

Highlights

- Title V and State General Fund (SGF) allocations to California's Maternal, Child and Adolescent Health (MCAH) programs decreased significantly between 2000 and 2010.
- Over the same period, low birth weight rates consistently increased, while infant mortality and teen births declined.
- We estimated the association between funding and these outcomes and found that lower funding was associated with worse outcomes, *even those that have improved*.
- Associations were stronger for disadvantaged populations.

Local MCAH Funding

California receives federal funds from the Title V Maternal & Child Health Services Block Grant. A portion of these funds is allocated annually to each MCAH program in the state (58 counties and 3 city public health departments). Local MCAH programs use these funds to improve the health of women of reproductive age, pregnant mothers, infants, children, and adolescents.

Except for a small increase between 2000 and 2001, over the 2000-2010 decade state allocations to MCAH programs remained flat or decreased year over year. In particular, a significant reduction occurred in 2009, when SGF allocations were eliminated. Compared to their peak level in 2001 (\$17 million), MCAH allocations were 36% lower (\$10.9 million) in 2010. Furthermore, adjusting for inflation and the number of women of reproductive age (WRA), we estimate a 55% decrease in per-capita allocations to local MCAH programs during that decade: from \$3.1/WRA in 2001 to \$1.4/WRA in 2010 (see Figure 1).

MCAH Outcomes

Local MCAH programs conduct a variety of activities—such as outreach, case finding, referrals, and community education—in order to achieve the following goals: (1) ensure that children are born healthy to healthy mothers; (2) reduce health disparities; (3) provide a safe and healthy environment for women, children and their families; and (4) ensure them equal access to appropriate and needed care.

MCAH activities target a wide range of health outcomes. In this study, we focus on three of them: low birth weight (LBW), infant mortality (IM), and births to teenage mothers (BTM). Trends in these outcomes are shown in Figure 2. Between 2000 and 2010, the LBW rate in California increased by 8%, from 4.8 to 5.2 LBW babies per 100 singleton births. Changes in the LBW rate largely mirrored changes in funding, with the steepest increase occurring after the elimination of SGF allocations in 2009. In contrast, both infant mortality and teen birth rates consistently decreased over the same period, with reductions of 16% and 28%, respectively.

Figure 1. Allocations to Local MCAH Programs, California, 2000-2010 (Dollars/Woman of Reproductive Age)

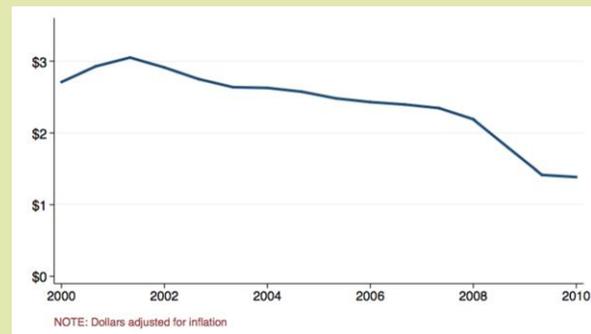
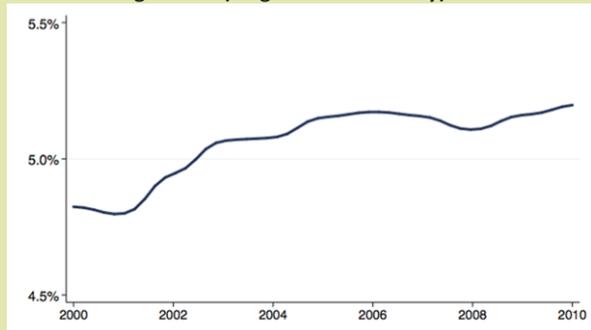
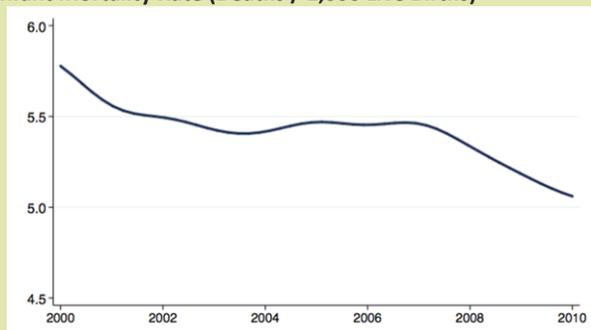


Figure 2. Selected MCAH Outcomes, California, 2000-2010

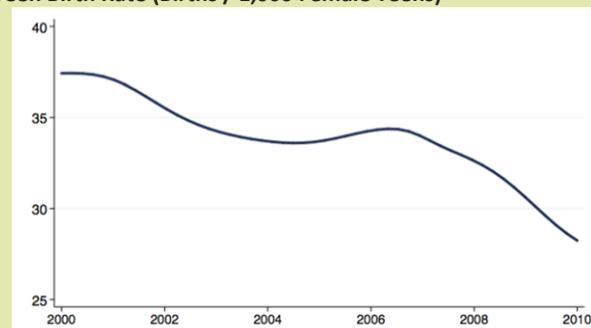
A. Low Birth Weight Rate (Singleton Births Only)



B. Infant Mortality Rate (Deaths / 1,000 Live Births)



C. Teen Birth Rate (Births / 1,000 Female Teens)





Relationship Between Changes in MCAH Allocations and Health Outcomes

The trends shown in Figures 1 and 2 do not necessarily imply that lower local MCAH funding had a negative impact only on LBW rates and not on infant mortality or teen pregnancy rates. National trends unrelated to changes in MCAH funding are likely to affect these outcomes; for example, between 2000 and 2010, the US teen birth rate decreased by 28%, which suggests that much, if not all, of the decrease in California’s BTM rate over the same period could be explained by national trends. Another possibility is that health departments may have tried to minimize the impact of lower MCAH funding by increasing their own expenditures in public health and medical services for MCAH populations.

Figures 1 and 2 conceal additional issues that may further obscure the relationship between funding and health outcomes. First, changes in both funding and outcomes have varied significantly across counties. Thus, even for outcomes that improved in the state, populations exposed to steeper funding decreases may have experienced smaller progress—or even decline—than populations exposed to lower funding reductions. Second, because MCAH activities often target disadvantaged populations, funding reductions may have had a disproportionately negative impact on these groups, which could be obscured by the improvements observed among the population as a whole.

We estimated the association between local MCAH funding and health outcomes using vital records and county-level funding data. The methodology we used to address the issues described above is briefly described in Box 1.

Findings

We found statistically significant associations between MCAH funding and each of the three outcomes, suggesting that MCAH funding reductions partially explain the recent increase in LBW rates and that IM and BTM rates could have improved even more in the absence of these reductions. In addition, these associations were stronger for populations likely to be targeted by MCAH programs, such as mothers with less than a high school education (LBW), Blacks (IM and BTM), and Hispanics (BTM). (Detailed results available upon request.)

Using the results of this analysis, we projected the potential impact of a reversal in the reductions to local MCAH funding. We estimate that restoring allocations to their 2001 levels could prevent 515 low weight births, 27 infant deaths, and 2,083 births to teen moms each year in the state, compared to 2010 (see Box 2).

Box 1. Methodology Summary

Data

Data on MCAH allocations (Title V and SGF) and all singleton births and infant deaths in California between 2000 and 2010 was provided by the California Department of Public Health. County-level public health and medical care expenditures, and population estimates, were provided by the California Department of Finance.

To allow for longitudinal statistical methods, birth and death records were collapsed to groups defined by county of residence and demographic characteristics. For example, in the analysis of LBW rates, birth data were collapsed to groups defined by the mother’s county of residence; education (less than high school, high school, some college, or college and higher); race/ethnicity (White, Black, Hispanic, Other); nativity (US- or foreign-born); and age (<20, 20-24, 25-29, 30-34, or ≥35). LBW rates were calculated at each year for all groups with births in that year.

Records were similarly collapsed for the analyses of teen births and infant mortality, but due to data limitations, these groups were only defined by county of residence and race/ethnicity.

Analysis

Each group described above was considered a panel. We estimated 3-level generalized linear mixed regression models, where health outcomes were functions of group-level characteristics and annual county-level MCAH allocations, public health expenditures, medical care expenditures, unemployment rates, and public and private insurance rates. Each regression model included random-effects for each group (2nd level) and county (3rd level), as well as year fixed-effects to capture time trends.

Because we expected to find diminishing returns to investments in MCAH programs (i.e., at some point one extra dollar in funding yields lower benefits than the previous dollar), we modeled the relationship between funding and outcomes using a log-linear model, where the response variable had a normal distribution and a logarithmic link function.

Finally, heterogeneous effects of MCAH funding were explored via interactions between funding and mother’s education (LBW) or funding and mother’s race/ethnicity (IM and BTM).

Box 2. Projected Health Outcomes in California Under Various Local MCAH Program Allocations Levels

Local MCAH Allocations	LBW Births	Infant Deaths	Births to Teen Moms
2010 Funding (\$10.9 million)	23,189	2,381	36,804
Restore 2001 Funding (\$24.3 million*)	22,674	2,354	34,721
Difference	-2.2%	-1.1%	-5.7%

* Adjusted for inflation and reproductive-age female population size