily considered.

Table IV.5: Example of an Allocation That Strikes a Balance Between Equity for Children at Risk and State Taxpayers

Dollars in thousands

State	1990 Allocation	Balanced equity allocation	Difference	Percent difference
Alabama	$10,407	$12,713	$2,306	22.2%
Alaska	950	2,267	1,317	138.6
Arizona	4,903	7,236	2,333	47.6
Arkansas	6,236	6,873	637	10.2
California	28,775	49,839	21,064	73.2
Colorado	6,360	4,269	(2,092)	(32.9)
Connecticut	4,250	2,962	(1,288)	(30.3)
Delaware	1,833	2,267	434	23.7
D.C.	6,863	3,786	(3,077)	(44.8)
Florida	14,376	12,720	(1,656)	(11.5)
Georgia	13,925	17,198	3,273	23.5
Hawaii	2,000	2,267	267	13.3
Idaho	2,877	2,267	(610)	(21.2)
Illinois	18,971	25,904	6,933	36.5
Indiana	10,624	5,797	(4,826)	(45.4)
Iowa	6,108	2,267	(3,841)	(62.9)
Kansas	4,150	2,267	(1,883)	(45.4)
Kentucky	10,227	9,990	(236)	(2.3)
Louisiana	11,339	20,217	8,878	78.3
Maine	3,200	2,267	(933)	(29.2)
Maryland	11,090	6,093	(4,997)	(45.1)
Massachusetts	10,429	5,337	(5,092)	(48.8)
Michigan	16,737	18,809	2,072	12.4
Minnesota	8,305	3,305	(5,000)	(60.2)
Mississippi	8,639	13,357	4,718	54.6
Missouri	10,914	6,294	(4,621)	(42.3)
Montana	2,118	2,267	149	7.0
Nebraska	3,684	2,267	(1,417)	(38.5)
Nevada	1,137	2,267	1,130	99.3
New Hampshire	1,859	2,267	408	22.0
New Jersey	10,509	8,094	(2,414)	(23.0)
New Mexico	3,429	5,592	2,164	63.1
New York	35,223	40,422	5,199	14.8
North Carolina	14,644	10,651	(3,993)	(27.3)
North Dakota	1,704	2,267	563	33.1
Ohio	19,574	14,674	(4,899)	(25.0)
Oklahoma	6,047	4,726	(1,321)	(21.8)
Oregon	5,311	3,138	(2,172)	(40.9)

(continued)

Dollars in thousands

State	1990 Allocation	Balanced equity allocation	Difference	Percent difference
Pennsylvania	21,823	14,495	(7,328)	(33.6)
Rhode Island	1,477	2,267	790	53.5
South Carolina	10,289	10,473	183	1.8
South Dakota	2,079	2,267	188	9.0
Tennessee	10,250	11,630	1,380	13.5
Texas	25,268	37,186	11,919	47.2
Utah	5,503	5,746	243	4.4
Vermont	1,608	2,267	659	41.0
Virginia	11,132	4,953	(6,179)	(55.5)
Washington	7,430	4,245	(3,185)	(42.9)
West Virginia	5,868	4,799	(1,069)	(18.2)
Wisconsin	9,848	3,614	(6,234)	(63.3)
Wyoming	1,111	2,267	1,156	104.1
United States	**453,411**	**453,411**	**0**	**0.0**

Statistical Analysis of Grant Targeting Under the Maternal and Child Health Block Grant

Introduction

If the two equity standards we used to evaluate the targeting of federal MCH funding—equity for beneficiaries and equity for state taxpayers—were fully implemented, each would result in different distributions of federal assistance. Both, therefore, cannot be achieved simultaneously. If equal funding per child at risk is provided, it means taxpayers in poorer states would have to bear higher tax burdens to finance the national average level of MCH benefits. Conversely, if state taxpayer burdens were equalized, wealthier states would receive less funding per beneficiary than poorer states. By analyzing the existing distribution of federal MCH grants across states, we determined (1) the weight implicitly given the two competing objectives and (2) whether they could be achieved more efficiently.

Our approach was to develop a general model of grant targeting. It incorporates our two equity standards as special cases that depend on the extent to which grant funds are targeted to states with less taxpaying ability. Then, using the existing distribution of MCH funding and applying standard regression techniques, we were able to statistically estimate the relative weights implicitly, given the two equity goals, and assess how efficiently these goals were achieved.

Development of a General Model of Grant Targeting

We first structured our apportionment formula to achieve taxpayer equity—it equalizes the tax burden state taxpayers must bear to finance the national average level of MCH benefits.[1] This model was then generalized to allow for policy goals that reduced, but did not eliminate, disparities in state taxpayer burdens, thus allowing a more equal distribution of funding per beneficiary. The general model allowed us to quantitatively measure the trade-off the existing allocation of MCH grants implicitly makes between the two equity goals.

Complete Tax Burden Equalization

The apportionment formula for achieving taxpayer equity was summarized in equation IV.4 of app. IV. By substituting the expressions for the share of MCH benefits to be financed from federal sources in equation IV.5 and for state expenditure needs from equation IV.1 into IV.4, the taxpayer equity model can be expressed in the following form:

[1]An alternative definition of taxpayer equity would be to equalize tax burdens per unit of service provided rather than the burden of financing an average service level. Equalizing tax burdens on a per unit of service basis leads to the implication that, other things being equal, grant funds should be distributed in accordance with each state's tax effort in providing MCH services. Because MCH grants are not allocated in accordance with state's tax effort, we concluded that the definition of taxpayer equity used was more appropriate for this analysis.

Equation V.1

$$G_i = [1 - \alpha(y/c_i n_i \bar{y})] * [P_i n_i c_i \bar{e}]$$
$$= 0 \text{ if } (y_i/c_i n_i \bar{y}) > 1/\alpha$$

where

G_i = grant to state i (in dollars),[2]
y_i = taxpaying ability (per capita dollars),
$\bar{y}$ = U.S. average taxpaying ability (per capita dollars),
c_i = unit cost of services (index),
n_i = concentration of at-risk children (index),
P_i = population,
$\bar{e}$ = U.S. per capita MCH spending (federal, state, and local), and
α = nonfederal share of MCH spending.

The first expression in square brackets is the share of MCH benefits financed by the federal grant. The second expression in square brackets represents the expenditures required to finance the national average benefit level, which we refer to as expenditure needs. The federal share of expenditure needs becomes larger and hence targets more federal funding to states with low taxpaying ability (y) relative to the national average ability ($\bar{y}$),[3] and relative to the cost of services and their concentration of at-risk children.[4] The targeting pattern produced can be better illustrated by first expressing the grant on a per capita basis, adjusted for differences in the concentration of at-risk children and the cost of providing MCH services. Dividing by Pnc expresses the per capita grant in "real" terms (that is, adjusted for differences in both the cost of services and the concentration of at-risk children):

[2]Subsequently in this appendix, we delete subscript $_i$ to simplify the notation.

[3]If this factor were not taken into account, the tax burden equalizing formula would simplify to our first equity standard. This can be seen by noting that if $y/cn\bar{y} = 1$, that is, the same value for all states, the formula simplifies to $G = (1 - \alpha) * Pnc\bar{e}$, the formula for funding equity for beneficiaries shown in equation IV.2 of app. IV.

[4]The indicators we used to measure at-risk children, taxpaying ability, and the cost of services are described in apps. I, II, and III.

Equation V.2

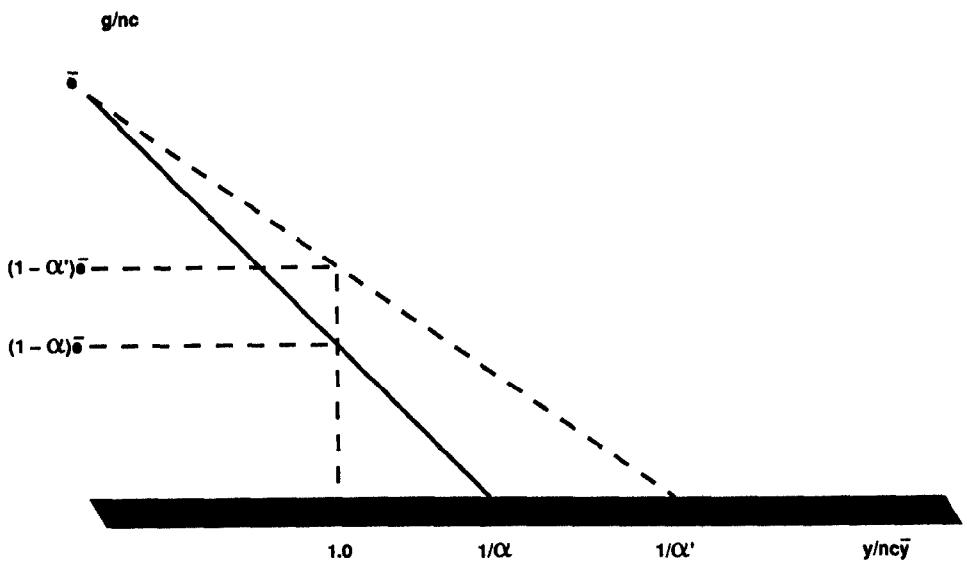
$$g/cn = [1 - \alpha(y/cn\,\bar{y})] * \bar{e}$$
$$= 0 \text{ if } y/cn\,\bar{y} > 1/\alpha$$

where

g = per capita grant (G/P)

The targeting pattern produced by this formula is illustrated in figure V.1. The real per capita grant is measured vertically and the ability to pay for services, also measured in real terms, on the horizontal axis. A state with no taxpaying ability would receive a per capita grant equal to the national average benefit level, $\bar{e}$. A state with average ability to pay ($y/cn\,\bar{y} = 1$) would receive a grant of $(1 - \alpha)\,\bar{e}$, and states whose ability to pay exceeded a value of $(1/\alpha)$ would be ineligible for funding.[5]

Figure V.1: Grant Targeting Under Tax Burden Equalizing Formula



[5]The threshold value of $1/\alpha$ is obtained by solving equation V.2 for the real income level ($y/cn\bar{y}$) that would yield a grant of zero. For example, if federal grants funded 50 percent of the national average benefit level (that is, $1 - \alpha = .5$), then states whose ability to pay, in real terms, was more than twice the national average (that is, $1/\alpha = 2.0$) would not be funded. Alternatively, if federal grants funded 75 percent, then states with real ability to pay up to four times the national average (that is, $1/\alpha = 1/.25 = 4$) would be eligible for funding.

The relationship in equation V.2 shows that real per capita funding must decline with states' ability to pay, also measured in real terms[6] to equalize state taxpayer burdens. More importantly, it shows that the degree to which grant funding is targeted to states with low taxpaying ability depends on the share of benefits financed from state and local sources (α). A greater reliance on state and local financing moves the point $y/cn\bar{y} = 1/\alpha$ to the left (that is, the solid line rotates), lowering the threshold funding cutoff.

With a larger federal share, tax burden equalization can be achieved with less targeting to states with a low ability to pay, illustrated in figure V.1. If a predetermined national benefit level is financed with a larger federal share ($1 - \alpha'$), grants would be determined by the dotted line. They would reflect a lesser need to target grants to low-capacity states, as state tax bases would fund a smaller share of program costs. The state with average taxpaying ability would receive an adjusted grant of $(1 - \alpha')\bar{e}$. As can be seen from the diagram, most of the additional federal funding would be targeted to states with above average ability to pay.[7]

Partial Equalization

Because the degree of targeting to states with low ability to pay depends on the share of benefits financed by the federal grant, there exists a tradeoff between the degree of targeting to low-ability states and program appropriations. If we assume a fixed national average benefit level, a larger federal appropriation makes it possible to equalize state taxpayer burdens with less targeting of grant funds to states with low taxpaying ability. Conversely, smaller allocations, in the context of a fixed national average benefit level, must be accompanied by greater targeting to states with low taxpaying ability if the burden of financing program benefits is to be equalized. In fact, if federal funding is especially limited, full equalization of state taxpayer burdens could require a grant distribution so highly targeted that little or no grant funding would be provided for states with above-average taxpaying ability. In this circumstance, policy makers may opt to reduce but not eliminate tax burden disparities so that more equal funding may be provided. That is, they may trade off the goal of tax burden equalization to achieve the competing goal of more equal funding per child at risk, after adjusting for differences in the cost of services.

[6]That is, adjusted for both unit costs and concentrations of at-risk children.

[7]The additional federal funding is represented by the area between the solid and dotted lines. As can be seen, most of this area is to the right of the average ability to pay, $y/cn\bar{y} = 1$.

This policy option can be incorporated into the tax burden-equalizing model by introducing an equalization parameter that reduces the degree of targeting to states with low adjusted ability to pay, while keeping the federal share of benefits fixed at a predetermined level. States with above-average ability then will receive more funding than they otherwise would.

To accomplish this, we introduce an "equalization" parameter, β, into the tax burden equalizing formula, as follows:

Equation V.3

$$g/cn = [1 - \beta\alpha(y/cn\,\bar{y})] * \bar{e} * [(1 - \alpha)/(1 - \beta\alpha)]$$ [8]

The equalization parameter ranges from $\beta = 0$—no equalization—to $\beta = 1$—complete equalization—of state taxpayer burdens. Partial tax burden equalization is represented as $0 < \beta < 1$. Therefore, its appearance in the first expression in square brackets has the effect of increasing grant allotments to states with a higher ability to pay for services compared with the full equalization model.[9] If this were the only adjustment to the formula, it would increase the appropriation level. Therefore, to stay within a predetermined appropriation level, grant funding, as determined by the first two terms, must be reduced. This reduction is accomplished by a scaling factor represented by the third term in square brackets.

The formula in V.3 represents a general model of grant targeting that includes our two equity standards as special cases. If $\beta = 0$, the formula simplifies to:

Equation V.4

$$g/cn = (1 - \alpha) * \bar{e}$$

Thus, each state's per capita grant, adjusted for at-risk children and the cost of services, is a fixed share $(1 - \alpha)$ of the national average per capita benefit level, and hence, equal grants per child at risk across states. And, if $\beta = 1$, the general formula simplifies to the tax burden equity formula shown in V.3. A value of β between 0 and 1 therefore can be interpreted as

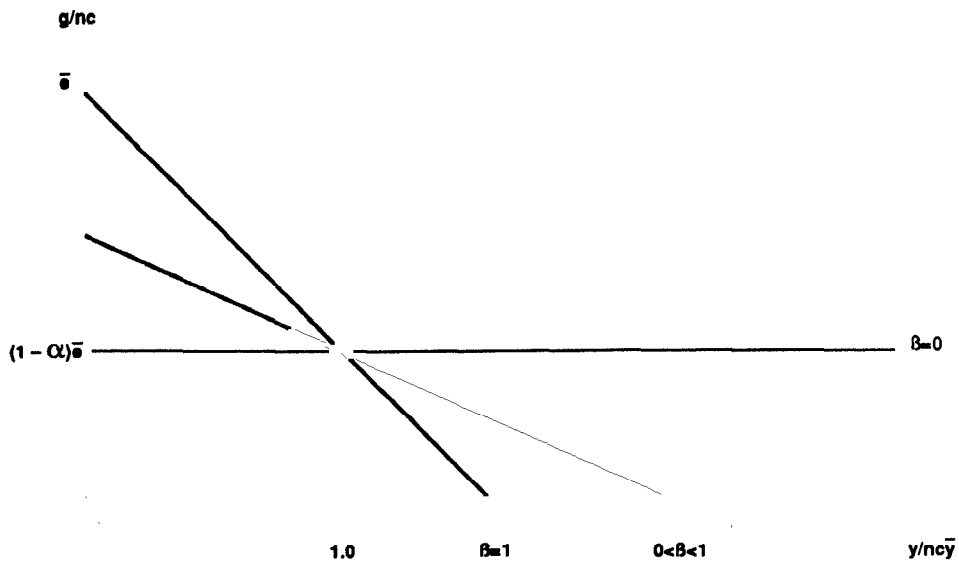
[8]A complete algebraic derivation of the general formula is available upon request.

[9]The formula represented by the dotted line in fig. V.1 compared with the solid line formula.

a choice to partially equalize tax burdens so that differences in grant funding per child at risk are minimized. A value closer to 0 reflects a funding distribution more consistent with the equal funding equity standard; a value closer to 1 reflects a distribution more consistent with the taxpayer equity standard.

The general model and the special cases of no equalization and complete equalization are illustrated with the aid of figure V.2. Per capita grants, adjusted for at-risk children and unit costs are measured vertically and adjusted taxpaying ability is measured on the horizontal axis. Our first equity standard, equal per capita grants, adjusted for children and unit costs, is represented by the horizontal line labeled $\beta = 0$, reflecting the formula in equation V.4. The taxpayer equity standard is represented by the line labeled $\beta = 1$, representing complete equalization of state taxpayer burdens.[10] A partial equalization goal is represented by the line labeled $0 < \beta < 1$. The line $(0 < \beta < 1)$ is less steeply sloped than $(\beta = 1)$, because taxpayer equalization is not complete. But differences in grants per child at risk are smaller than in the case implied by the line $(\beta = 1)$.

Figure V.2: Comparison of Three Grant Formulas: Equal Funding, Equal Tax Burdens, and Partial Equalization



[10]The slope of the formula is determined exclusively by the share of benefits financed from nonfederal sources (α) (see equation V.3).

Statistical Analysis

Our general model of grant targeting, summarized in equation V.3, identifies three indicators that should determine the distribution of federal grants: (1) children at risk, (2) the unit cost of services, and (3) state taxpayers' ability to pay for services. To determine the relative weights, the existing distribution of MCH funding implicitly assigns the two equity standards—equal funding per child at risk (adjusted for service costs) and equal funding for state taxpayers—it is necessary to estimate the unknown equalization parameter, β. We can evaluate the efficiency of grant targeting by how well the three types of need indicators explain the existing distribution of MCH funding.

To accomplish this, we first express the general model in a form suitable for statistical estimation using the statistical technique of linear regression. We then describe the data used to estimate the model and present the results.

Statistical Model

To estimate the equalization parameter, β, it is necessary to express the general equalization model in a form suitable for estimation using regression techniques. Equation V.3 is multiplied by cn, which yields an expression for the per capita grant. This, in turn, is divided by the average per capita grant to express the per capita grant relative to the national average:

Equation V.5

$$g/\bar{g} = [1/(1 - \beta\alpha)] * nc - [\beta\alpha/(1 - \beta\alpha)] * (y/\bar{y})]$$ [11]

As explained in appendix I, we identified three indicators of at-risk children: (1) children under 21 (p21), (2) children living in poverty (pov), and (3) the number of low-weight births (lbw). Children under 21 is used as a proxy for handicapped and other children with special needs. They represent approximately one-third of the population served by the block grant. Low-weight births and children in poverty are used as proxies for mothers and infants. This group represents roughly two-thirds of the population served by the block grant.

To test whether the existing distribution of aid reflects the fact that one-third of funds are used to serve children with special needs and

[11]This expression is obtained by noting that the U.S. average per capita grant is the federal share of U.S. average per capita MCH spending, that is, $g = (1 - \alpha)\bar{e}$.

two-thirds to serve mothers and infants, we included these three indicators and estimated their weights based on the current distribution of MCH funding.

An index reflecting the concentration of children at risk can be formed by taking a weighted sum of each state's percentage share of each of the three at-risk groups, expressed relative to their share of total population:[12]

Equation V.6

$$n = w_1 * pov + w_2 * lbw + (1 - w_1 - w_2) * p21, \text{ where}$$

w_i = weight attached to the ith at-risk group,[13]
pov[14] = children in poverty,
lbw = index of low-weight births, and
p21 = index of children under 21

Substituting V.6 into V.5 yields the following model:

Equation V.7

$$g/\bar{g} = [w_1/(1 - \beta\alpha)] * (pov * c) + [w_2/(1 - \beta\alpha)] * (lbw * c) + [(1 - w_1 - w_2)/(1 - \beta\alpha)] * (p21 * c) - [\beta\alpha/(1 - \beta\alpha)] * (y/\bar{y})$$

This relationship shows that, under a partial equalization model, each state's per capita grant is a weighted sum of cost-adjusted children at risk and states' taxpaying ability. The coefficient associated with each high-risk group depends on its weight in the overall index of at-risk children (w_i), the nonfederal share of program financing (α), and the degree of tax burden equalization (β). The weight on the unadjusted ability-to-pay variable depends only on β and α.

[12]For example, the index measuring the concentration of children under 21 is:

p21 = [P21/sum(P21)]/[POP/sum(POP)] where

p21 = concentration index of children under 21,
P21 = state total of children under 21,
sum(P21) = U.S. total of children under 21,
POP = total state population, and
sum(POP) = U.S. population

[13]The weights are constrained to sum to one.

[14]Lower-case letters denote that the variable is indexed to the national average. Upper-case letters reflect absolute numbers.

Data

Table V.1 defines the variables and data used to estimate the model. All variables are index numbers that measure each variable relative to its corresponding national average. Table V.2 displays the data on each variable and table V.3, a correlation matrix of the data. Multicolinearity among possible regressors does not appear to be a serious problem. The largest correlation is between p21c and lbwc with a correlation coefficient of .64.

Table V.1: Definitions of Variables

Variable	Definitions
$g/\bar{g}$	MCH grant (FY 1990)
p21	children under 21 (1989)
pov	children in poverty (1980)
lbw	low-weight birth (1986-88 average)
c	unit cost index (1980)
$y/\bar{y}$	Total Taxable Resources (1986-88 average)
p21c	cost-adjusted children under 21 (p21 * c)
povc	cost-adjusted children in poverty (pov * c)
lbwc	cost-adjusted low-weight births (lbw * c)

Table V.2: Data on Variables

State	$g/\bar{g}$	p21	pov	lbw	c	$y/\bar{y}$	p21c	povc	lbwc
Alabama	1.38	1.04	1.51	1.08	0.87	0.79	0.91	1.33	0.95
Alaska	0.99	1.19	0.66	0.97	1.52	1.71	1.82	1.02	1.48
Arizona	0.75	1.06	0.81	1.05	1.00	0.89	1.06	0.82	1.06
Arkansas	1.42	1.04	1.56	1.09	0.81	0.77	0.85	1.29	0.89
California	0.54	1.02	0.80	1.01	1.15	1.10	1.17	0.93	1.16
Colorado	1.05	1.01	0.70	1.16	1.02	1.04	1.03	0.72	1.18
Connecticut	0.72	0.92	0.76	0.92	1.07	1.34	0.99	0.82	0.98
Delaware	1.49	0.97	0.89	1.04	1.00	1.03	0.98	0.90	1.04
D.C.	6.22	0.89	1.54	2.29	1.24	2.08	1.11	1.93	2.83
Florida	0.62	0.88	0.79	1.02	0.92	0.90	0.81	0.73	0.94
Georgia	1.18	1.08	1.31	1.26	0.90	0.93	0.98	1.20	1.14
Hawaii	0.98	1.01	0.75	1.08	1.07	1.02	1.09	0.82	1.16
Idaho	1.55	1.15	1.07	0.73	0.92	0.77	1.06	1.00	0.67
Illinois	0.89	0.99	1.04	1.09	1.09	1.07	1.09	1.15	1.19
Indiana	1.04	1.02	0.84	0.88	0.91	0.91	0.93	0.77	0.80
Iowa	1.18	0.97	0.69	0.67	0.88	0.92	0.85	0.62	0.59
Kansas	0.90	1.01	0.68	0.87	0.85	0.99	0.87	0.58	0.74

(continued)

State	g/ḡ	p21	pov	lbw	c	y/ȳ	p21c	povc	lbwc
Kentucky	1.50	1.01	1.61	0.84	0.88	0.82	0.90	1.43	0.74
Louisiana	1.42	1.11	1.78	1.36	0.91	0.89	1.08	1.74	1.31
Maine	1.43	0.97	0.97	0.62	0.85	0.87	0.83	0.84	0.53
Maryland	1.29	0.96	0.74	1.20	1.02	1.06	0.99	0.77	1.22
Massachusetts	0.97	0.90	0.84	0.82	1.07	1.20	0.97	0.91	0.88
Michigan	0.99	1.03	1.01	1.01	1.04	1.00	1.07	1.06	1.05
Minnesota	1.04	1.00	0.68	0.70	0.97	1.02	0.97	0.67	0.68
Mississippi	1.80	1.13	2.37	1.28	0.81	0.70	0.92	1.95	1.05
Missouri	1.16	0.98	0.96	0.93	0.94	0.96	0.92	0.91	0.87
Montana	1.44	1.03	0.98	0.79	0.93	0.85	0.97	0.93	0.74
Nebraska	1.25	1.01	0.77	0.75	0.87	0.95	0.89	0.68	0.65
Nevada	0.56	0.95	0.46	1.12	1.09	1.01	1.05	0.51	1.23
New Hampshire	0.92	0.99	0.51	0.69	0.93	1.06	0.92	0.47	0.64
New Jersey	0.74	0.92	0.90	0.98	1.13	1.26	1.05	1.03	1.11
New Mexico	1.23	1.13	1.46	1.17	0.95	0.84	1.07	1.39	1.11
New York	1.07	0.94	1.22	1.11	1.12	1.19	1.07	1.39	1.25
N. Carolina	1.22	0.99	1.11	1.09	0.85	0.88	0.84	0.96	0.93
North Dakota	1.41	1.04	1.02	0.67	0.87	0.91	0.91	0.90	0.59
Ohio	0.98	1.00	0.94	0.93	0.96	0.96	0.96	0.91	0.89
Oklahoma	1.03	1.03	1.00	0.88	0.91	0.88	0.93	0.92	0.80
Oregon	1.03	0.95	0.77	0.68	1.03	0.88	0.99	0.80	0.70
Pennsylvania	0.99	0.92	0.90	0.87	0.99	0.95	0.92	0.90	0.86
Rhode Island	0.81	0.91	0.81	0.78	0.98	0.96	0.89	0.80	0.77
S. Carolina	1.60	1.06	1.31	1.29	0.84	0.77	0.89	1.11	1.08
South Dakota	1.59	1.05	1.31	0.67	0.77	0.81	0.81	1.02	0.51
Tennessee	1.14	0.99	1.37	1.03	0.88	0.85	0.87	1.22	0.91
Texas	0.81	1.12	1.17	1.12	0.94	0.98	1.05	1.11	1.05
Utah	1.76	1.39	0.84	1.10	0.99	0.79	1.38	0.84	1.09
Vermont	1.55	0.99	0.80	0.66	0.86	0.90	0.84	0.69	0.56
Virginia	1.00	0.96	0.82	0.98	0.89	1.03	0.86	0.74	0.88
Washington	0.85	0.99	0.68	0.73	1.08	0.97	1.07	0.74	0.79
West Virginia	1.73	0.98	1.31	0.69	0.97	0.76	0.95	1.28	0.66
Wisconsin	1.11	1.00	0.73	0.73	0.92	0.95	0.92	0.68	0.67
Wyoming	1.28	1.09	0.56	0.97	1.06	1.17	1.16	0.60	1.03

Table V.3: Correlation Matrix on Variables

	$g/\bar{g}$	p21	pov	lbw	c	$y/\bar{y}$	p21c	povc	lbwc
$g/\bar{g}$	1.00								
p21	.47	1.00							
pov	.56	.29	1.00						
lbw	-.02	.30	.42	1.00					
c	-.48	.03	-.41	.14	1.00				
$y/\bar{y}$	-.54	-.16	-.51	.02	.83	1.00			
p21c	-.13	.57	-.19	.25	.84	.61	1.00		
povc	.44	.30	.94	.50	-.11	.28	.06	1.00	
lbwc	-.26	.25	.10	.86	.63	.45	.64	.33	1.00

Results of Unconstrained Models

Before estimating the parameters of the tax burden equalizing model summarized in equation V.7, we estimated the model without any restrictions on the model's coefficients. Thus, the first set of regression models we estimated were:

Equation V.8

$$g/\bar{g} = b_0 + b_1 * (povc) + b_2 * (lbwc) + b_3 * (p21c) - b_4 * y/\bar{y} + \varepsilon,$$

where ε is an error term added to account for unexplained factors that determine the distribution of MCH grants.

The results of estimating equation V.8 using ordinary least squares is summarized as model 1 in table V.4. The three at-risk population groups, adjusted for unit costs and taxpaying ability, explain 51 percent of the variation in relative MCH grants in fiscal year 1990. That is, 49 percent of the variation in MCH grants cannot be accounted for by the proxies used for at-risk children, cost of services, or states' taxpaying ability. It is as if almost half of MCH funding was randomly distributed or determined by factors unrelated to at-risk children, costs, or taxpaying ability.

Table V.4: Regression Results of Unconstrained Models

	Model						
Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Constant	1.31	1.538	1.563	.217	.326	.990	1.800
	(4.89)	(5.51)	(5.80)	(0.49)	(0.69)	(3.88)	(6.74)
p21				1.628	1.460		
				(4.13)	(3.52)		
pov				.394	.251		
				(3.46)	(2.34)		
lbw				-.494			
				(2.67)			
c				-.600	-.828		
				(1.26)	(1.66)		
$y/\bar{y}$	-.857	-1.108	-.536	-.073	-.115		-1.093
	(3.10)	(3.89)	(2.01)	(0.21)	(0.31)		(4.90)
p21c	.813	.428					
	(2.73)	(1.47)					
povc	.456	.270	.472				
	(3.35)	(2.06)	(3.24)				
lbwc	-.627		-.378				
	(2.98)		(1.87)				
nc						.167	.426
						(0.63)	(1.90)
R^2	.507	.410	.425	.600	.535	.008	.344

Note: t-statistics are shown in parenthesis.

The results also indicate that states with higher concentrations of children under 21 and children in poverty and less taxpaying ability receive more funding. However, targeting with respect to low birthweight is perverse. Other things being equal, states with a higher concentration of low-weight births receive less rather than more funding.

Presumably, it was not Congressional intent to target less aid to states with high concentrations of low-birthweight babies. We therefore estimated the model without the low-birthweight variable. The results, model 2 in table V.4, show that only 41 percent of the distribution of MCH funding can be rationally accounted for by children under 21, children in poverty, and states' taxpaying ability. It is as if 59 percent of MCH funding was randomly distributed or accounted for by factors unrelated to at-risk children, unit costs, or ability to pay. Excluding low-weight births has little effect on the remaining variables. The coefficients on p21c and povc become smaller but

are still positive, and the coefficient on taxpaying ability becomes increasingly negative.

The fact that p21c and lbwc are correlated with one another raises the possibility that the sign of the lbwc variable may be sensitive to the inclusion of p21c in the model. We checked to see if multicolinearity between these two variables may have caused the perverse sign on lbwc reported in model 1. Model 3 replaces p21c with lbwc. The results show that when p21c is excluded from model 1, the sign of lbwc remains negative. Thus, multicolinearity between these two variables apparently does not affect our results.

Adjusting at-risk populations by the cost index, as implied by our tax burden equalization model, constrains the relationship between grant funding and costs to be positive. We also estimated the model without this restriction to determine whether MCH funding is targeted to high-cost states. The results are reported in models 4 and 5. Model 4 includes all three children indicators, and model 5 deletes the low-birthweight variable because its coefficient was negative when included in model 4. Allowing costs to enter the model unconstrained improves the explanatory power of the model. The coefficient of determination increases from 41 percent in model 2 to 53 percent in model 5. However, the targeting of MCH funding with respect to costs is perverse. After taking into account states' taxpaying ability and concentration of at-risk children, states with higher service costs receive less rather than more assistance. The inverse relationship is unaffected by the inclusion of the low-birthweight variable.

We also constructed a proxy for at-risk children using weights that reflect the fact that one-third of the block grant is used to support services for children with special health care needs and two-thirds for mothers, infants, and children. The P21 variable was used as the proxy for children with special health care needs and children in poverty, and low birthweight were used as proxies for the needs of mothers and infants (see app. I). The index used was computed as follows:

Equation V.9

$$n = (1/3) * p21 + (1/3) * lbw + (1/3) * pov$$

The proxy for children at risk was then adjusted for differences in unit costs. The results reported in model 6 indicate that our proxy for children

at risk cannot explain any of the variation in relative MCH grants. However, if differences in ability to pay are controlled for our proxies for children at risk, unit costs and ability to pay can account for only 34 percent of the variation in relative MCH grants (see table V.4, model #7).

Results of Constrained Models

In light of the results of estimating the unconstrained models of grant targeting, we deleted low-weight births from the general equalization model. With this revision, the general model becomes:

Equation V.10

$$g/\bar{g} = [w_1/(1 - \beta\alpha)] * (povc) + [(1 - w_1)/(1 - \beta\alpha)] * (p21c) - [\beta\alpha/(1 - \beta\alpha)] * (y/\bar{y})$$

Because the theory implies specific relationships between the coefficients in the model, unique estimates of the model's parameters cannot be determined from this specification. Although $\beta\alpha$ can be calculated from the coefficient on $y/\bar{y}$, the coefficients on povc and p21c produce two different estimates of w_1, the weight on children in poverty.

However, the model can be transformed into a form that does allow the model's parameters to be identified. Factoring w_1 from the first two terms yields the following specification, which can be estimated by ordinary least squares:[15]

[15]This specification is arrived at as follows:

V.10 can be rewritten as

$$(1)\ g/\bar{g} = [w_1/(1 - \beta\alpha)] * povc + [(1/(1 - \beta\alpha)] * p21c - [w_1/(1 - \beta\alpha)] * p21c - [\beta\alpha/(1 - \beta\alpha)] * y/\bar{y},$$

collecting terms,

$$(2)\ g/\bar{g} = [w_1/(1 - \beta\alpha)] * [povc - p21c] + [1/(1 - \beta\alpha)] * p21c - [\beta\alpha/(1 - \beta\alpha)] * y/\bar{y}$$

Now the coefficients from the second and third terms yield independent estimates of $\beta\alpha$. However, using the identity $\beta\alpha/(1/\beta\alpha) = [1/(1 - \beta\alpha)] - 1$ and substituting this for the coefficient of $y/\bar{y}$ we get

$$(3)\ g/\bar{g} = [w_1/(1 - \beta\alpha)] * [povc - p21c] + [1/(1 - \beta\alpha)] * p21c - [1/(1 - \beta\alpha)] * y/\bar{y} + y/\bar{y}$$

Collecting terms and putting $y/\bar{y}$ on the left hand side of the equation yields the specification in V.11.

Equation V.11

$$g/\bar{g} - y/\bar{y} = [w_1/(1 - \beta\alpha)] * [povc - p21c] + [1/(1 - \beta\alpha)] * [p21c - y/\bar{y}] + \varepsilon$$

ε equals the error term. The product $\beta\alpha$ can be calculated from the coefficient of $[p21c - y/\bar{y}]$. Since α can be determined from data on federal and nonfederal MCH spending, the equalization parameter β can be calculated. Given the value for $\beta\alpha$, the weight on the poverty variable can be calculated from the coefficient on [povc - p21c]. The weight on p21c is then $1 - w_1$. The results are summarized in table V.5.

The estimated coefficient of $[p21 - y/\bar{y}]$ was 1.587. This implies $\beta\alpha = .370$. Data for the period from 1982-87 indicates that the nonfederal share of MCH spending ranged between 65 and 78 percent. Using an approximate value of .75 for the nonfederal share, our model estimates the equalization parameter at $\beta = .49$. Recalling that $\beta = 0$ implies no equalization, this indicates that the current distribution of MCH grants would achieve a significant reduction in state taxpayer burdens if efficiently targeted.

Table V.5: Regression Results of Constrained Models

Parameter	Value	t-statistic
$w_1/(1 - \beta\alpha)$	.554	3.66
$1/(1 - \beta\alpha)$	1.587	4.73
$\beta\alpha$	.370	
α	.75	
β	.49	
w_1	.35	
$1 - w_1$	.65	

The weight on children in poverty implied by our estimates is 35 percent, producing a 65-percent weight on children under 21. These results imply that the existing distribution of MCH funding is at odds with how the funds are used. The children under 21 factor is used as a proxy for handicapped children.[16] Currently, about 30 percent of program funds are used to fund services for this population group. Yet the existing distribution of MCH funding is allocated as if they represented 65 percent of the population

[16]This assumes the number of handicapped children is proportional to the total number of children in each state.

served. Similarly, children in poverty serves as a proxy for mothers and infants in need of services. Approximately 70 percent of the block grant is used to serve this group, but MCH funding is distributed as if they were only 35 percent of the population served.

Agency Comments and Our Evaluation

DEPARTMENT OF HEALTH & HUMAN SERVICES

Office of Inspector General

Washington, D.C. 20201

NOV 18 1991

Ms. Linda G. Morra
Director, Human Services Policy
and Management Issues
United States General
Accounting Office
Washington, D.C. 20548

Dear Ms. Morra:

Enclosed are the Department's comments on your draft report, "Maternal and Child Health: Block Grant Funds Should Be Distributed More Equitably." The comments represent the tentative position of the Department and are subject to reevaluation when the final version of this report is received.

The Department appreciates the opportunity to comment on this draft report before its publication.

Sincerely yours,

Richard P. Kusserow
Inspector General

Enclosure

DEPARTMENT OF HEALTH AND HUMAN SERVICES (HHS) COMMENTS ON THE GENERAL ACCOUNTING OFFICE (GAO) DRAFT REPORT "MATERNAL AND CHILD HEALTH -- BLOCK GRANT FUNDS SHOULD BE DISTRIBUTED MORE EQUITABLY"

Congress and the States have long questioned the equity of the maternal and child health (MCH) formula allocations to States. The Omnibus Reconciliation Act of 1981 mandated a study of more equitable formulas. This study was completed and forwarded to the Congress with a recommendation from HHS that no change be made in the formula, which is still being utilized, for distribution of Title V funds.

This recommendation resulted from a review by a panel of experts made up of HHS, State Agency, and GAO staff of over 350 formula variations which examined representative tax base, per capita income, infant mortality, State ability to pay, rural versus urban births, and a veritable host of other factors, weighted and non-weighted, regressed, et cetera. It became clear that the concept of "equity" differed considerably in the opinions of those who were involved in this study. Clearly, without a significant increase in appropriated funds, anywhere from one-fifth to one-half of the States would stand to lose funding under any of these more "equitable" formulas.

Using either the beneficiary or the taxpayer equity formulas, many States would lose significant portions of their current MCH Block Grant funding. At a time when States are in dire financial situations, the subsequent service disruption that would follow any redistribution of funds must be weighed against the presumed improvement in equity for the "winning" States. The Department does not see how the "losing" States would fund the offsets, and either services to this fragile population would be cut or States would put tremendous pressure on Congress to provide alternative funding to make up their loss. It is likely that both would occur.

The Department is also concerned that any new formula not appear to be rewarding States with high health care costs, and rewarding States with low tax rates. In an era of emphasis on cost containment, and increasing States' fiscal responsibility, these two consequences of the proposed equity formulas seem out of place.

Other methodological concerns have to do with the proxies used for need and cost. For example, data on the number of children with congenital birth defects, the incidence and prevalence of births to substance addicted mothers, crippling childhood disease and injuries, are available. Since certain morbidities are not geographically consistent, these data could be used to provide a more specific measure of children at risk than simply using the number of children under age 21.

2

Also, simply recognizing the limitations of the Health Economics Research cost index for the maternal and child health population may not be sufficient, since it is the index used in the computations. Provider, equipment, and malpractice costs are quite different with respect to pregnant women and children than they are for the substance abusing population. The magnitude of the consequences of changing the MCH Block Grant allocation may necessitate the need to develop a new cost index or an appropriately modified cost index for the maternal and child health population.

The Department also notes that the allocation formula proposed by GAO does not take into account all of the recipients eligible under the MCH Block Grant. In Fiscal Year 1991, MCH Block Grant funds were provided to Puerto Rico, American Samoa, the Federated States of Micronesia, and the Marshall Islands. Although these are small entities, they too would be impacted by the formula changes.

Notwithstanding, the Department agrees that it is appropriate to consider whether alternative formulas for distribution of block grant funds could result in a more equitable distribution of funds, and the allocation formula developed by GAO should be viewed as one example of such alternatives. However, in considering alternatives to the current MCH Block Grant formula, it is important that revised formulations aimed at more equitable distribution do not create new inequities. Other factors in addition to the components used in the current formula and the new data elements that GAO used must be balanced; for example, special attention is needed to prevent from arbitrarily penalizing States with high quality programs and good results or rewarding States that have less comprehensive or efficient programs and poorer outcomes. Until a broader range of options has been analyzed, no change should be made to the current formula.

The Department also has a number of technical comments, ranging from the use of ordinary least squares as opposed to weighted least squares in the regressions, to some suggestions for consistent notation in the formulas. The Department would be pleased to provide detailed technical comments or a briefing on these concerns.

Major Contributors to This Report

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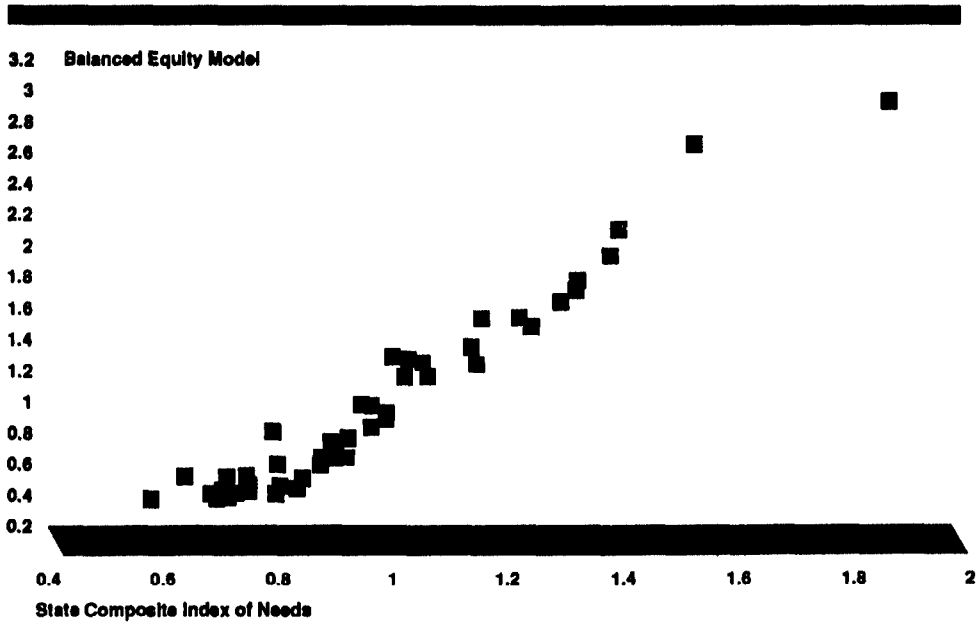
Figure 3.2: MCH Grants Under a Balanced Equity Model Compared With State Composite Index of Needs

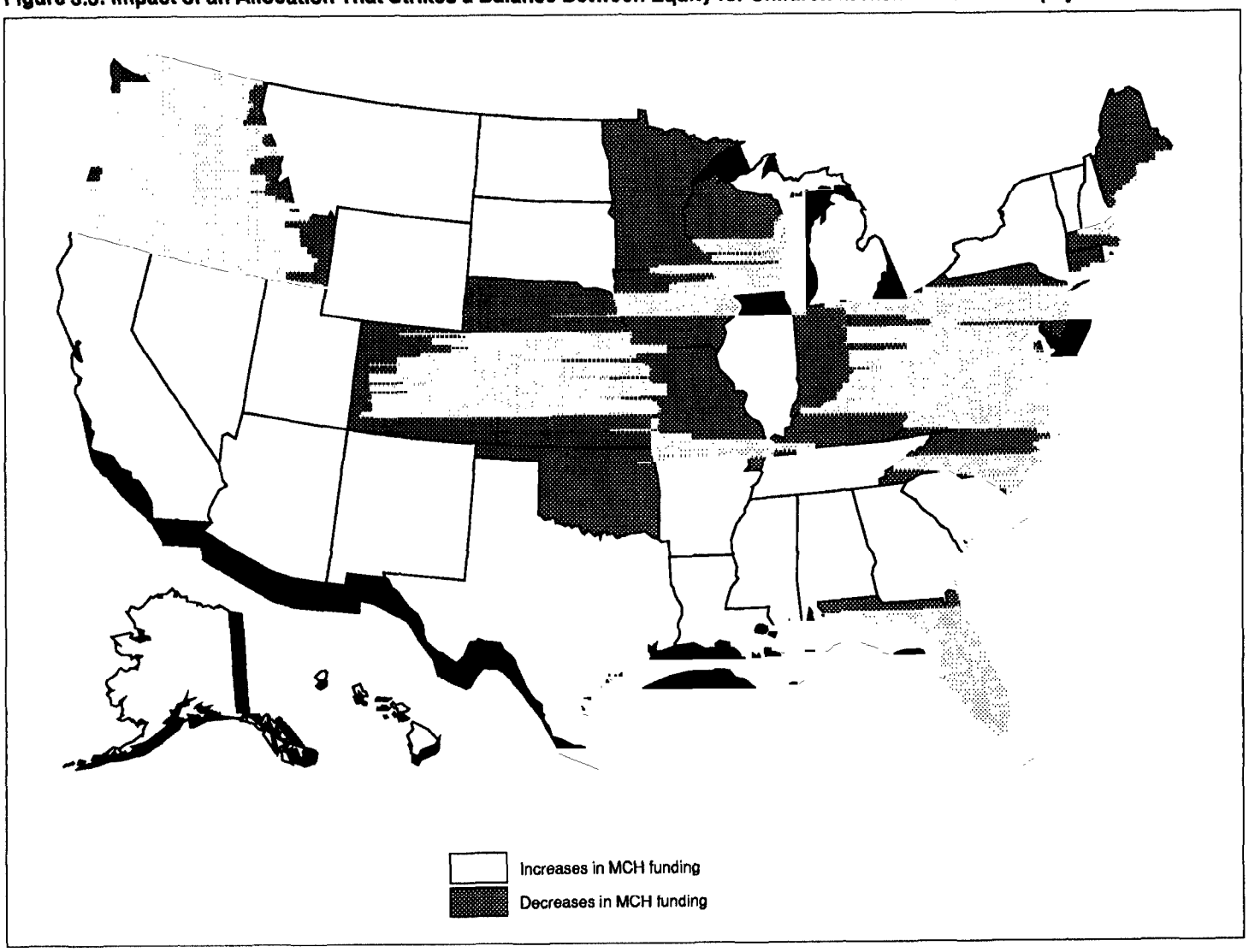


Distributional Implications of a Redesigned Formula

Any MCH formula change will cause some states' grants to be reduced so that other states with greater needs, fewer resources, or higher service costs can receive more. In our opinion, the differences between the distributions under the current formula and a balanced equity formula are moderate. A total of $80.4 million—17.7 percent of the 1990 allocation—would shift from lower to higher need states. Grants would be reduced in 25 states and increased in 26 (see fig. 3.3). The average grant reduction would be $.44 per capita and the average increase $.41 per capita. When states are ranked by percentage changes in MCH funds, grants would decline by less than 25 percent in 5 states and more than 50 percent in 4 states. Similarly, grants would increase by more than 50 percent in 8 states, and by less than 25 percent in 13 states.

The above example, however, does not attempt to calculate beneficiary equity or taxpayer equity for the U.S. insular areas, such as Puerto Rico, the U.S. Virgin Islands, and Guam. Data are not available to measure our equity standards. Our three formula alternatives used the insular areas' current percentages of total MCH appropriations. Another way to allocate MCH grants to them would be to distribute funds based each area's percentage of total U.S. population. However, the insular areas would receive 41 percent less from a population-based allocation than they receive under the current method.

Figure 3.3: Impact of an Allocation That Strikes a Balance Between Equity for Children at Risk and State Taxpayers



Summary

Allocating Maternal and Child Health Services block grants on the basis of equal funding per child at risk would be an application of a commonly accepted standard of equity for program beneficiaries. Allocating funding to equalize state taxpayer burdens is an application of equity for those who finance these programs. Currently, the MCH block grant is not distributed in accordance with either equity standard.

The MCH formula could be redesigned to improve equity for beneficiaries and state taxpayers. While both standards cannot be fully satisfied simultaneously, substantial progress on both can be made, while assuring that children at risk in all states can be served.

Recommendation

We recommend that the Congress adopt an MCH formula that improves equity for both intended beneficiaries and state taxpayers by distributing funding among the states according to three factors: the concentration of children at risk, the costs of providing health care services, and the states' ability to finance maternal and child health services from state resources. In adopting a redesigned MCH formula, the Congress will need to strike a balance between these two equity standards. GAO's weighing of these two concerns in its example of a new allocation formula demonstrates one way in which the Congress's preferences could be implemented.

Matters for Congressional Consideration

The Congress would need to determine the way in which the MCH formula would apply to grants to the U.S. insular areas. One way to implement such grants is to fund future levels by the MCH grant percentages that the areas currently receive. Another alternative would be to distribute MCH funds on the basis of each insular area's percentage of total U.S. population.

Agency Comments and Our Evaluation

HHS agreed that it is appropriate to consider alternative formulas that yield a more equitable distribution of MCH grants. However, it concluded that the current distribution method should not be changed until indicators of state need can be further improved and a broader range of formula alternatives can be considered.

We disagree. Substantial improvement can be made with currently available indicators, and our report presents alternative equity-based formulas that reflect a full range of possible alternatives.

The Department states that there are many concepts of equity and many possible indicators of need; in effect, no one formula is a better measure of equity than others. We agree that there is more than one concept of equity and there are honest disagreements about which might be the most appropriate. For this reason we did not recommend a specific formula. Rather, the Congress must decide on a particular concept of equity to guide its choice of a particular formula. Our analysis uses two generally accepted criteria of equity (beneficiary equity and taxpayer equity). These

are consistent with a wide variety of funding formulas that take into consideration children at risk, costs of services, and ability to pay. From our analysis, we conclude the current distribution of funding is inconsistent with either of the equity criteria we have used and therefore recommend Congress adopt a more generally accepted, equity-based formula. We note that the Department neither disputes the equity criteria we used nor advances alternative equity criteria that could be applied with existing data.

The Department also suggests the formula options we present appear to reward states with high health care costs and low tax rates. We disagree. The cost index we used was selected because it would avoid any incentive for states to provide services at high cost. The proxies we used to reflect the cost of office space and labor are based on what the states' private sector typically pays for these factors. Thus, federal funding would not increase if states pay more for these factors than the private sector typically pays for them. Similarly, our indicator of ability to pay is based on income produced or received by state residents. While all taxes are ultimately paid out of income, income does not determine whether a state has high or low tax rates. Thus, the formula options we present do not systematically reward or penalize states with either high or low tax rates.

The Department also expresses methodological concerns with the proxies used for at risk children and the cost of providing services. It notes that data are available that could be used to develop a more specific measure of children at risk, and that it would be desirable to develop a cost index more closely related to services provided to the maternal and child health population.

We agree that better indicators of both at-risk children and costs probably could be developed. If HHS should propose better indicators at some future time they could easily be incorporated into the formula when they become available. For our study, we reviewed the Department's 1982 study and consulted various experts, including HHS's National Center for Health Statistics. We decided to use essentially the same indicators of at-risk children as HHS used in its earlier study.

Similarly, we believe the cost index we used, though not perfect, is better than the current formula, which ignores cost differences altogether and thereby assumes all states faced the same costs.

HHS noted that the draft report does not address the means of funding U.S. insular areas, such as Puerto Rico or Guam. We agree and have revised the

relevant sections of our report to show how we factored the insular areas into our formula allocations. Generally, we allocated the insular areas the same level of funding as they currently receive, since there is no data on their needs, costs, or ability to pay.

HHS believes that other factors, in addition to the components used in the current formula, and the new data elements that we used, must be balanced. For example, special attention is needed to avoid arbitrarily penalizing states with high-quality programs and good results or rewarding states that have less comprehensive or efficient programs and poorer outcomes.

In response, the equity standards that make up our formula options include three types of factors: children at risk, cost, and ability to pay. None of these factors are systematically related to how good or how bad a state program may be or how efficient or inefficient they are. States that would receive less funding under these options do so because other states (1) have higher concentrations of children at risk, (2) must pay more for health care workers and office space, (3) have lower incomes and therefore a lesser ability to fund services from their own resources, or (4) have a combination of these factors. While HHS may be suggesting that indicators of state performance should be used to reward states with well managed and efficient programs, implementing this suggestion would require the development of indicators that reliably reflect the relative performance of individual states to serve as a criterion for providing such rewards. If the Department developed such indicators, they could be considered for incorporation into the formula. However, with the indicators of need now available, we believe the equity with which MCH funds are being distributed could be improved by implementing one or a combination of the formula options described in our report.

A copy of HHS's comments appears in appendix VI.

Providing a Transition to a New MCH Formula

The adoption of a more equitable formula for distributing Maternal and Child Health Services block grant funds could cause some states to receive fewer funds so that others with greater needs could receive more. As we stated in chapter I, current MCH grants are allocated according to prior program grant formulas, under which no state receives a lesser percentage of funds under MCH than it did under the previous programs. When a new federal aid formula is implemented, it often provides transition periods so that grant recipients have time to adjust, especially those whose grants will be reduced.

Transition Alternatives

The Congress may wish to consider two approaches for making the transition to a more equitable MCH formula.[1] Either would help offset extreme funding shifts as grants to states are redistributed. One method would phase out the existing "hold-harmless" amount. Under this method, however, some states would see reductions in MCH funding. Another method would phase in a redesigned formula without reducing any state's funding. This method, however, would require that the MCH appropriation be increased. The length of the transition period and how quickly to proceed under either approach would need to be determined.

The rationale for a phased transition to a new allocation system is that it helps to avoid dramatic disruptions in state funding, especially for states facing significant reductions. The 1982 HHS study identified funding stability and a deliberate transition period as principals to be incorporated into a new formula. The study stated that a new formula should allow for predictability and stability. This would allow states to develop long-range planning and program commitments as well as avoid major disruptions to existing state services.

Phasing in All States by Reducing Hold-Harmless

Under the first transition alternative, the overall MCH appropriation would remain at its current level, while the portion of MCH funds distributed to the states under the existing method would be reduced. Under this method, some states would receive less than under the current distribution, with those funds going to states with greater needs. For example, Minnesota would experience a substantial reduction in MCH funding—from $8.3 million to $3.3 million, or about 60 percent.

[1]We use the balanced equity formula for purpose of contrasting these approaches. For a further discussion of this formula redesign, see ch. 3 and app. IV.

Our example of this transition option reduces the existing allocation method in amounts of $50 million, starting at $400 million and falling to zero. The remainder of MCH funds then would be distributed by the new formula. Table 4.1 illustrates the effects of phasing out the current distribution method on equitably redistributing MCH funds to states. One way to implement this transition would be to replace the portion of MCH dollars now allocated to states by their shares of low-income children (see app. I) with a new formula, increasing the portion allocated by the new formula in future years.

Table 4.1: Effects of MCH Formula Phase-In With Hold-Harmless Reductions

Hold-harmless amount (millions)	No. of states on formula[a]	Percent redistributed
$400	26	2.93%
350	26	4.85
300	26	6.77
250	27	8.68
200	28	10.56
150	28	12.40
100	28	14.23
50	29	16.02
0	51	17.72

[a]States whose MCH grants are calculated entirely by the allocation formula. Figures include the District of Columbia.

To fund all states equitably, as table 4.1 illustrates, the current distribution method would have to be completely eliminated. Even reducing the hold-harmless level to $50 million still limits the equitable distribution of MCH grants. At this level, 22 states would receive more funds because of the hold-harmless. As a result, 1.7 percent or $7.7 million, of the fiscal year 1990 allocation to states would not be distributed according to our equity standards.

Phasing in All States by Increasing Funds

Another method of bringing all states under a redesigned formula is to increase total MCH federal funding levels to the point where all states receive their equitable share of MCH funding without any state receiving less than its present grant amount (see table 4.2). However, to do this all states would receive additional funding, with greater shares allocated to states ranking higher on equity grounds. The total MCH funding level would have to rise significantly from its 1990 level of $553.6 million to almost $1.6 billion—289 percent more than the 1990 allocation.

An alternative to these two options would be to reduce the hold-harmless amount, while correspondingly raising MCH allocations. However, because the hold-harmless maintains an artificially high funding level for some states, an equitable reallocation is still difficult to achieve. Reducing the hold-harmless to $50 million still requires an increase in the MCH allocation to almost $1.3 billion.

Table 4.2: MCH Formula Phase-In With Fixed Hold-Harmless

Dollars in millions

Funding level amount	Percent increase	No. of states on formula[a]
$568.6	2.7%	14
668.6	21.1	27
768.6	39.6	31
868.6	58.2	38
968.6	76.7	41
1,068.6	95.3	46
1,168.6	113.8	47
1,268.6	132.3	48
1,368.6	150.9	49
1,468.6	169.4	50
1,568.6	188.0	51

[a]States whose MCH grants are calculated entirely by the allocation formula. Figures include the District of Columbia

Matters for Congressional Consideration

A redesigned MCH formula would mean changes for the states, both in the standards for receiving MCH funding and in the amounts received. The Congress would need to determine the rate and the way in which those changes would be implemented. Central to this issue would be a choice between holding MCH allocations at the current level or raising them so that no state experienced a reduction in its present level of funding.

Agency Comments and Our Evaluation

HHS notes that its 1982 study of the formula recommended no change be made to the formula. It cited disagreements over the concept of equity and the fact that " . . .from one-fifth to one-half of the states would stand to lose funding under any of these more #equitable' formulas." HHS goes on to say that states are now " . . . in dire financial situations . . ." and that "(t)he Department does not see how the #losing' states would fund the offsets . . ."

A number of states could receive less federal funding under a new formula. This point, however, is not so much an argument against changing the formula as it is a statement of concern that a formula change should be implemented carefully. Our report suggests various approaches for implementing a new formula that would guard against making large disruptive changes. These transition alternatives range from protecting states from any funding reductions at all coupled with an increase in federal funding, to phasing in a new formula over a period of several years to guard against making large disruptive changes if federal funding is not increased. We therefore included the above matter for Congressional consideration to emphasize the need for the Congress to consider the potential for programmatic disruptions a formula change could cause.

A copy of HHS's comments appears in appendix VI.

Indicators Used to Measure Children at Risk

As defined in this report, an equitable distribution of the Maternal and Child Health Services block grant would allocate funds based, in part, on comparative populations of children at risk. However, there is no single measure of this population, which comprises expectant mothers, infants, and children with special health care needs. We developed an overall estimate of the at-risk population by drawing on congressional intent, as set forth in the Omnibus Budget Reconciliation Act (OBRA) of 1981 (P.L. 97-35), as amended, and on a congressionally mandated study of equitable block grant formulas conducted by the Department of Health and Human Services.[1]

Background

When the Maternal and Child Health block grant was created by OBRA of 1981, MCH grants were allocated among states based on their proportionate share of funding received under the prior categorical programs, as we described in chapter 1. To arrive at a more equitable allocation of funding, OBRA mandated that the HHS Secretary identify an alternative apportionment formula. Under the mandate, HHS was to consider such statistical indicators as (1) the populations of the states, (2) the numbers of live births, (3) the number of children with special health care needs, (4) the number of low-income mothers and children, as well as (5) such factors as the Secretary deemed appropriate.

In 1982, the Secretary suggested three possible allocation formulas to the Congress. Each of these alternatives used statistical indicators regarded by the HHS panel as the best available measures of the needs of expectant mothers, infants, or children with special health care needs. We used indicators similar to those identified in the 1982 study for this report. How we developed them and why we reject certain others are described in this appendix.

Low Birthweight, Poverty Status Reflect Mothers and Infants in Need

Our analysis uses two statistical indicators—the number of low-weight births and the number of children living at or below poverty in states—to reflect the populations of expectant mothers and infants-in-need. Health professionals consider the percentage of low-birthweight babies—infants of 2,500 grams or less (5.5 lbs. or less)—to be the best indicator of the health care needs of mothers and infants. The 1982 HHS study reached its

[1]HHS, Report to the Congress on the Study of Equitable Formulas for the Allocation of Block Grant Funds for Preventive Health and Health Services, Alcohol and Drug Abuse and Mental Health Services, Maternal and Child Health Services, Sept. 1982.

conclusion based on the views of the study's advisory panel of program experts and state health officials. The study also concluded that low birthweight rate is a more meaningful indicator of child health problems than either infant mortality rates or the total number of live births. For our indicator of at-risk mothers and infants, we chose the number of low-weight births in each state divided by the number of low-weight births nationally, rather than infant mortality or live births. Our source for current state numbers of low birthweight is the HHS National Center for Health Statistics, which provided the number of low-birthweight infants in 1988.[2]

The 1982 HHS study also identified children under 18 years old living at or below the poverty level as an indicator of the needs of mothers and infants. HHS chose this indicator on the grounds that, other things being equal, poor children are less likely to be served because their parents lack the resources to pay for needed services. Additionally, OBRA of 1989 amended MCH legislation to require funds in excess of the fiscal year 1983 funding level be distributed on the basis of state shares of low-income children.[3] We used the Census Bureau's 1980 decennial data on income and poverty status to identify state shares of children under 18 years of age living at or below the poverty level.

Children With Special Health Care Needs Assumed Proportional to Number of Children Under 21

The final component of our estimate of children at risk is children with special health care needs. When HHS undertook its study in 1982, state-level data on children with special health care needs were unavailable. This was still the case in 1991. Since we depended on secondary data bases for our work, we accepted HHS's assumption that the national distribution of children under 21 is the best predictor of the distribution of children with special health care needs. For these figures, we used annual estimates on child populations, by state, from the Census Bureau.[4]

[2]HHS, National Center for Health Statistics, Monthly Vital Statistics Report, Vol. 39, No. 4 Supplement, Aug. 15, 1990,

[3]See P.L. 101-239, sec. 6502(a)(4)(B), 103 stat. 2275. The amount provided to states in fiscal year 1983 was $422,050,000.

[4]Bureau of the Census, Current Population Reports: State Population and Household Estimates, Ser. P-25, No. 1058, July 1, 1989.

Indicators of At-Risk Children Weighted to Approximate Proportion of Program Funds

Our three statistical indicators are weighted to best reflect the approximate share of program funding devoted to expectant mothers and infants, children in poverty, and children with special health care needs. Thus, we weighted states' share of low-weight births and their share of children under 18 living in poverty one-third each, giving a two-thirds weight to the needs of low-income mothers, infants, and children. To reflect the needs of children with special health care needs, we gave a one-third weight to the population under 21 years of age. According to the MCH Bureau, approximately two-thirds of program funding is devoted to mothers and infants and one-third to children with special health care needs.

We constructed an index of children at risk based on an equally weighted composite of these three indicators. Indexes for each indicator—low birthweight, children in poverty, and children under 21—were computed by dividing the state share of each indicator by the state share of total U.S. population (see table I.1).

Table I.1: Indexes of Children at Risk by State

State	Low birthweight	Children living poverty	Children under 21	Children-at-risk index
Alabama	1.084	1.508	1.043	1.212
Alaska	0.971	0.660	1.192	0.941
Arizona	1.054	0.808	1.057	0.973
Arkansas	1.094	1.564	1.042	1.233
California	1.010	0.796	1.017	0.941
Colorado	1.157	0.698	1.008	0.954
Connecticut	0.917	0.759	0.915	0.864
Delaware	1.042	0.888	0.973	0.968
D.C.	2.288	1.544	0.893	1.575
Florida	1.022	0.788	0.879	0.896
Georgia	1.262	1.310	1.081	1.217
Hawaii	1.081	0.752	1.009	0.947
Idaho	0.731	1.068	1.145	0.981
Illinois	1.085	1.038	0.990	1.038
Indiana	0.880	0.837	1.016	0.911
Iowa	0.669	0.695	0.970	0.778
Kansas	0.868	0.678	1.012	0.853
Kentucky	0.842	1.611	1.014	1.156
Louisiana	1.361	1.778	1.112	1.417
Maine	0.624	0.973	0.975	0.857
Maryland	1.199	0.745	0.964	0.969

(continued)

State	Low birthweight	Children living poverty	Children under 21	Children-at-risk index
Massachusetts	0.820	0.840	0.896	0.852
Michigan	1.008	1.012	1.026	1.015
Minnesota	0.700	0.682	1.001	0.794
Mississippi	1.283	2.365	1.132	1.594
Missouri	0.928	0.960	0.980	0.956
Montana	0.792	0.984	1.033	0.936
Nebraska	0.751	0.768	1.015	0.845
Nevada	1.121	0.459	0.953	0.844
New Hampshire	0.693	0.505	0.987	0.728
New Jersey	0.982	0.899	0.924	0.935
New Mexico	1.170	1.457	1.130	1.252
New York	1.112	1.219	0.944	1.092
North Carolina	1.092	1.114	0.986	1.064
North Dakota	0.674	1.023	1.042	0.913
Ohio	0.926	0.940	1.002	0.956
Oklahoma	0.882	1.004	1.026	0.971
Oregon	0.683	0.766	0.954	0.801
Pennsylvania	0.870	0.895	0.922	0.896
Rhode Island	0.785	0.810	0.913	0.836
South Carolina	1.289	1.307	1.058	1.218
South Dakota	0.671	1.310	1.049	1.010
Tennessee	1.031	1.372	0.991	1.132
Texas	1.119	1.166	1.115	1.133
Utah	1.100	0.837	1.388	1.108
Vermont	0.657	0.804	0.986	0.816
Virginia	0.985	0.817	0.961	0.921
Washington	0.733	0.682	0.988	0.801
West Virginia	0.686	1.306	0.978	0.990
Wisconsin	0.727	0.729	0.998	0.818
Wyoming	0.973	0.564	1.094	0.877
U.S. average	**1.000**	**1.000**	**1.000**	**1.000**

Indicators Used to Measure Costs of Providing MCH Services

As defined in this report, an equitable distribution of Maternal and Child Health Services block grants would allocate funds so that states would be able to purchase "comparable" services per child at risk. Ideally, such a distribution would adjust for the fact that states faced with higher unit costs for health services need more dollars in federal assistance to purchase the same services as states in which unit costs are lower. This appendix describes our approach to estimating these costs.

Choosing a Cost Index for MCH Services

The unit cost of services depends on a variety of factors that include (1) the array of services that are eligible for financing under the block grant; (2) the cost of inputs (such as personnel, office space, materials, and supplies) used to provide services; (3) the productivity of personnel; and (4) the efficiency of program management.

Using a cost factor that reflects all these determinants, including management efficiency, in an allocation formula would introduce some "undesirable incentives" into the program. An undesirable incentive is a factor that can be directly influenced by the grantees. For example, a state that efficiently manages its program will be able to provide the same quality of care with lower unit costs than a state with less efficient management. In this case, using information on actual per unit costs could reward inefficient states by providing more assistance in keeping with their high, yet uncontrolled, costs.

A common approach used to minimize such problems is to use the average cost of a common set of goods and services to identify service costs. A "typical" basket of inputs (for example, personnel, office space, and supplies) is used to measure cost differences that are the result of factors beyond the direct influence of grantees. Thereafter, total costs are computed by weighting the price of each input according to its share of total spending on services included initially. This approach avoids introducing some of the undesirable incentives into an allocation formula by using factors that are not directly influenced by the behavior of grantees.

Currently, no such measure exists that estimates the costs of specific MCH-related services. Developing one would be costly and time-consuming. For example, surveys would have to be carried out to define the "typical" basket of MCH services eligible for financing under the block grant. A consensus would have to be reached on the level of detail to be included in

such an indicator. Finally, a data collection system would have to be developed to provide the data necessary to compute the cost index.

Still, not taking cost differences into account when designing an equity-based formula would be to predicate it on the false assumption that all states face the same cost of providing MCH services. Therefore, we used a simplified cost index recently developed by Health Economics Research, Incorporated (HER).[1] While this index is crude, it allows us to recognize that costs do differ among states. And it avoids introducing undesirable incentives, as an index based on actual costs would do.

Proxy Used to Measure Costs of Health Care Services

The HER index was developed as part of a study originally designed to calculate health service costs for the Alcohol, Drug Abuse, and Mental Health Block Grant (ADMS). The index measured the cost of a fixed "market basket" of health services (weighted in proportion to estimates of each service's contributions to total health service costs) within each state. Thereafter, HER used these estimates to approximate the average costs of providing the same level of services across all 50 states. Our use of the HER cost index was reviewed by outside experts in public health and maternal and child health care. They did not object to using this cost index as a plausible proxy to measure maternal and child health service costs across states.

Three general factors make up the HER cost index: (1) labor, (2) office space, and (3) drugs and miscellaneous medical supplies. Since precise costs estimates for these factors were unavailable, HER used statistical indicators as acceptable substitutions. A cost index for each state is calculated on a weighted averages of the three indicators, divided by the state's share of population to the U.S. total. The weights were estimates of each indicator's proportion of total health care services costs. Estimates were based on a previous analysis of physicians' costs using 1987 American Medical Association data.[2]

[1]Pope, Gregory C., Adjusting the Alcohol, Drug Abuse, and Mental Health Services Block Grant Allocations for Poverty Population and Cost-of-Service, Health Economics Research, Inc., Mar. 30, 1990.

[2]Welch, W. Pete, Stephen Zuckerman, and Gregory Pope, The Geographic Medicare Economic Index: Alternative Approaches. Final Report to the Health Care Financing Administration under grant #18-C-98326/1-01, 17-C-98758/3-01, and 17-C-98758/1-03, June 1989.

Labor Indicator

The labor indicator represents both physicians' and health service employees' income and wages, which account for 75 percent of overall costs. HER used median hourly earnings of all nonmanufacturing workers in each state from the 1980 decennial Census of Population and Housing. The Census collects income and occupation information from a 20-percent sample of the U.S. population.

Office Space Indicator

Commercial office space costs were estimated in the HER index by the use of a substitute indicator. The HER study estimated commercial office space by substituting residential rental data in place of commercial leasing data. This plausible substitution was made because no comprehensive data on commercial office rents is currently available. The HER study assumes that residential costs can be substituted for commercial costs because the factors that affect real estate values should affect both equally. HER uses apartment rental information collected by the Department of Housing and Urban Development. Office space costs is considered 15 percent of the overall cost index.

Indicator for Supplies, Drugs, and Miscellaneous

This indicator represents medical supplies, equipment, and miscellaneous costs. The study assumes that these supplies and equipment can be acquired on national markets at prices that do not vary from state to state. This indicator is given a weight of 10 percent in the overall index.

Table II.1: Cost of Service Indexes by State

State	Labor index	Office space index	Overall cost index
Alabama	0.892	0.695	0.873
Alaska	1.636	1.304	1.522
Arizona	0.994	1.044	1.002
Arkansas	0.817	0.679	0.815
California	1.119	1.396	1.149
Colorado	1.030	0.980	1.019
Connecticut	1.042	1.278	1.073
Delaware	0.985	1.074	1.000
D.C.	1.240	1.374	1.236
Florida	0.905	0.944	0.921
Georgia	0.905	0.838	0.904
Hawaii	1.043	1.268	1.072
Idaho	0.918	0.882	0.921
Illinois	1.113	1.072	1.095
Indiana	0.926	0.798	0.914
Iowa	0.874	0.806	0.876
Kansas	0.853	0.756	0.853
Kentucky	0.899	0.707	0.880
Louisiana	0.989	0.820	0.965
Maine	0.813	0.936	0.850
Maryland	1.029	1.000	1.021
Massachusetts	1.022	1.384	1.074
Michigan	1.063	0.941	1.038
Minnesota	0.971	0.939	0.969
Mississippi	0.815	0.681	0.814
Missouri	0.957	0.816	0.940
Montana	0.940	0.847	0.932
Nebraska	0.874	0.761	0.870
Nevada	1.072	1.264	1.094
New Hampshire	0.867	1.170	0.926
New Jersey	1.114	1.324	1.134
New Mexico	0.954	0.867	0.945
New York	1.102	1.318	1.124
North Carolina	0.849	0.763	0.851
North Dakota	0.869	0.786	0.869
Ohio	0.984	0.807	0.959
Oklahoma	0.916	0.800	0.907
Oregon	1.038	1.001	1.029
Pennsylvania	1.005	0.932	0.994
Rhode Island	0.957	1.058	0.976
South Carolina	0.846	0.714	0.841

(continued)

State	Labor index	Office space index	Overall cost index
South Dakota	0.745	0.715	0.766
Tennessee	0.883	0.772	0.878
Texas	0.958	0.808	0.940
Utah	1.009	0.917	0.994
Vermont	0.800	0.965	0.845
Virginia	0.892	0.835	0.894
Washington	1.111	0.960	1.077
West Virginia	1.000	0.775	0.967
Wisconsin	0.927	0.834	0.920
Wyoming	1.114	0.824	1.059
U.S. average	**1.000**	**1.000**	**1.000**

Source: Health Economics Research, Inc.

Inherent Limitations of Cost Index

The HER study contains certain limitations for representing the costs incurred in the delivery of maternal and child services. Because the study originally was designed to estimate service costs for alcohol, drug abuse, and mental health programs, these assumptions may not accurately reflect the extent of conditions in providing MCH services. For example, malpractice insurance costs, equipment, and supply expenses under ADMS programs may differ from average MCH costs. An equity-based formula should give consideration to such cost differences, and we are satisfied that this index is the best available.

Indicators Used to Measure Taxpayer Ability to Pay

State taxpayer equity is one of two standards we used to evaluate the current allocation of federal MCH funding. For our analysis, taxpayer equity is defined as a distribution of federal funds such that states are able to finance the national average level of MCH services with average taxpayer burdens. The average taxpayer burden is the relative ability of states to finance public services from their own resources.

To apply this standard to the MCH formula, we first needed to estimate each state's ability to finance public services, or its fiscal capacity. A number of options for measuring fiscal capacity are available. The simplest measure, commonly found in grant programs that distribute aid to states and localities, is Per Capita Personal Income (PCPI). A second measure is Total Taxable Resources, developed by the U.S. Department of the Treasury. A third measure, developed by the U.S. Advisory Commission on Intergovernmental Relations, is the Representative Tax System (RTS). The purpose of this appendix is to explain our rationale for choosing TTR to estimate fiscal capacity for the purposes of this report.

Measuring Fiscal Capacity

All indicators of state fiscal capacity make an effort to measure the relative ability of states (together with their local governments) to finance public services from their own resources. Expert consensus is that a measure of fiscal capacity should have these qualities:

- Comprehensiveness. A fiscal capacity indicator should measure the total ability of a state to finance public services. This implies that it should measure all types of potential resources.
- Reflect tax exporting. To be comprehensive, a fiscal capacity measure should take into account the phenomenon of tax exporting. Tax exporting arises when nonresidents pay taxes to a state.
- Measure available, not actual use of fiscal resources. A fiscal capacity measure should reflect inherent ability to finance public services. It should not be affected by an individual state's actual fiscal decisions.

Income-Based and Revenue-Based Approaches

In recent years, public finance specialists have developed two approaches for measuring fiscal capacity. One estimates the ability of a state to raise revenue by gauging its taxing capacity against an average or typical revenue system.[1] A second estimates the ability of taxpayers to pay taxes according to estimates of economic income, broadly defined.[2] Revenue-based approaches would be used to equalize government capacities to raise revenues, while income-based approaches would be used to equalize taxpayer burdens.

Between these notions of equalization, the income-based approach was well suited to our reporting objective of assessing the extent to which the current allocation of MCH funding accords equity to state taxpayers. Since the revenue-based approach focuses on the capacity of governments to raise revenue, rather than on taxpayers' ability to pay taxes, we eliminated this approach from consideration.

Total Taxable Resources Better Measure of Fiscal Capacity Than Per Capita Personal Income

Per Capita Personal Income, an income-based indicator, is the fiscal capacity measure most commonly used in federal grant formulas. As defined and compiled by the Department of Commerce, PCPI is intended to measure the income received by state residents, including wages and salaries, rents, dividends, interest earnings, and income from nonresident corporate business. It also includes an adjustment for the rental value of owner-occupied housing on the ground that such ownership is analogous to the interest income earned from alternative financial investments.

Nevertheless, PCPI is a relatively poor choice for measuring fiscal capacity primarily because it does not comprehensively measure income. In

[1]The well-known version of this revenue-based approach to measuring fiscal capacity is the RTS. RTS measures fiscal capacity by estimating the tax yields that would result if a standard set of tax base definitions and tax rates were applied in every state. The 27 taxes included in ACIR's system represent all state and local taxes commonly used in the United States. RTS does not seek to establish an "ideal" tax structure. Instead, it relies on revenue sources that are currently taxed. From these, national average rates are applied to calculate the tax revenues that hypothetically could be raised from existing bases. By applying national averages, RTS does not reflect a state's actual tax policy when estimating its fiscal capacity. However, by tying a state's measured fiscal capacity to its tax base, RTS estimates do reflect differences in public and private consumption within states.

[2]Income-based measures of fiscal capacity draw on economic theory to provide a comprehensive definition of income (total consumption plus the change in net worth) to reflect the total purchasing power of state residents. Because total purchasing power is measured by income, determinations of fiscal capacity based on this approach are made without regard to actual state or local tax policies or practices. A comprehensive fiscal capacity measure also should include the capacity to collect taxes from nonresidents. Within an income-based framework, this is achieved by including the income of nonresidents whom states have the ability to tax (corporate income, for example).

particular, PCPI fails to capture income that is produced in the state, but not realized (such as, corporate retained earnings and unrealized capital gains). Furthermore, PCPI ignores tax exporting. The income of nonresidents received from activities within a state is considered relevant to a state's fiscal capacity because taxation of such income (for example, through retail sales, other excise taxes, or corporate income taxes) reduces the burdens on resident taxpayers. On both grounds, PCPI is a relatively poor indicator of fiscal capacity.

Like PCPI, TTR measures a state's fiscal capacity through its income. TTR, as defined and compiled by the Department of Treasury, is an average of PCPI and per capita Gross State Product (GSP). GSP measures all income produced within a state, whether received by residents, nonresidents, or retained by business corporations. Consequently, it reflects the income received by out-of-state commuters, landlords, and business owners operating in a state as well as income produced in-state received by residents. GSP also includes indirect business taxes, such as retail sales and excise taxes, which are excluded from PCPI. It includes these taxes without regard to whether they are paid out of income received by residents or nonresidents.

By averaging GSP with PCPI, the TTR measure covers more types of income than PCPI alone, including income received by nonresidents. Thus, TTR is a better overall measure of fiscal capacity because it is a more comprehensive indicator of economic income and addresses tax exporting. TTR has the added feature of technical and political feasibility, as it is currently in use as a measure of fiscal capacity in the Alcohol and Drug Abuse and Mental Health Services block grant formula.

Description of Equity-Based Allocation Formulas

We used two different standards to design formula options that improve MCH funding equity. The first is funding an equal share of the national average MCH benefit level in each state—funding equity for beneficiaries. The second is equalizing the burden on state taxpayers of funding the state share of the national average level of MCH benefits—funding equity for state taxpayers. The first standard requires that state differences in the cost of MCH services and differences in the number of at-risk children be reflected in the allocation formula. The second standard requires that the federal government fund a higher share of the national average benefit level in states with a lesser ability to finance program services. In this appendix we describe the allocation formulas we designed to maximize funding equity based on these standards.

Funding Equity for Beneficiaries

Funding an equal share of MCH benefits results in a grant that finances comparable MCH benefits per child at risk in each state. To implement this equity standard, we first define the national average level of MCH benefits per capita. Because the average is applied equally to all states, it has no influence on the funding any particular state will receive. Rather, the average establishes a benchmark that can be used to estimate states' expenditure needs—the dollar outlays necessary to finance the national average per capita benefit level. With this consideration in mind, we chose the simplest approach by using the national average level of per capita spending for MCH services financed from federal, state, and local sources.

A state's MCH expenditure needs then can be computed by multiplying per capita benefits level by the state population. The result represents the dollar outlays needed to finance the national average benefit level. However, this calculation does not reflect state differences in concentrations of children at risk or differences in the cost of providing MCH services. To account for these differences, we adjusted the national average benefit level by each state's concentration of children at risk and service costs.[1] Making these adjustments, each state's expenditure need can be calculated using the following formula:

[1]To make these adjustments we used the state index of children at risk, described in app. I and the cost of services index, described in app. II.

Equation IV.1

Expenditure need $= Pnc\bar{e}$, where

P = state population,
n = state index of at-risk children,
c = state index of MCH service costs, and
$\bar{e}$ = national average benefit level[2]

Funding equity for at-risk children is achieved by providing a federal grant that represents the same percentage of each state's expenditure needs. We call this formula the beneficiary equity formula (see table IV.1). The apportionment formula for allocating grants based on this standard is:

Equation IV.2

Grant[3] = (federal share) * (expenditure needs), where

federal share = national average percentage of total MCH spending financed by federal MCH grants[4]

expenditure need $= Pnc\bar{e}$

Data on federal, state, and local MCH spending—needed to measure and the average federal share of expenditures—are available from the Public Health Foundation. The most recent year for which data are available is fiscal year 1987, when national average per capita spending was $5.40, and the average federal share of MCH spending was 31 percent of total funding from federal, state, and local sources.

[2]The average benefit level is made operational by using average per capita spending by federal, state and local governments for MCH services. This allows expenditure needs to be expressed in dollar terms.

[3]Grant funding distributed in all formula in this appendix are based on the share of actual federal funds available to states, since the sum for all states' federal share of expenditure needs might be greater or less than actual federal funding available.

[4]As expressed here, the federal share determines the size of each state's grant, which when summed across states yields the total level of federal grant funding. More realistically, one could think of the federal share being determined by the amount of funding appropriated for the program and the amount of MCH funding provided by state and local governments.

Table IV.1 compares actual MCH funding for fiscal year 1990 with the funding states would have received had MCH funding been allocated according to the beneficiary equity standard.

Table IV.1: Comparison Between the 1990 MCH Grant and the Beneficiary Equity Model

Dollars in thousands

State	1990 MCH allocation	Beneficiary equity allocation	Difference	Percent difference
Alabama	$10,407	$7,998	$(2,409)	(23.1%)
Alaska	950	1,386	436	45.9
Arizona	4,903	6,365	1,462	29.8
Arkansas	6,236	4,440	(1,796)	(28.8)
California	28,775	57,692	28,917	100.5
Colorado	6,360	5,923	(438)	(6.9)
Connecticut	4,250	5,512	1,262	29.7
Delaware	1,833	1,196	(637)	(34.8)
D.C.	6,863	2,159	(4,704)	(68.5)
Florida	14,376	19,209	4,833	33.6
Georgia	13,925	13,007	(918)	(6.6)
Hawaii	2,000	2,073	73	3.7
Idaho	2,877	1,683	(1,194)	(41.5)
Illinois	18,971	24,322	5,351	28.2
Indiana	10,624	8,553	(2,071)	(19.5)
Iowa	6,108	3,553	(2,555)	(41.8)
Kansas	4,150	3,356	(794)	(19.1)
Kentucky	10,227	6,960	(3,267)	(31.9)
Louisiana	11,339	11,003	(337)	(3.0)
Maine	3,200	1,635	(1,565)	(48.9)
Maryland	11,090	8,529	(2,561)	(23.1)
Massachusetts	10,429	9,933	(496)	(4.8)
Michigan	16,737	17,947	1,210	7.2
Minnesota	8,305	6,151	(2,154)	(25.9)
Mississippi	8,639	6,243	(2,396)	(27.7)
Missouri	10,914	8,514	(2,400)	(22.0)
Montana	2,118	1,291	(826)	(39.0)
Nebraska	3,684	2,174	(1,510)	(41.0)
Nevada	1,137	1,885	747	65.7
New Hampshire	1,859	1,371	(488)	(26.2)
New Jersey	10,509	15,065	4,556	43.4
New Mexico	3,429	3,321	(108)	(3.1)
New York	35,223	40,451	5,228	14.8

(continued)

Dollars in thousands

State	1990 MCH allocation	Beneficiary equity allocation	Difference	Percent difference
North Carolina	14,644	10,926	(3,718)	(25.4)
North Dakota	1,704	961	(742)	(43.6)
Ohio	19,574	18,367	(1,207)	(6.2)
Oklahoma	6,047	5,213	(835)	(13.8)
Oregon	5,311	4,268	(1,042)	(19.6)
Pennsylvania	21,823	19,681	(2,142)	(9.8)
Rhode Island	1,477	1,495	19	1.3
South Carolina	10,289	6,606	(3,683)	(35.8)
South Dakota	2,079	1,016	(1,064)	(51.1)
Tennessee	10,250	9,012	(1,238)	(12.1)
Texas	25,268	33,233	7,966	31.5
Utah	5,503	3,453	(2,050)	(37.2)
Vermont	1,608	718	(890)	(55.4)
Virginia	11,132	9,218	(1,914)	(17.2)
Washington	7,430	7,543	113	1.5
West Virginia	5,868	3,264	(2,605)	(44.4)
Wisconsin	9,848	6,726	(3,122)	(31.7)
Wyoming	1,111	810	(301)	(27.1)
United States	**$453,411**	**$453,411**	**$0**	**00.0**

Funding Equity for State Taxpayers

To evaluate equity for state taxpayers, we asked: What effective tax rate must state taxpayers bear if they are to finance the national average benefit level? By definition, the effective tax rate is the taxes state taxpayers must pay to finance the average benefit level, expressed as a percentage of taxpayer income. In our analysis, we used Total Taxable Resources as our indicator of state taxpayer income.[5] By definition, the level of state taxes required to finance the national average benefit level is the difference between the state's expenditure needs and its federal grant. This gives rise to the following expression for a state's effective tax rate:

Equation IV.3

Effective tax rate = (expenditure needs - MCH grant)/TTR

[5]See app. III for a discussion of TTR and other indicators of states' ability to pay for MCH services.

An index of state tax rates based on the fiscal year 1990 distribution of MCH grants is shown in column 1 of table IV.2. The index is constructed to have an average value of 100, shown at the bottom of the table. This index provides a measure of state-to-state differences in tax rates required to finance an average level of MCH benefits. The fiscal year 1990 distribution of MCH grants results in a standard deviation of ±26 percent. This represents relatively wide differences in state tax rates.

Table IV.2: Index of State Tax Rates Under Current Formula and Under a Beneficiary Equity Formula (FY 1990)

State	Current formula	Beneficiary equity formula
Alabama	120.3	133.9
Alaska	92.3	83.5
Arizona	117.5	109.1
Arkansas	113.3	131.1
California	114.7	98.1
Colorado	90.9	93.2
Connecticut	74.4	69.1
Delaware	76.7	93.4
Florida	99.1	91.4
Georgia	115.2	118.0
Hawaii	101.0	99.9
Idaho	89.3	117.2
Illinois	113.8	106.0
Indiana	84.4	91.8
Iowa	56.4	74.3
Kansas	67.5	73.4
Kentucky	104.7	124.3
Louisiana	151.3	152.9
Maine	57.0	84.0
Maryland	83.6	93.0
Massachusetts	74.6	75.9
Michigan	107.7	105.3
Minnesota	66.4	75.2
Mississippi	161.1	184.9
Missouri	85.0	93.8
Montana	80.2	102.1
Nebraska	59.3	77.4
Nevada	103.6	91.4
New Hampshire	55.9	63.4
New Jersey	92.9	84.3
New Mexico	139.0	140.5

(continued)

State	Current formula	Beneficiary equity formula
New York	107.8	103.3
North Carolina	90.6	102.3
North Dakota	64.8	87.5
Ohio	93.7	95.8
Oklahoma	94.3	99.7
Oregon	86.0	93.7
Pennsylvania	90.3	93.7
Rhode Island	85.1	84.7
South Carolina	108.6	133.6
South Dakota	62.0	95.6
Tennessee	111.0	116.4
Texas	117.0	108.3
Utah	111.4	139.1
Vermont	44.4	76.1
Virginia	74.0	79.5
Washington	88.8	88.4
West Virginia	92.5	126.3
Wisconsin	67.1	79.4
Wyoming	69.3	79.1
U.S. average	**100.0**	**100.0**
Standard deviation	**±25.7**	**±23.4**

Note: The District of Columbia is not included due to tax exporting limitations (see app. III).

The index of state tax rates that would result if the distribution of MCH funding were based on the beneficiary equity model is shown in column 2. The wide variations in tax rates shows that achieving beneficiary equity does not improve equity for state taxpayers. Although distributing grants to improve beneficiary equity improves taxpayer equity for states like California and Texas (their tax rates are closer to the national average under this formula alternative), it produces greater inequities for states like Arkansas and Alabama (whose tax rates would have to exceed the national average by an even larger margin). Overall, the standard deviation in tax rates falls from ±26 percent under current law to ±23 percent under the beneficiary equity model, indicating a very modest improvement in taxpayer equity.

An apportionment formula that will equalize state taxpayer burdens can be derived by setting the expression for state taxpayer burdens in equation IV.3 equal to the national average burden and solving for the MCH grant.[6] This yields the following MCH apportionment formula:

Equation IV.4

MCH grant = [federal share] * [expenditure needs]

where expenditure needs are calculated from the expression in equation IV.1. and the federal share varies across states in accordance with their taxable resources, children at risk and service costs, computed by the following formula:

[6]The apportionment formula is derived as follows:

Equalizing effective tax rates requires the following condition be satisfied:

(1) $(Pnc\bar{e} - G)/Y = \bar{t}$, where

G = MCH grant,
Y = Total Taxable Resources (in dollars), and
$\bar{t}$ = national average tax burden

By definition, $\bar{t}$ is:

(2) $\bar{t} = \alpha * \bar{e}/\bar{y}$, where

α = the national average share of MCH benefits financed by states [that is, $(\Sigma P\bar{e} - \Sigma G)/\Sigma P\bar{e}$], and
$\bar{y}$ = the U.S. average TTR per capita

Substituting (2) into (1) and solving for G yields the following apportionment formula:

(3) $G = Pnc\bar{e} - [(\alpha * \bar{e})/\bar{y}] * Y$

Factoring $Pnc\bar{e}$ from both terms yields:

(5) $G = [Pnc\bar{e}] * [1 - \alpha(y/nc\,\bar{y})]$, where

y = state per capita TTR (that is, Y/P)

The first term represents a state's expenditure need, as defined in equation IV.1, and the second is the share of expenditure needs financed by the federal grant, referred to in equation IV.4. The federal share is one minus the average state share (α) adjusted by the state's relative per capita TTR, deflated by its concentration of children at risk (n) and unit costs (c).

Equation IV.5

Federal share $= [1 - \alpha(y/nc\,\bar{y})]$, where

α = share of MCH spending financed from state and local resources,
y = state per capita total taxable resources,
$\bar{y}$ = U.S. per capita total taxable resources,
n = state index of children at risk, and
c = state index of unit costs.

In table IV.3, actual MCH funding for fiscal year 1990 is compared with the funding states would have received had MCH funding been allocated based on this equity standard. Under this standard, four states (Connecticut, Iowa, Kansas, and New Hampshire) would receive no federal grant. These states have relatively fewer at-risk children compared to their financing capacity and cost of services and would be able to finance the national average level of MCH benefits completely from state resources with a tax rate below the national average.

Table IV.3: Comparison Between the 1990 MCH Grant and Taxpayer Equity Model

Dollars in thousands

State	1990 MCH allocation	Taxpayer equity allocation	Difference	Percent difference
Alabama	$10,407	$14,031	$3,623	34.8%
Alaska	950	592	(358)	(37.7)
Arizona	4,903	7,986	3,083	62.9
Arkansas	6,236	7,586	1,349	21.6
California	28,775	55,005	26,230	91.2
Colorado	6,360	4,711	(1,649)	(25.9)
Connecticut	4,250	0	(4,250)	(100.0)
Delaware	1,833	956	(876)	(47.8)
D.C.	6,863	4,178	(2,685)	(39.1)
Florida	14,376	14,039	(337)	(2.3)
Georgia	13,925	18,980	5,055	36.3
Hawaii	2,000	2,084	84	4.2
Idaho	2,877	2,426	(451)	(15.7)
Illinois	18,971	28,589	9,618	50.7
Indiana	10,624	6,398	(4,226)	(39.8)
Iowa	6,108	0	(6,108)	(100.0)
Kansas	4,150	0	(4,150)	(100.0)

(continued)

Dollars in thousands

State	1990 MCH allocation	Taxpayer equity allocation	Difference	Percent difference
Kentucky	10,227	11,025	799	7.8
Louisiana	11,339	22,313	10,973	96.8
Maine	3,200	730	(2,470)	(77.2)
Maryland	11,090	6,724	(4,365)	(39.4)
Massachusetts	10,429	742	(9,687)	(92.9)
Michigan	16,737	20,758	4,021	24.0
Minnesota	8,305	238	(8,067)	(97.1)
Mississippi	8,639	14,741	6,102	70.6
Missouri	10,914	6,946	(3,968)	(36.4)
Montana	2,118	1,383	(735)	(34.7)
Nebraska	3,684	325	(3,359)	(91.2)
Nevada	1,137	1,380	243	21.4
New Hampshire	1,859	0	(1,859)	(100.0)
New Jersey	10,509	6,967	(3,541)	(33.7)
New Mexico	3,429	6,172	2,743	80.0
New York	35,223	44,611	9,388	26.7
North Carolina	14,644	11,755	(2,889)	(19.7)
North Dakota	1,704	565	(1,139)	(66.8)
Ohio	19,574	16,195	(3,378)	(17.3)
Oklahoma	6,047	5,216	(831)	(13.7)
Oregon	5,311	3,464	(1,847)	(34.8)
Pennsylvania	21,823	15,997	(5,826)	(26.7)
Rhode Island	1,477	717	(760)	(51.4)
South Carolina	10,289	11,558	1,269	12.3
South Dakota	2,079	889	(1,190)	(57.2)
Tennessee	10,250	12,835	2,585	25.2
Texas	25,268	41,040	15,773	62.4
Utah	5,503	6,341	839	15.2
Vermont	1,608	60	(1,547)	(96.2)
Virginia	11,132	2,327	(8,806)	(79.1)
Washington	7,430	4,685	(2,745)	(36.9)
West Virginia	5,868	5,297	(572)	(9.7)
Wisconsin	9,848	1,664	(8,185)	(83.1)
Wyoming	1,111	189	(922)	(83.0)
United States	**$453,411**	**$453,411**	**$0**	**00.0**

Table IV.4 compares the tax rate each state would have had to impose if it were to finance the national average level of MCH benefits, given its fiscal year 1990 MCH grant amount (shown in table IV.3), with what it would have

been had grants been distributed using the taxpayer equity formula described here. This verifies that the taxpayer equity formula equalizes tax rate of all states except those that do not qualify for funding.

Table IV.4: Index of State Tax Rates Under the Current Formula and Under a Taxpayer Equity Formula (FY 1990)

State	Current formula	Taxpayer equity formula
Alabama	120.3	
Alaska	92.3	
Arizona	117.5	
Arkansas	113.3	
California	114.7	
Colorado	90.9	
Connecticut	74.4	
Delaware	76.7	
Florida	99.1	
Georgia	115.2	99.6
Hawaii	101.0	99.7
Idaho	89.3	[illegible]
Illinois	113.8	[illegible]
Indiana	84.4	[illegible]
Iowa	56.4	[illegible]
Kansas	67.5	[illegible]
Kentucky	104.7	
Louisiana	151.3	
[illegible]	57.0	
[illegible]	83.6	
[illegible]	74.6	
[illegible]	107.7	
[illegible]	66.4	
[illegible]	161.1	[illegible]
[illegible]	85.0	
[illegible]	80.2	
[illegible]	59.3	
[illegible]	103.6	
New Hampshire	55.9	
New Jersey	92.9	
New Mexico	139.0	
[illegible]	107.8	
North Carolina	90.6	
North Dakota	64.8	
[illegible]	93.7	
[illegible]	94.3	

(continued)

State	Current formula	Taxpayer equity formula
Oregon	86.0	99.6
Pennsylvania	90.3	99.6
Rhode Island	85.1	99.6
South Carolina	108.6	100.0
South Dakota	62.0	99.7
Tennessee	111.0	99.8
Texas	117.0	99.8
Utah	111.4	100.0
Vermont	44.4	99.5
Virginia	74.0	99.5
Washington	88.8	99.6
West Virginia	92.5	99.9
Wisconsin	67.1	99.5
Wyoming	69.3	99.5
U.S. average	**100.0**	**100.0**
Standard deviation	**±25.7**	**±5.4**

Note: The District of Columbia is not included due to tax exporting limitations (see app. III).