State Government Organization of Health Services, 1990-2009: Correlates and Consequences

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Objectives: To describe changes in the organizational structure of state health-related departments/agencies between 1990 and 2009; to identify factors associated with key organizational structures; and to investigate their relationship with different resource allocations across health policy areas, as represented by state budgets. **Design:** Original data collection on the organization of state health-related departments/agencies from 1990 to 2009. Analyses included descriptive statistics, logistic regression, and time-series regression modeling. **Setting and Participants:** All 50 states. **Main Outcomes Measures:** Organizational structure of state government related to health in 4 areas (Medicaid, public health, mental health, human services); coupling of Medicaid and public health in the same agency; state budget changes in health policy areas, including Medicaid, public health, and hospitals. **Results:** The housing of 2 or more health-related functions in the same unit was common, with 21 states combining public health and Medicaid at 1 or more points in time. Eighteen states (36%) reorganized their health agencies/departments during the study period. Controlling for numerous economic, social, and political factors, when the state agency responsible for public health is consolidated with Medicaid, the share of the state budget allocated to Medicaid declined significantly, while public health allocations were unchanged. However, consolidating Medicaid with other services did not impact state Medicaid spending. **Conclusions:** Government organizational structure related to health varies greatly across states and is somewhat dynamic. When Medicaid and public health functions are consolidated in the same stage agency, public health does not "lose" in terms of its share of the state budget. However, this could change as Medicaid costs continue to grow and with the implementation the Patient Protection and Affordable Care Act of 2010.

KEY WORDS: **Medicaid, organizational research, public health infrastructure, public health systems, state health departments**

State health departments and various other organizational units within state government have the important responsibility of assuring the delivery of a wide range of public health and health care services and programs.[1] There are some common core services that are provided by all states, including essential public health activities related to health protection/disease prevention and Medicaid, with federalism playing a strong role in public health financing, policy, and program options at the state and local level.[2] However, the ways in which state governments organize public health and health care services in terms of departments, divisions, and agencies vary significantly across states and within states over time.[3-5]

An example of change in state organizational structure related to health occurred in the 1990s, when

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several states consolidated their Medicaid programs with 1 or more departments or agencies devoted to some other aspect of health. In 1996, Michigan created the Department of Community Health by consolidating the Department of Public Health, the Department of Mental Health, and the Medical Services Administration (Michigan's Medicaid agency). Other states implemented similar reorganizations during the 1990s and early 21st century, including both inter- and intra-agency restructuring.

Consolidations are often precipitated by a desire to integrate services, achieve administrative efficiencies, and reduce staffing in highly constrained environments. Organizational theory suggests that consolidations involving departments of dissimilar size may facilitate operational change in the merged entity based on unequal power distribution.[6,7] The more powerful department will, in effect, be in a stronger position to exercise leverage for operational change and to preserve organizational culture and identity. In practical terms, when a smaller and a larger department are merged, the new entity might reduce the resources allocated for the programmatic initiatives of the smaller department in the merger in favor of the dominant partner.[8]

Such concerns have been raised recently about state government reorganizations that have merged Medicaid agencies and public health departments. Because public health program budgets are relatively small in comparison to state Medicaid budgets, a merger could mean a decrease in both the absolute and relative resources allocated to such important public health functions as surveillance, disease prevention and control, and public education.[9] A second concern is that Medicaid has an organizational culture with a more medicalized view of public health. If the dominant culture in a newly consolidated organization is more influenced by Medicaid, this, in turn, could lead to the disproportionate allocation of resources to health care safety net services at the expense of critical but nonclinical public health activities.[10]

Despite speculation about the influence of state government restructuring on public agendas and priorities, there is virtually no public health systems research on this topic. This includes a paucity of research on the range of ways in which states are organized around health, the actual incidence of different types of reorganization, or the impact of such reorganization on resource allocation decisions. As such, this study had 2 primary research objectives.

1. To describe variation of, changes in, and factors associated with the organizational structure of state government departments/agencies related to health between 1990 and 2009.
2. To investigate whether the state organizational structures of health agencies are associated with different resource allocations across health policy areas, as represented by state budgets.

Methods

Data

We collected primary data from all 50 states to create a descriptive history of their organizational structures related to health from 1990 to 2009. State governments are organized in a variety of ways around key administrative areas related to health, both in terms of structure (departments, divisions, bureaus, agencies, commissions, etc) and in terms of roles and functions. States often use different terms or labels to describe similar organizational units. Our focus was on how 4 key government service areas fit in the state's organizational structure at the level of a department or agency, meaning a higher-level unit for which there is budget and the director/leader reports directly to the governor. The 4 areas were as follows: Medicaid, public health, mental health, and human or social services (specifically welfare or economic assistance). We included human/social services because state Medicaid programs and/or mental health services are often included in this part of the state health organization.

Data to create the organizational histories were collected from a variety of sources. First, we attempted to identify a state historian or librarian in every state and then contacted that person via telephone or e-mail with a standardized information request. For 23 states, we received documents including organizational charts, department annual reports, statements of reorganization, and other materials that allowed us to create a 20-year history of the state's health-related organizational structure. Second, we searched state government Web sites to identify the current structure and to identify online resources that would provide a historical picture back to 1990. Many state Web sites include histories of the major governmental departments or agencies, including timelines that document major reorganizations. It is also possible in most states to search for executive orders or legislative decrees announcing organizational change or restructuring in the state government.

Triangulating across these sources, we built 20-year histories of the primary organizational structure related to health in each state. In the few cases for which we were not able to create a complete state history from the sources mentioned earlier, we contacted key

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informants whose long histories with the state government in question provided helpful information. In all cases, we gathered written, reproducible documentation of the organizational structure in place in 1990 and of any subsequent changes.

The organizational structure related to the 4 health service areas was coded for each year for all states. We identified 12 different permutations of how the 4 areas were structured in terms of departments/agencies (described later). The result was a state-level database that contains a variable indicating its organizational structure for each year from 1990 through 2009.

In addition, we obtained information on state budget allocations from the Census of Governments, which is a Census Bureau project documenting the nature and scope of state and local government powers, activities, and organization. The state budget data report spending in 3 comparable health budget categories—public health, hospitals, and Medicaid—as well as numerous other policy areas, including welfare, education, and transportation, from 1990 to 2009.[11] The Census of Governments reports federal transfers to states regarding Medicaid as "social policy" but includes federal aid to other areas of the health budget in a health category.

We also compiled state sociodemographic, economic, and political data from multiple sources to create annual measures of state characteristics—including age distribution, race/ethnicity, and density of population[12]—unemployment,[13] average per capita real personal income,[14] poverty rate,[14] partisan composition of the state legislature and governor,[15,16] an indicator of states with stringent of balanced budget requirements,[16,17] indices of the governor's power to set budget policy or veto budgets,[18,19] complete budget data (including federal and local transfers, operational expenses, and capital budgets) for state spending on education, welfare, police, natural resources, and transportation, and detailed revenue data.[15] Budget data did not take into account the influx of money related to bioterrorism preparedness in the early 2000s as this was federal rather than state funding.

In summary, we created a database with time-varying information on state budget allocations related to health and key characteristics of the social, economic, and political environment that was merged with the primary data we collected about state organizational structure from 1990 to 2009.

Analysis

For objective 1, simple counts and descriptive analyses were employed to describe the health-related organizational structures over time. We also conducted logistic regression analysis to identify covariates (described earlier) associated with the dependent variable of a state government combining Medicaid and public health within the same department (coded as 1) versus not (coded as 0) at any time during the study period. We employed a variety of model specifications and found our results generally insensitive to which controls were included or excluded. Here we report those models judged to fit best by well-established goodness of fit measures: the Akaike Information Criterion; the percent correctly predicted; and the concordance index (or area under the receiver operating characteristic curve), which is the probability that the model correctly assigns higher probability to a randomly selected positive case than a randomly selected negative case.[20]

For objective 2, we employed time series regression models of compositional data to trace whether changes in organizational structure preceded shifts in state budget priorities in 3 different health-related areas (Medicaid, public health, and hospitals). With limited exceptions, states are required to balance their budgets. Most questions regarding state budget priorities are thus really questions about how a fixed budget should be split among competing policy demands. When demand for 1 policy area increases, the total share of the state budget available for all other policy priorities necessarily decreases. Pressure on 1 budget area is felt not just on spending for that area, but potentially—and with possibly different effects—on the entire range of state policies. Therefore, a good model of the effects of covariates on state budget shares for Medicaid will *simultaneously* estimate the effects of those covariates on other areas of health *and* nonhealth spending, such as education, labor, transportation, etc. Failure to take the cross-budget effects of covariates into account is statistically inefficient and also risks misattributing the effects of covariates on one budget category for potential budget competition from a rival or competing category.

We adopted a strategy for multivariable regression modeling of the dependent variable of percent change in a state budget in a health-related area (running separate models for public health, Medicaid, hospital budgets), using data that are compositional, that is, summing to a budget constraint. We transformed the k budget shares for a given state and year into a set of k-1 additive log ratios. We then estimated the effects of the covariates on all the log-ratio-transformed responses as a system of equations.[21,22] In each equation, we also controlled for 1 or more lags of the log ratios. These lags account for the sticky nature of state budgets, in which change does not happen quickly. We conducted robustness checks regarding the length of the lag and found that the results did not vary across assumptions of a 1- to 5-year lag.

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Results

Objective 1

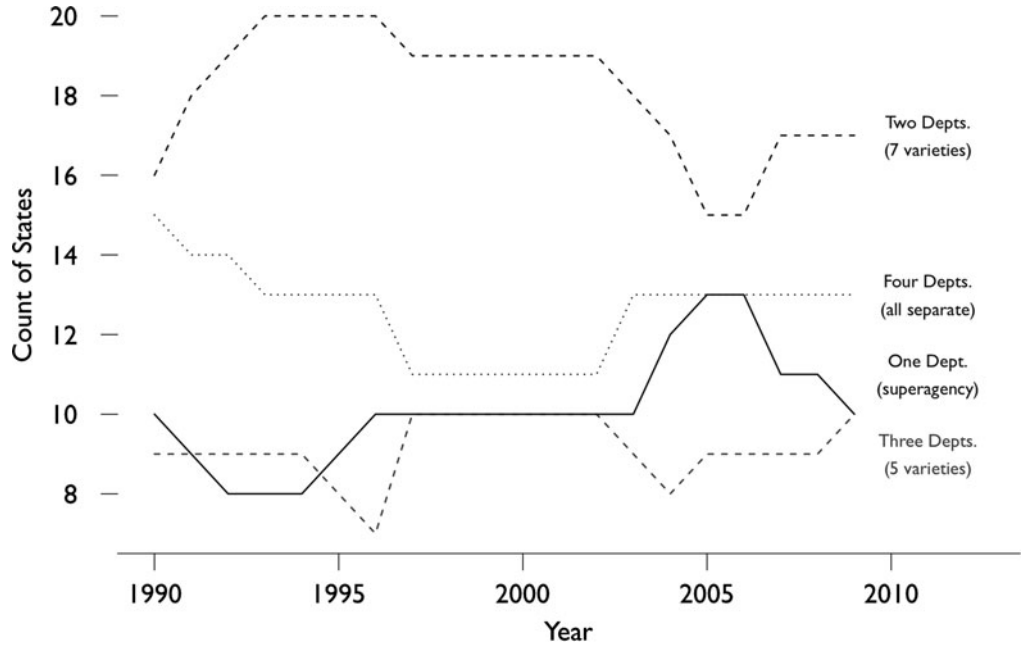
During the 20-year time period of 1990 to 2009, the majority of US states had no change in their organizational structure related to public health, human services, mental health services, or Medicaid. A total of 32 states (64%) had no organizational change during this time, and a total of 18 states (36%) had at least 1 change that involved consolidation or decoupling of the departments or agencies addressing these 4 key areas of health and human services. Of the 18 states that experienced organizational change, 5 changed twice during the study period.

Figure 1 summarizes the evolving organizational state structure in our focus areas from 1990 to 2009. The most common type of organizational structure consisted of 4 separate departments for the 4 areas of interest, with 10 states (20%) having this structure in place for the entire study period, and several others experimenting with this form at different times. In contrast, 7 states had all 4 areas within a single consolidated department throughout the entire time period, with as many as 13 using this form in 2005. Organization of the 4 functions into 2 or 3 departments was common but involved many different permutations: states with 2 departments employed 7 different configurations, and those with 3 departments employed 5 different configurations. Overall, there was a movement toward a 2-department structure in the late 1990s, and toward a single super department in the middle of the last decade, but diversity across states in terms of organizational structure remained the norm throughout the period.

Another way to make sense of the 14 different configurations of health agencies used by the states over the past 20 years is to consider the coupling or decoupling pairs of main functions. By 2009, the pairs of functions most often combined into a single agency were Medicaid with human services, Medicaid with mental health, and human services with mental health. Nevertheless, combining Medicaid and human services grew less popular after 1990, at the time when fully three-fifths of states used a common agency for both. Generally, public health was less often paired with other functions, although over the last 2 decades more states moved to combine public health and Medicaid (8 states) than to decouple them (5 states).

Notably, there is no single trend in the combination of functions over the study period, as similar numbers of states moved to merge or split most potential pairings. One result of this churning is that during at least 1 point during the study period, 27 states (54%) had an organizational structure that housed public health and Medicaid within the same department. In addition, of the 32 states with no change in their organizational structure, 15 of them (or 47%) had a structure that combined Medicaid and public health.

FIGURE 1 ● Counts of Consolidation and Decoupling of Departments Related to 4 Health Functions in US State Governments, 1990-2009



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Turning to multivariable exploration of the social, economic, and political context associated with different organizational structures, the Table shows the results of a logistic regression model of whether states ever had public health and Medicaid combined in a single department during the study period. Conditional relative risks (and 95% confidence intervals) of an otherwise average state having Medicaid and public health in the same agency are reported, as calculated from a logistic regression controlling for all the covariates described earlier and a time trend (N = 920, Akaike information criterion = 968, percent correctly predicted = 74%, concordance index = 0.622).

The results (Table) suggest that, relative to the average state, the probability that a state combined public health and Medicaid in the same department was significantly higher ($P < .05$) in states with a larger number of residents, higher unemployment rates, greater receipt of Federal social welfare aid (including Medicaid), or a Western location. In contrast, the probability that a state had combined public health and Medicaid was significantly lower ($P < .05$) in states with a higher proportion of people older than 65 years, a higher proportion of black or Hispanic population, greater receipt of Federal health aid, or a Midwestern location. None of the political variables were significantly associated with long-term organizational structure related to health services (1990-2009).

TABLE ● Covariates from Logistic Regression Analysis of Organizational Consolidation of Medicaid and Public Health Services in 50 States, 1990-2009

Covariate	Relative Risk	95% CI
Higher probability of joint administration of Medicaid and public health		
Western state	1.80	1.51, 2.10
Federal social welfare aid +1 SD	1.30	1.13, 1.48
Income per capita +1 SD	1.29	1.00, 1.59
log population +1 SD	1.26	1.13, 1.38
Unemployment rate +1 SD	1.20	1.06, 1.33
No significant effect		
Southern state	1.12	0.83, 1.41
Per capita state budget growth +1 SD	1.00	0.90, 1.09
Proportion of population < 19 y +1 SD	0.96	0.80, 1.13
Total democratic control	0.93	0.71, 1.20
Northeastern state	0.92	0.62, 1.25
Poverty rate +1 SD	0.90	0.71, 1.10
Total republican control	0.88	0.66, 1.15
Population density +1 SD	0.81	0.64, 1.00
Lower probability of joint administration of Medicaid and public health		
Proportion of black population +1 SD	0.75	0.61, 0.90
Federal health aid +1 SD	0.66	0.56, 0.77
Proportion of population > 65 y +1 SD	0.50	0.37, 0.65
Proportion of Hispanic population +1 SD	0.48	0.37, 0.61
Midwestern state	0.30	0.20, 0.42

To better understand *changes* in state health organization, we examined which factors made states more likely to consolidate or separate the administration of health services in a specific year. To model this outcome, we estimated an ordered probit with 3 categories (consolidate, preserve, or separate agencies), controlling for a similar set of covariates in the model mentioned earlier (N = 874, Akaike information criterion = 121, percent correctly predicted = 97.7%, concordance index = 0.68). To reduce the large number of covariates in the model, and without substantively altering our results, we replaced the demographic variables with a 2-factor summary produced by factor analysis, using standard data reduction procedures. The results suggested that states were significantly more likely to separate health services into separate agencies when Republicans controlled the legislature and governorship. Compared with the average state, the relative risk of separation was 4.23 (95% CI: 1.08, 11.6) for Republican control. States were also significantly more likely to consolidate responsibility for health services when the federal government provided more funds for Medicaid: with federal aid 1 standard deviation above the mean, the relative risk of consolidation was 2.33 (95% CI: 1.18, 4.18). No other covariates had a significant effect on the timing of consolidation or separation.

Objective 2

We investigated potential budget consequences of state organizational structure related to health. Descriptive data revealed that state budgets shares for Medicaid increased substantially between 1990 when the median share was 9.1% and 2009 when the median share was 15.0%. The budget shares for public health, however, remained fairly stable (the 1990 median share was 3.2% vs 3.0% in 2009) while the budget shares for hospitals declined (the 1990 median share was 4.0% vs 2.3% in 2009).

We report that the findings of 2 different time series compositional data models in Figure 2, focusing on conditional expectations of the cumulative change in budget shares for health and nonhealth spending categories in 5 years, did not produce different results. These models differed in how they measured the structure of state health organizations. The first model (top row of Figure 2) considered whether Medicaid and public health were jointly administered by the same agency, while the second controlled for the number of health functions merged, respectively, with public health Medicaid, human services, or mental

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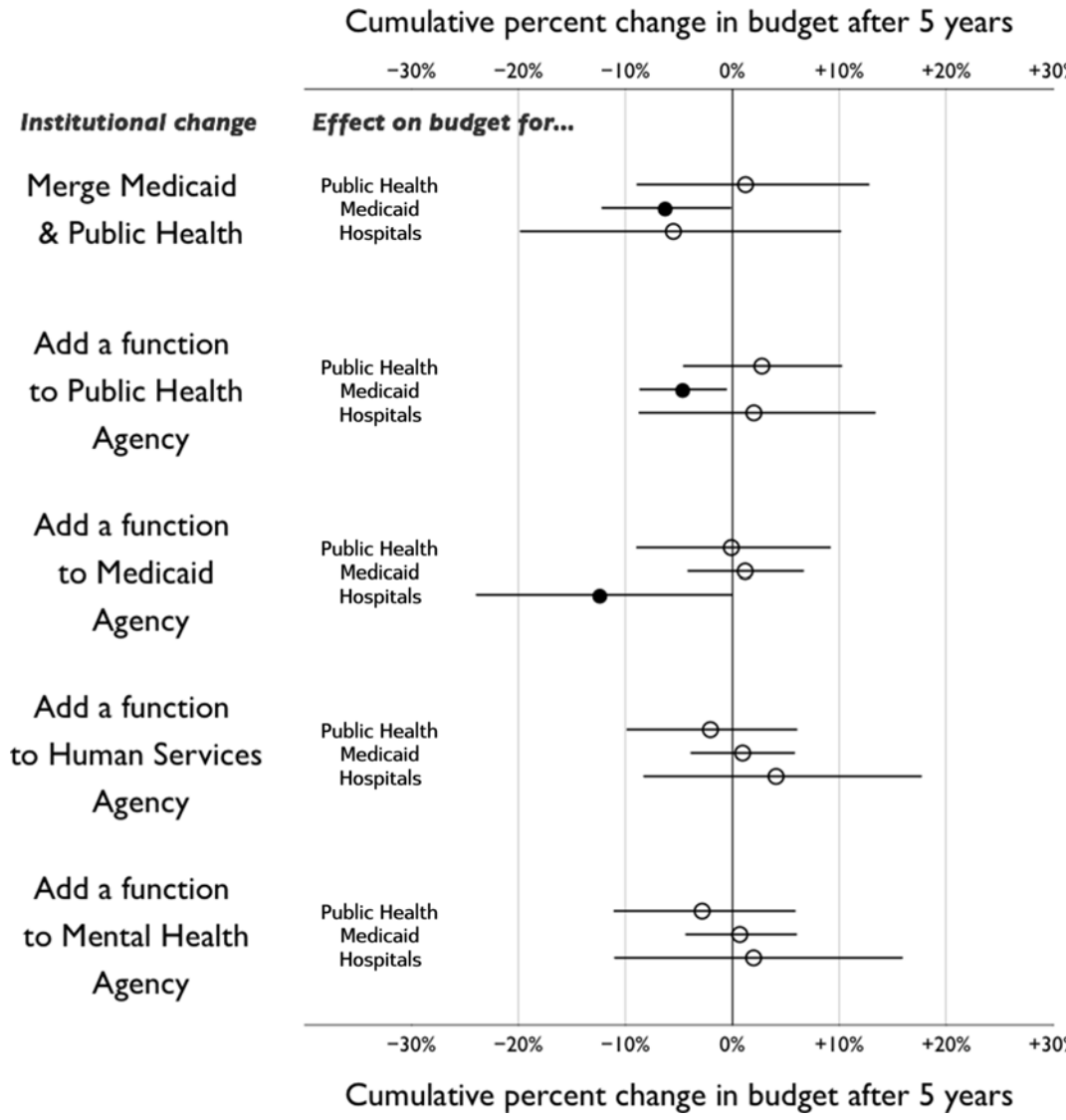
FIGURE 2 ● Estimated Cumulative Percentage Change (and 90% Confidence Interval) in State Health Budget Areas Following Selected Changes in State Organization Related to 4 Health Functions, 1990-2009. Filled Circles = $P < .10$



health. Both models were obtained from a time series cross-sectional compositional data model of state budget shares across 10 categories, controlling for state health organization, lagged budget shares, the state unemployment rate, per capita state income, state demographics (population density, population younger than 19 years, population older than 65 years), region, federal aid by budget category, a time trend, and 1-year lags of the partisan control of state government, the governor's budget powers, and the stringency of balanced budget requirements ($N = 7866$, $R^2 = 0.915$).

The results reveal the estimated accumulated change in budget priorities 5 years after Medicaid and public health services are merged, all else equal (Figure 2, top row). When these services are merged, Medicaid's share of the state budget is predicted to shrink by 6.3% (90% CI: −12.2%, −0.2%), while public health spending is predicted to remain unchanged. Of note, non-Medicaid welfare spending increases in this case by 5.4% roughly countering the decline in the Medicaid budget (results not shown in Figure 2), although this result is not statistically significant (90% CI: −1.1%, 12.3%). The reverse holds when Medicaid and public health are separated.

The findings for budget shifts when states consolidate agencies or add an agency function are also presented in Figure 2. These results include the finding that as the agency responsible for public health gains new service areas, Medicaid's share of the state budget declines significantly (−4.7%; 90% CI: −8.9%, −0.6%), while there is a small yet statistically insignificant gain in the budget for public health (Figure 2, row 2).

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Consolidating Medicaid with other services, however, does not impact Medicaid spending significantly but does significantly reduce the state budget share for hospitals (−12.5%; 90% CI: −24.3%, 0.0%) (Figure 2, row 3).

Conclusions

There is a need for an increase in public health systems research, which is a growing, multidisciplinary field of inquiry and includes research on public health funding.[23-25] This study provides some basic yet previously undocumented information, including a description of how state bureaucracies have organized around the provision of key health and human services over the past 20 years. This study also presents multivariable analyses elucidating the impact of organizational structures of particular interest—such as the consolidation of public health and Medicaid services in the same department—on state budget allocations for health-related activities.

A major conclusion from this study is that government organizational structure related to health varies greatly across states and is somewhat dynamic, with 18 states making some sort of organizational change during the time period under investigation. The majority of states (64%), however, have not undertaken a major restructuring of their key health-related departments over the past 20 years. Another conclusion is that consolidation of health-related services is common. Only 10 states had an organizational structure with no consolidation among public health, mental health, human services, and Medicaid functions over the 20-year study period. Between 1990 and 2009, 21 states had an organizational structure that housed public health functions and Medicaid within the same department at 1 or more points in time.

Of interest is our finding that controlling for numerous economic, social, and political factors, when the state agency responsible for public health was consolidated with Medicaid, the share of the state budget allocated to Medicaid declined significantly, while public health allocations were unchanged. However, consolidating Medicaid with other services did not impact state Medicaid spending.

Extant theory would have predicted that a larger program would "win" in terms of economic resources when consolidated or merged with a smaller program. Surprisingly, our results suggest that when Medicaid and public health units are combined, there is a negative impact on state budget allocations to Medicaid—the larger program—rather than to public health. The reasons for this are unclear. One hypothesis is that there are organizational efficiencies associated with consolidation that allow for decreases in the expense of operating the large Medicaid program. It could also be that, when Medicaid has organizational proximity to public health, there are "spillover effects" from a stronger public health focus on primary and secondary prevention and thus a reduction in Medicaid expenditures due to decreased health care utilization or improved health status. While these hypotheses are easy to put forth, they are extremely difficult to investigate empirically.

There are several limitations to this research. First, our analysis only considers changes in state health service organization back to 1990. States made significant organization changes to their health-related bureaucracies during the 1970s and 1980s, which are not considered in this analysis, primarily because it becomes increasingly difficult to reconstruct state bureaucratic structures as one goes further back in time. Second, given the small number of departmental changes that involved mergers between Medicaid and public health in our 20-year study period, it was not possible to conduct robust analyses of the predictors and consequences of this particular type of change. Third, it is possible that budget changes might not simply be the outcome of organizational change but might also lead or influence change. We were not able to address the possibility for such reverse causation in this analysis. Fourth, our limited data provide no insight into the reasons *why* governments pursue specific organizational reforms.

In addition, although state budget allocations are one important outcome of organizational structure and change, we did not have data on additional outcomes of interest such as organizational culture, programmatic agendas and priorities, human resource allocation, types of services provided, clients and communities reached, and public health impact. Mays et al[26] found that increases in local health department spending can have detectable and positive impacts on health (including lower mortality rates), especially in resource-poor communities. Nonetheless, these researchers also caution that increased funding alone will not lead to measurable, sustained health gains without simultaneous improvements in public health practice. The relationship between government organizational structures related to health, budget allocations, public health priorities and practices, and population-based outcomes is in great need of further research.

Despite its limitations, this study does provide new descriptive information on the range and types of organizational structure states have implemented related to key health and social service functions over the past 20 years. Importantly, our study results might assuage concerns that when Medicaid and public health functions are consolidated in a state bureaucracy, public health "loses" in terms of its share of the economic pie. Our findings do not support this concern. However,

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this could change as Medicaid costs continue to grow and with the implementation of Medicaid expansions associated with the Patient Protection and Affordable Care Act of 2010.[27] State bureaucracy architects need to carefully consider how to more effectively and efficiently design the organizations charged with delivering key health and social services to their populations.

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