

# Research Report



## The Quest for Cost-Efficient Local Government in New England: What Role for Regional Consolidation?

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# The Quest for Cost-Efficient Local Government in New England: What Role for Regional Consolidation?

Local governments form an important sector of the U.S. economy. Collectively, spending by the nation's roughly 89,000 local governments (cities, towns, counties, independent school districts, and special districts) totaled \$1.5 trillion in 2007, approximately 11 percent of U.S. GDP.

The Great Recession and its aftermath have made it more difficult for localities to maintain this level of spending. Budget shortfalls have led many states to cut aid to local governments, and falling property values have constrained local own-source revenues in many parts of the nation. As a result, local governments have been forced to enact a range of cost-cutting measures, including reductions in services, staffing, and employee compensation.

Revenues to fund local government operations are expected to remain constrained for the foreseeable future. As the federal government takes steps to bring its budget closer to balance, it is likely to pare back discretionary grants to state and local governments. In addition, state and local governments are likely to face continued pressures to pre-fund employee retirement benefits, possibly at the expense of other budget items that are arguably more discretionary. Thus, policymakers at all levels may find themselves re-examining cost-cutting options that once seemed unpalatable, including reorganizing service responsibilities across geographic or political boundaries.

Motivated by the prospect of continuing strain on local government finances, this study examines the extent to which a move to provide local government services at the regional rather than the local level could potentially reduce costs. It focuses especially on the expected long-term savings in the New

England states, with specific numerical estimates for Massachusetts and Connecticut. Where possible, the study also addresses the effects of regionalization on service quality, and indicates whether the available evidence on quality reinforces or mitigates the results based on costs alone.

The provision of local government services is fragmented in New England relative to the rest of the United States. Together, the six New England states comprise only about 2 percent of the nation's land area, but they account for about 4 percent of the nation's local governments. In addition, the region has a tradition of home rule, whereby the primary responsibility for providing local services is assigned to cities and towns—not to larger areas such as counties or metropolitan areas. From the standpoint of economic theory, New England's reliance on small local government units offers both advantages and disadvantages (Box 1).

Recognizing that local control has deep historical roots in New England, this study focuses on mechanisms that allow localities to continue to exist as distinct units, but that take advantage of economies of scale by transferring responsibilities for specific municipal services to a consolidated government organization or a consortium of local governments. One such mechanism is the intermunicipal partnership, sometimes referred to as intergovernmental (or interlocal) cooperation. Under this form of regional consolidation, a locality enters into a formal agreement to provide certain public services jointly with one or more other localities. Another mechanism is to centralize responsibility for designated municipal services in an existing regional (or state) authority or government. While

## Box 1.

### Economic Perspectives on Local versus Regional Government

In a decentralized political structure, localities are able to distinguish themselves from one another by providing distinct combinations of public services and taxing structures. The resulting diversity allows people and businesses to choose the location that most closely satisfies their preferences with respect to the role of government and thereby tends to increase societal well-being.

On the other hand, decentralization may lead to a higher cost of providing local services. To the extent that public services exhibit economies of scale, larger jurisdictions can provide them at a lower cost per user than smaller jurisdictions. One mitigating factor, however, is that providing services by smaller jurisdictions may make it easier for residents to monitor their government closely, possibly resulting in a reduced cost or higher quality of public services than if services were provided by a more centralized level of government.

Additional economic arguments against decentralization center on inequities and externalities. In the absence of funding support from higher levels of government, assigning local governments the responsibility for providing services to their populations tends to exacerbate inequality if people self-select into jurisdictions based on their ability to pay for services. Also, in the absence of any mechanisms to coordinate decision-making across jurisdictions, local governments may make decisions that have adverse consequences, such as environmental damage or traffic congestion, for neighboring areas. Combining governments or having a structure for coordinated decision-making across governments would result in the internalization of externalities.

full-scale mergers of local governments have remained extremely rare, intergovernmental cooperation and service sharing appear to be on the rise.<sup>1</sup>

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1 For a review of alternative approaches to regionalization, see Jered B. Carr and Richard C. Feiock, eds., 2004, *City-County Consolidation and Its Alternatives: Reshaping the Local Government Landscape*, M.E. Sharpe: Armonk, New York, and London, England. For an overview of cooperative versus competitive approaches to service delivery, see Mildred E. Warner, "Reversing privatization, rebalancing government reform: Markets, deliberation and planning," in *Policy and Society* (2008), doi: 10.1016/j.polsoc.2008.09.001. Additional information is available in "Inter-local government merger and management arrangements" by Elena Papoulias and Robert Tannenwald, New England Public Policy Center memorandum dated May 28, 2008, available at <http://www.bos.frb.org/economic/neppc/memos/2008/papouliastannenwald052808.pdf>.

Local governments perform many different functions, including ensuring public safety, maintaining roads, collecting trash, and educating children. As policymakers consider regionalizing the services currently provided by cities and towns (but *not* combining cities and towns into larger units), they need empirical evidence on the merits of consolidation at the *service category level*. This includes information on the scale at which government services are currently provided, on which services could be provided more effectively at a larger scale, and on how large the associated cost savings or quality improvements are likely to be. Finally, once policymakers have formulated their regionalization priorities, they would likely want to consider alternative mechanisms by which to achieve their objectives.

The outline of the study is as follows. The following section summarizes the evidence on regional consolidation of public services from individual case studies and broader research. The available evidence indicates that many services can be provided as cost effectively by smaller units as by larger units of government. However, some services exhibit economies of scale, indicating that local governments may be able to achieve savings through regionalized service delivery. Moreover, for a subset of these services, examples of successful regionalization are available to guide cities and towns that continue to provide these same services locally. For a limited number of services, there is also evidence that regionalization would likely lead to improvements in service quality.<sup>2</sup> For other services, notably education, which consumes the largest portion of local budgets, the evidence is mixed and the topic controversial because findings on the impact of school size on service quality are diverse and seem to be heavily influenced by factors that are idiosyncratic to individual localities.

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2 Glaeser (2012) discusses the possible impacts of local control on the quality of public services and concludes that for the most part empirical evidence falls short of what decision-makers need. See Edward L. Glaeser, "The Challenge of Urban Policy," in *Journal of Policy Analysis and Management*, volume 31, issue 1 (Winter), pp. 111-122.



Therefore, the remainder of the study focuses on three services: emergency call handling and dispatch, public health services, and public pension plan administration. The arguments in favor of regionalizing these services are particularly strong, and the available data allow us to analyze the likely savings associated with specific consolidation scenarios.

We start by comparing the degree to which the provision of these services is fragmented in each of the New England states as compared with the nation. The evidence suggests that, among the New England states, Massachusetts would experience the largest long-run percentage cost savings from regionalizing emergency call handling and dispatch, public health, and local public pension administration, followed closely by Connecticut. The overall potential for further savings would be lowest in Maine, which already provides these services on a regional or statewide level. While these are the statewide conclusions, the framework suggests that there may be smaller areas within each state that could achieve substantial cost reduction from regionalization.

We then estimate the potential long-term savings from consolidating the provision of all three services in Massachusetts and Connecticut. We find evidence confirming that these types of services should be prioritized for regional consolidation, and we discuss possible mechanisms for incentivizing a shift away from local control.

### **Economies of Scale for Local Public Services: An Overview Across and Within Functional Categories**

Because local governments perform such a diverse array of services, policymakers need information on which ones are compelling candidates for regional consolidation. Both the experiences of local officials and the findings of scholarly studies indicate that capital- and technology-based services, as well as some other services that require specialized skills, are the services for which interlocal cooperation has the greatest potential for cost reduction. Moreover, in some cases, service

quality tends to improve when public services are provided on a regional rather than a local basis. By contrast, most labor-intensive services do not exhibit economies of scale and are provided as effectively (or possibly even more effectively) by smaller jurisdictions.

A recent compendium on *Shared Services and Municipal Consolidation* by Marc Holzer and John C. Fry provides an impartial review of service consolidation from both scholarly studies and the experiences of local officials, estimating that nearly 20 percent of local government expenditures are characterized by economies of scale.<sup>3</sup> To detail which services are most suited to consolidation, this section summarizes the evidence by spending category in decreasing order of budget share, starting with education and then turning to non-education services.

### **K-12 Education**

Education is by far the single largest component of local government budgets. Nationwide, it accounts for almost 45 percent of total spending. Among the New England states the share of local budgets devoted to education

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3 See Marc Holzer and John C. Fry, *Shared Services and Municipal Consolidation: A Critical Analysis*, Public Technology Institute, Alexandria, VA, 2011. Among city managers, the desire to achieve economies of scale is the most common motivation for regional cooperation. As the primary obstacles, city managers cite loss of control and employee opposition. See Mildred E. Warner, "Competition or Cooperation in Urban Service Delivery?" in *Annals of Public and Cooperative Economics*, volume 82, number 4 (2011), pp. 421–435. The degree of support for service consolidation likely varies with the specific type of consolidation. Warner distinguishes alternative forms of intergovernmental cooperation according to their degree of formality and the range of services included. On the informal end of the spectrum, she notes that the most common form of cooperation among U.S. local governments is mutual aid agreements to share services. For example, highway departments and fire departments in one jurisdiction frequently assist those in nearby jurisdictions in the event of major emergencies, even if they have no binding agreement to do so. Councils of Government are another informal mechanism. These are coalitions of local government leaders who promote regional collaboration across a wide range of services but have no official governing authority over the group of participating jurisdictions. Warner cites intermunicipal contracting as an intermediate form of intergovernmental cooperation. Under formal mechanisms she lists special districts (single function) and consolidated regional government (multi-functional). See Table A1 for data on the number of special districts nationwide and in the New England states.

ranges from about one-half in Massachusetts to about two-thirds in Vermont.<sup>4</sup>

Responsibility for overseeing K-12 education differs across the nation. Outside New England, independent school districts are the norm. Other than in very large cities, their jurisdiction usually encompasses more than one city or town. Although many independent school districts exist in parts of northern New England, they are not common in southern sections, where K-12 education is one of the key responsibilities of cities and towns.<sup>5</sup>

A large body of evidence is available on the effects of K-12 consolidation across local jurisdictions. The studies on school districts generally point to budgetary and other advantages of consolidation, while the studies pertaining to school consolidation fail to reach a clear consensus, particularly at the primary school level.<sup>6</sup>

Both research and case studies have found that consolidating small school districts into larger administrative units results in sizable cost savings.<sup>7</sup> Even when districts

are not formally merged, sharing services across districts can be beneficial. For example, cooperative purchasing agreements across districts can result in cost savings, and distance learning options can offer students in remote areas high-quality access to advanced course material at a relatively low cost. Information systems development also lends itself well to larger service areas.

The bulk of education spending is at the school rather than the district level. School consolidation remains a contentious issue, and the merits of mergers appear to depend on specific circumstances. Studies have found evidence of cost savings not only from closing very small schools, but also from breaking up very large schools. In the case of small school closures, the need to transport students to regional schools imposes new costs (either on the school district or on the affected families), particularly if the regional school draws students from a large geographic area.

In practice, regional high schools are more common than regional elementary and middle schools. This may be because consolidating high schools across localities offers greater potential for achieving economies of scale. High schools have fewer grades (and therefore possibly fewer students), as well as greater demand for more specialized course offerings and extra-curricular activities, than elementary and middle schools. In addition, transporting teenagers to other cities and towns is likely viewed as less problematic than transporting younger children.

To draw conclusions concerning the desirability of consolidating schools, it is necessary to understand the likely effect on service quality. This is where the issues become complicated. Researchers have reached diverse conclusions regarding the effects of school consolidation on educational quality, and although quality can be measured by student outcomes, these are multifaceted and play out over many years, making it difficult to isolate the effect of school size from all of the other determinants of educational quality. As a result, the disagreements over whether local or regional schools provide better education are likely to persist.

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4 Appendix A presents data on the allocation of local government spending nationwide and in New England.

5 See the last column of Table A1 for data on the number of independent school districts nationwide and in New England.

6 Useful reviews of the scholarly literature on economies of scale in education include Matthew Andrews, William Duncombe, and John Yinger, "Revisiting Economies of Scale in American Education: Are We Any Closer to a Consensus?" in *Economics of Education Review*, volume 21 (2002), pp. 245-262; Timothy Zimmer, Larry DeBoer, and Marilyn Hirth, "Examining Economies of Scale in School Consolidation: Assessment of Indiana School Districts," in *Journal of Education Finance*, volume 35, issue 2 (fall 2009), pp. 103-127; and Craig Howley, Jerry Johnson, and Jennifer Petrie, "Consolidation of Schools and Districts: What the Research Says and What It Means," National Education Policy Center Brief, February 2011. For relevant case studies, see Terry E. Spradlin, Fatima R. Carson, Sara E. Hess, and Jonathan A. Plucker, "Revisiting School District Consolidation Issues," Center for Evaluation and Education Policy, Education Policy Brief, volume 8, number 3 (summer 2010), and Gordon A. Donaldson, "Efficiency Realized: A Pre/Post Look at Maine's School Consolidation Effort," paper presented at the Annual Meeting of the American Educational Research Association, Chicago, IL, April 2007.

7 In addition to benefitting from economies of scale in administration, larger school districts may have lower costs per pupil because they are able to employ better administrators.

Consequently, this study focuses on services where the issues are clearer and the opportunities more obviously attractive.

### Non-Education Services

Some non-education services have been found to exhibit economies of scale as well as other attributes that make them good candidates for geographically consolidated provision. One consideration is timing. If a service can be provided on a staggered or intermittent schedule across jurisdictions, resource sharing across the jurisdictions is more likely to result in labor or equipment cost savings than if all jurisdictions must be served simultaneously. Another factor is the degree to which cooperation tends to result in better outcomes than competition does. For example, infrastructure development in one jurisdiction has spillovers for neighboring jurisdictions, so the planning of major public works or transportation projects lends itself naturally to a regionalized approach.

Under public safety, the strongest evidence concerns emergency dispatch. (See Appendix Table B1 for the findings pertaining to the opportunities for regional consolidation for a variety of non-education services.) Holzer and Fry report that “[g]overnments have been centralizing [dispatch services] with considerable success, resulting in reduced costs and appropriate response to 9-1-1 calls” and that “[m]oving to a larger organization levels out the peaks and reduces the need for capacity that is excess and under-utilized in non-peak demand circumstances” (p. 177). And although dispatchers need some familiarity with the service area and interpersonal skills in handling calls, advances in communications and information technologies have reduced the need for them to have specific knowledge about the locality.

The findings on bigger-ticket public safety functions are less definitive. By and large, academic studies yield mixed results on whether or not economies of scale exist for police and fire protection services, but many of the studies were conducted several decades

ago and have not been updated.<sup>8</sup> Many local fire departments already participate in mutual aid agreements whereby they are obligated to assist nearby departments when called upon; such arrangements may lessen the need for formal consolidation. However, some case-study evidence is emerging that small towns have been able to achieve savings through merging their police forces or making use of a more centralized structure for policing. In addition, Holzer and Fry indicate that regionalized approaches are likely to yield savings for specialized, back-office aspects of public safety, such as investigations.

For public works, some maintenance functions may be streamlined through cooperation or centralization, but individual municipalities need to be convinced that a centralized provider would accord them adequate priority in case of emergencies. Public works planning and construction, on the other hand, clearly lend themselves to a regional approach, especially for large projects.

“Public health is ... inherently more of a state or federal service than it is a municipal service” (Holzer and Fry, p. 179). Left on their own, municipalities might tend to underfund public health services because they might overlook the beneficial effects of their spending on residents of neighboring communities. Because health and safety are of broad concern, basic standards are often set by higher levels of government. And while responsibility for inspections and enforcement often falls to individual localities, these activities may require specialized skills that communities lack. Holzer and Fry report that “the existing use of centralized, regionalized, or contracted services is testimony to the fact that many municipalities

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<sup>8</sup> For a summary of the findings of academic studies concerning economies of scale in police, fire, and waste management services, see Grant Forsyth, “Municipal Economies of Scale & Scope and Post-Consolidation Economic Performance: A Literature Review,” Monograph No. 15, Institute for Public Policy and Economic Analysis, Eastern Washington University, November 2010. For additional evidence including some case studies, see Douglas Coate and Richard W. Schwesler. “Use of State Police Services for Local Policing: The Case of New Jersey,” *Public Budgeting & Finance*, volume 29, issue 3(Fall) 2009, pp. 97–109.

have looked for a larger and more cost-effective solution” (p. 179).

Finally, Holzer and Fry identify expert tasks in finance, administration, purchasing, and IT systems development as strong candidates for regional provision. In general, they recommend a structure in which state or regional employees perform the higher-level technical work and then share access to the required systems with front-line municipal employees who interact with the ultimate customers.

To summarize, based on what is currently known, it appears that regional consolidation efforts in New England should target the roughly 20 percent of local government spending that is characterized by demonstrated economies of scale, in situations where loss of local control does not seriously compromise service quality. While 20 percent or so appears to be an appropriate upper bound for the region as a whole, the portion of local budgets that may be amenable to some form of consolidation across city and town borders likely varies both across and within states, depending, in part, on variation in spending allocations.<sup>9</sup>

To ascertain how large the savings from geographic consolidation are likely to be, policymakers need more detail on how services are currently provided in their state or local area, as well as on the typical extent of cost reduction as scale increases. The next section provides evidence on these issues for selected services.

### **Estimating the Long-Run Cost Savings from Geographic Consolidation: Specific Examples**

With the preceding findings as background, this section goes on to investigate the potential savings from pursuing intermunicipal agreements or service sharing for three specific services: 9-1-1 call handling and dispatch, public health, and public pension administration. In each case, we first present evidence on the degree of fragmentation in each of the New England states and nationally. Even though

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<sup>9</sup> As noted in the text, the effects of consolidation on service quality have been documented for some local services, but not others, and they remain especially uncertain in the case of education.

the New England states are characterized by local control, we show that there is not a one-to-one correspondence between service units and local governments. Depending on the particular service, states may have either more or fewer service units than cities and towns. Therefore, an understanding of the potential benefits from regional consolidation requires specific information about how each service is provided—not just a tally of the number of local governments.

Next, we estimate cost functions for each service category, based on the available nationwide data on expenditures, scale, and additional information that affects how much is spent per unit of service. The resulting shape of the cost curve shows the range over which the economies of scale are most pronounced, enabling policymakers to identify service units that are inefficiently small.

Finally, we use these estimates to examine the potential cost savings in Massachusetts and Connecticut from consolidating provision of 9-1-1 services, public health services, and local public pension administration. These two states are distinguished by their relatively high numbers of service units, so the computed percentage savings can serve as upper bounds for the remaining New England states.

The estimates are intended as statewide ballpark measures of the potential cost savings from regionalizing local government services. They are based on publicly accessible data, and are not intended to be a substitute for more detailed analyses of particular city and town consolidation measures by service-area experts.<sup>10</sup> Nor do they consider the adjustment costs of consolidation, such as changes in personnel requirements, or how either the operating

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<sup>10</sup> Studies using a similar methodology have analyzed business mergers, most notably in the banking and hospital sectors. Santiago Carbó Valverde and David B. Humphrey compare the estimated and actual cost savings from bank mergers. They find that both econometric estimates and bank executive estimates are imprecise in individual cases. However, for their sample, econometric models do a better job of accurately predicting the overall cost savings from mergers as a group than the predictions obtained from adding up the estimates of market participants. See “Predicted and Actual Costs from Individual Bank Mergers,” *Journal of Economics and Business*, volume 56, issue 2 (2004), pp. 137–157.



or adjustment costs should be allocated across the participating communities. Nonetheless, the cost estimates—combined with the quality considerations discussed below—present an economic justification for moving toward greater consolidation for the three types of local government services studied.

### 9-1-1 Call Centers

Technological change is creating opportunities and incentives for consolidating 9-1-1 call centers, also known as Public Safety Answering Points (PSAPs).<sup>11</sup> Efficient dispatch once depended on detailed knowledge of the service area, providing a rationale for decentralized call handling. Increasingly, however, GPS and cellular location services can help locate callers and dispatch the appropriate responders (police, fire, or EMS) quickly and effectively. At the same time, the traditional source of funding for operating dispatch services—fees applied to landlines within the service area—is drying up as cellular phones replace landlines.

Citing cost, staffing, and safety concerns, some states have reacted to these technological changes by aggressively consolidating their call-taking and dispatch operations.<sup>12</sup> According to the Federal Communications Commission (FCC), North Carolina has closed 165 PSAPs since 2001, far more than any other state over this period (Table 1). Maine has reduced the number of its PSAPs from 67 to 26, making it the top-ranking state in the nation for the share of PSAPs that have been closed (61 percent). The state recently considered consolidating 9-1-1 call centers, with a target of reducing the total number to between 15 and 17.<sup>13</sup>

11 See “Emergency Communications: Broadband and the Future of 911” by Linda K. Moore, Congressional Research Service Report for Congress, December 22, 2010.

12 See “Key Findings and Effective Practices for Public Safety Consolidation,” report of Working Group #1A to the Communications Security, Reliability and Interoperability Council, October 2010.

13 See “Public Safety Answering Point (PSAP) Reconfiguration Plan” prepared by the Maine Public Utilities Commission at the request of the Utilities and Energy Committee of the Maine state legislature, November 1, 2010.

**Table 1. Public Safety Answering Point (PSAP) Consolidation Since 2001**

New England States and Other States with a High Share of PSAPs Closed				
	Number of Closed PSAPs	Number of Current PSAPs	Percent Closed	National Rank Based on Percent Closed
Maine	41	26	61.2	1
North Carolina	165	140	54.1	2
South Dakota	52	45	53.6	3
Washington	28	71	28.3	4
Vermont	3	8	27.3	5
Michigan	67	179	27.2	6
Hawaii	2	6	25.0	7
Nebraska	25	83	23.1	8
Missouri	50	176	22.1	9
Tennessee	38	165	18.7	10
Nevada	5	23	17.9	11
Oregon	11	51	17.7	12
California	81	440	15.5	13
Florida	46	254	15.3	14
West Virginia	8	54	12.9	15
Connecticut	11	111	9.0	18
Massachusetts	9	268	3.2	32
Rhode Island <sup>1</sup>	0	72	0.0	44
New Hampshire <sup>2</sup>	0	4	0.0	44

Source: FCC PSAP Master Registry as of December 13, 2011.

Note: PSAP counts do not include secondary PSAPs. PSAP counts in the FCC registry are not always consistent with those provided by states.

<sup>1</sup> The Rhode Island 9-1-1 system currently reports having only one primary PSAP, while the FCC registry reports 72 primary PSAPs.

<sup>2</sup> The New Hampshire Bureau of Emergency Communications currently reports having only one primary PSAP, while the FCC registry reports four primary PSAPs.

Table 2 indicates the high degree of fragmentation of 9-1-1 dispatch in southern New England compared with the nation as a whole. According to the FCC, Massachusetts and Connecticut have 268 and 111 PSAPs, respectively. Relative to population, these two New England states rank 12<sup>th</sup> and 19<sup>th</sup>, respectively, in the number of PSAPs per capita. Relative to land area, both states are in the top four in the nation. The final column shows the number of PSAPs relative to the total number of governments in each state.<sup>14</sup>

14 See Appendix A for further information on the number of general-purpose governments (counties, municipalities, and townships) and special-purpose governments by state.

**Table 2. Fragmentation of New England’s Public Safety Answering Point (PSAP) System**

	Total PSAPs	Per 100K Population (1=Most Fragmented)		Per 1,000 Square Miles (1=Most Fragmented)		Per Government (1=Most Fragmented)	
		Number	Rank	Number	Rank	Number	Rank
Connecticut	111	3.1	19	22.9	4	0.62	10
Maine	26	2.0	32	0.8	39	0.05	44
Massachusetts	268	4.1	12	34.2	2	0.75	5
New Hampshire <sup>1</sup>	4	0.3	50	0.4	46	0.02	49
Rhode Island <sup>2</sup>	72	6.8	3	68.9	1	1.85	1
Vermont	8	1.3	41	0.9	38	0.03	48
New England	489	3.4		7.8		0.30	
United States	6,863	2.2		1.9		0.18	

Source: Author’s calculations based on FCC Master Registry as of December 2011, 2007 Census of Governments, and 2010 Decennial Census.

Note: The number of governments excludes special-purpose governments. PSAP counts include state police. Massachusetts and Connecticut savings estimates exclude state police PSAPs.

<sup>1</sup> The New Hampshire Bureau of Emergency Communications currently reports having only one primary PSAP, while the FCC registry reports four primary PSAPs.

<sup>2</sup> The Rhode Island 9-1-1 system currently reports having only one primary PSAP, while the FCC registry reports 72 primary PSAPs

Even after accounting for the relatively large number of cities, towns, and other local governments, Massachusetts and Connecticut have exceptionally large numbers of PSAPs, compared with other states. While Rhode Island also appears decentralized according to the data presented in Table 2, a significant discrepancy between the PSAP counts of the FCC and the State of Rhode Island limits our ability to draw definitive conclusions about the state’s level of PSAP concentration.<sup>15</sup>

With funding help from state and regional authorities, various localities in southern New England have commissioned studies to determine the costs and benefits associated with regionalizing 9-1-1 call

15 The Rhode Island 9-1-1 system currently reports having only one primary PSAP, while the FCC registry reports 72 primary PSAPs for the state. The New Hampshire Bureau of Emergency Communications also reports having only one primary PSAP, while the FCC registry reports four primary PSAPs. The discrepancies for the remaining New England states are much smaller.

handling and dispatch.<sup>16</sup> As a complement to such detailed reports, this study aims at estimating the potential cost savings from consolidating PSAPs across an entire state. By examining state web sites and contacting emergency response agencies, we obtained data on call volumes, service areas, and cost distributions for a select number of states around the nation. Based on this information, we simulated the long-term cost savings from moving to a more consolidated PSAP structure in Massachusetts and Connecticut. Among the states for which we have call volume data for individual call centers, Massachusetts has the highest share of low-volume PSAPs. Over one-half of its PSAPs handle 10 or fewer calls per day.

To calculate the range of potential cost savings, we used data for the three states that provided the needed information on both costs and call volumes for individual PSAPs: Maryland, Michigan, and Pennsylvania. To illustrate the methodology, the following indicates how we used the Michigan data to compute cost savings in Massachusetts. Details of the full methodology appear in Appendix C.

We first plotted average operating expenditures per call against average daily call volume for Michigan PSAPs in 2010 and fit a regression line through the data. The orange dots in Panel A of Figure 1 show the fitted values for average expenditure. On a per-call basis, operating expenditures tend to fall steeply until daily call volumes reach about 50, and more gradually as call volumes exceed this threshold. (The average number of calls

16 For Massachusetts examples, see Appendix K of the 2010 report of the Massachusetts Regionalization Advisory Commission, available at <http://www.mass.gov/governor/administration/ltgov/lgcommittee/regionalcomm/commission-report/appendix-k-public-safety-report.pdf>. For Connecticut, see Southeastern Connecticut Council of Governments, “Public Safety Answering Point Consolidation Study: East Lyme, Montville, New London, and Waterford,” September 2008. The Rhode Island Senate Commission on Shared Municipal Services (2010) recommended consolidation of dispatch services across cities and towns, but did not refer to any existing studies. Their report is available at [http://www.rilin.state.ri.us/Reports/Senate\\_Commission\\_on\\_Municipal\\_Shared\\_Services\\_Analysis\\_052410.pdf](http://www.rilin.state.ri.us/Reports/Senate_Commission_on_Municipal_Shared_Services_Analysis_052410.pdf)

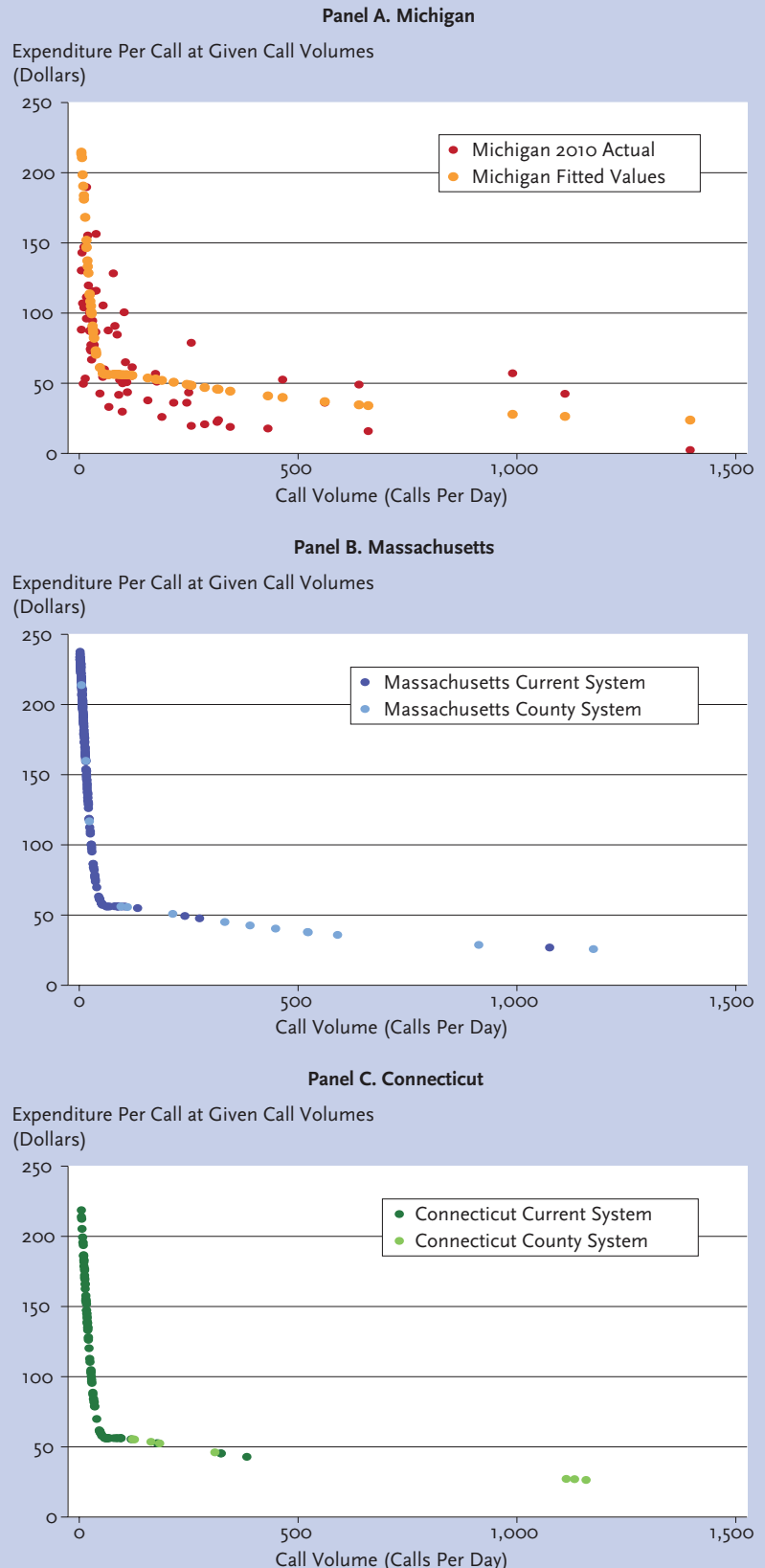
actually ranged up to over 3,500 per day. In order to highlight the data that are most relevant for smaller states such as Massachusetts and Connecticut, the figure omits the Michigan PSAPs that averaged 1,500 or more calls per day. It also omits outliers with expenditures exceeding \$ 250 per call.)

The next step involved comparing the expenditures associated with the current Massachusetts PSAP structure with those for a hypothetical consolidated structure, using the aforementioned regression relationship. Under the current structure, Boston had the busiest PSAP in 2010, averaging 1,074 calls per day. Springfield and Worcester were the second and third busiest, averaging 275 and 242 calls per day, respectively. All of the remaining PSAPs averaged fewer than 150 calls per day. We used the regression line derived from Michigan data to estimate the cost per call for each of the existing PSAPs in Massachusetts; these estimates are represented by the darker blue dots in Panel B of Figure 1.<sup>17</sup>

For purposes of illustration, the consolidation scenario entails reducing the number of PSAPs to one in each of the 14 counties in Massachusetts. This assumption was adopted mainly for convenience, as counties represent predefined regional areas into which the current PSAP boundaries could be mapped. However, judging by the data for other states, 14 appears to be a plausible number under a consolidated structure.<sup>18</sup> Regardless of the specific assumptions made about the number and distribution of call centers across the state, by consolidating PSAPs, Massachusetts would experience a movement down the cost curve. Holding the overall number of emergency assistance calls statewide unchanged, the majority of the county-level PSAPs would

**Figure 1. Projected Potential Savings from Public Safety Answering Point (PSAP) Consolidation in Massachusetts and Connecticut**

Scenarios Based on 2010 Michigan Data



Source: Author's calculations based on data from 2011 Annual Report to the State Legislature produced by the Michigan State 9-1-1 Committee.

17 Actual cost data for Massachusetts were unavailable, so these estimates could not be evaluated for accuracy.

18 Recall, for example, that the state of Maine (which is much larger than Massachusetts geographically but much smaller in population) recently considered reducing its number of PSAPs to a range of 15 to 17. Maryland has 24 PSAPs, serving a population that is roughly one-tenth smaller than that of Massachusetts, spread over a land area that is about one-quarter larger.

receive more than 150 calls per day (lighter blue dots).

The total operating costs for the hypothetical regional PSAP structure in Massachusetts are estimated at 39 percent of the current costs. Similar calculations using the Maryland and Pennsylvania data yield similar estimates. Thus, the data indicate that by reducing the number of PSAPs to 14, Massachusetts could reduce its overall operating costs by over 60 percent (Table 3). We used a modified procedure based on the New Jersey information, which indicated the equipment costs for various size categories of PSAPs (as opposed to operating costs for individual PSAPs). These data suggest that Massachusetts might save an even greater percentage in ongoing equipment expenditures (75 percent) through regional consolidation of PSAPs.

We performed a similar analysis for Connecticut. Like Massachusetts, Connecticut has a fragmented PSAP structure. The three largest PSAPs in Connecticut (Hartford, Bridgeport, and New Haven) each received between 300 and 400 calls per day in 2010, while each of the remaining

PSAPs received fewer than 200 calls per day. Consolidation by county would result in having eight PSAPs across the state and would cut expenses by roughly 60 percent, almost as much as estimated for Massachusetts. Table 3 and Panel C of Figure 1 provide further information on the consolidation scenarios for Connecticut, and Appendix C indicates the methods used to compute the savings.

The estimates for Massachusetts and Connecticut pertain to long-term savings, and do not factor in the substantial transition costs of investing in new equipment or facilities—either at the 9-1-1 call centers or at the associated police, fire, and ambulance stations. These estimates also ignore the effects of any Massachusetts- or Connecticut-specific staffing patterns that may differ from those in the comparison states.<sup>19</sup>

Moreover, while we simulated the cost savings from moving to a county-based system for handling 9-1-1 calls, other configurations are likely to be more compelling. Any restructuring of PSAPs should take into account various technological and operational considerations that are outside the scope of this study. Furthermore, although counties are important units of government in many states, they have much less meaning in Massachusetts and Connecticut, as Connecticut abolished all county government in 1960 and Massachusetts abolished eight of its 14 county governments starting in the late 1990s.<sup>20</sup>

**Table 3. Estimated Public Safety Answering Point (PSAP) Costs in Massachusetts and Connecticut under Current and Consolidated Structures, Based on Costs in Other States**

Massachusetts				
	Total Operating Cost			Equipment Replacement Cost
Computed based on data from:	Maryland	Michigan	Pennsylvania	New Jersey
Current Structure (Millions)	\$132.8	\$182.8	\$192.1	\$35.3
County Structure (Millions)	\$46.1	\$71.4	\$73.7	\$8.7
Savings (Percent)	65.3	60.9	61.6	75.3
Connecticut				
	Total Operating Cost			Equipment Replacement Cost
Computed based on data from:	Maryland	Michigan	Pennsylvania	New Jersey
Current Structure (Millions)	\$101.0	\$117.0	\$117.6	\$15.7
County Structure (Millions)	\$37.4	\$50.3	\$52.5	\$6.7
Savings (Percent)	63.0	57.0	55.4	57.4

Source: Author's calculations as described in text and appendix.

<sup>19</sup> Some small PSAPs are staffed by police officers or firefighters, and consolidation may entail the substitution of civilian dispatchers for uniformed personnel (with associated salary and benefit savings). These sorts of personnel savings are implicitly included in our estimates. However, if Massachusetts and Connecticut currently make unusually high (low) use of uniformed personnel but were to change to staffing patterns more similar to those in Maryland, Michigan, and Pennsylvania, the labor cost savings associated with consolidation could conceivably be greater (less) than we have estimated. See Consolidation Feasibility Study, prepared for Office of Statewide Emergency Telecommunications: State of Connecticut., L.R. Kimball, January 2012. See also Barnstable County E911 Regional Feasibility Study: Final Report, Intertech Associates, December 12, 2011; and Norfolk County E911 Regional Feasibility Study: Final Report. Intertech Associates. November 18, 2011.

<sup>20</sup> See Connecticut General Assembly Public Act 59-152 and Chapter 34B of the Massachusetts General Laws.



## Box 2.

### Policy Options: State-Level Incentives and Funding for PSAP Consolidation

State-imposed technological or staffing standards for PSAPs have proved to be an effective tool to encourage consolidation. Over the past decade, many states have issued mandates requiring that PSAPs be compatible with enhanced 9-1-1 technology (to be able to pinpoint the location of a wireless call), or that at least two call-takers be on duty at any given time. Enacted primarily to improve the quality of service, these requirements increased the local costs of maintaining small PSAPs because states did not fully fund the measures needed to comply with the stricter standards. Consequently, many small PSAPs were prompted to investigate merger opportunities in order to comply with state mandates.

Traditionally, Massachusetts has set very few requirements for PSAP technology and staffing. Starting in 2011, however, Massachusetts imposed rules concerning how emergency medical dispatch is to be performed. The state has also set training requirements for telecommunicators. Substantial state grants are available for training. While providing localities the funding needed to comply with state mandates can be justified on the grounds of fairness, such a policy has the side effect of reducing the incentives for consolidation.

Another policy lever pertains to state support for investments in consolidated facilities. States such as North Carolina have provided consolidation grants that almost entirely fund the creation of new regional centers. These awards have allowed localities to recognize the operational savings from consolidation without having to incur the initial capital expenditures.

Massachusetts and Connecticut currently offer planning grants to investigate the feasibility of consolidating PSAPs. Massachusetts also provides funding for consolidation. However, these grants are not sufficient to cover construction and equipment costs, so municipalities proceeding with consolidation must pay a large portion of the upfront capital costs.

Finally, limiting the amount of state operational funds available to nonconsolidated PSAPs is another way to encourage regionalization. North Carolina collects all 9-1-1-related phone surcharges at the state level and does not distribute any funds for recurring costs (such as rent or compensation). Other states, including Connecticut and Washington, provide minimal funding to small, nonconsolidated PSAPs and higher levels of funding to large or consolidated ones. Connecticut defines larger PSAPs as those serving at least 40,000 people; the state does not provide further incentives for consolidation of PSAPs beyond this threshold.<sup>1</sup> Finally, states such as New Mexico deny 9-1-1 surcharge funding to any county with more than one PSAP (with some exceptions related to distances and terrain).<sup>2</sup>

Massachusetts currently provides funding to both local and regional PSAPs through the Public Safety Answer Point and Regional Emergency Communication Center Support and Incentive Grant. This grant provides support to primary PSAPs and distributes additional “incentive” funds to regional PSAPs. Restructuring this grant so as to require nonconsolidated PSAPs to pay more of their operational costs would provide a further impetus to consolidation.

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1 See “New Jersey 9-1-1 Consolidation Study - Reorganizing 9-1-1 Operations: A Report on Experiences with Consolidation in Other States.” *John J. Heldrich Center for Workforce Development*. October 2005.

2 See Item 09A2 Consolidation Synopsis 2. NC 911 Board Agenda books. March 13, 2009. Available at [https://www.nc911.nc.gov/Board/agenda/Book/20090313\\_Item%2009A2%20Consolidation%20Synopsis%202\\_.pdf](https://www.nc911.nc.gov/Board/agenda/Book/20090313_Item%2009A2%20Consolidation%20Synopsis%202_.pdf). As is the case for Rhode Island and New Hampshire, there is a discrepancy between FCC and state-reported PSAP counts for New Mexico. According to the NC 911 Board Agenda books, New Mexico had 47 PSAPs in 2009, and a personal communication with the state’s E-911 board confirmed that the state had 46 PSAPs in FY 2011. However, the FCC currently shows 92 primary PSAPs.

Whatever the optimal configuration of PSAPs from a cost standpoint, another pressing concern is the effect of consolidation on emergency response times. We performed a preliminary analysis exploring the relationship between PSAP size and response time, using data provided by the National EMS Information System. With controls for location and a variety of exogenous delay factors (such as language barriers), our tentative results suggest that larger PSAPs are actually associated with faster response times. Thus, consolidation appears to have the potential to shorten the interval between 9-1-1 calls and the dispatch of first responders, an improvement that in turn would tend to have a beneficial impact on survival outcomes and other indicators of service effectiveness.<sup>21</sup>

Our analysis strongly suggests that 9-1-1 call center consolidation deserves more serious attention in Massachusetts and Connecticut than it has received to date. These states could choose among several policy levers in order to move in this direction. While Maine enacted legislation that directly mandated a reduction in the number of PSAPs, other states have achieved similar results through a combination of quality standards, restricted state funding for the operations of small PSAPs, and capital grants to fund consolidation (see Box 2).

Massachusetts recently adopted some measures along these lines. However, the state has not yet used them aggressively to promote consolidation, preferring instead to remain a fairly neutral player with respect to local government decision-making on 9-1-1 call handling. Connecticut already ties state funding to PSAP size. If the state decided to provide further inducements for consolidation, it could use the empirical information on economies of scale presented in this study or elsewhere to revise its funding formula.

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21 See Elizabeth Ty Wilde. "Do Response Times Matter? The Impact of EMS Response Times on Health Outcomes." Princeton University Working Paper Series, Industrial Relations Section, Working Paper #527. May 2008.

## Public Health

Compared with many of the other services performed by local entities, emergency call handling and dispatch services are relatively straightforward and homogeneous. Regardless of their size or location, the goal of 9-1-1 call centers is to provide quick and appropriate responses to requests for emergency assistance. Public health services, by contrast, are complicated and wide-ranging. Public health authorities are charged with a broad array of responsibilities, including "leading and coordinating public health campaigns, controlling epidemics, carrying out disease and injury surveillance, collecting vital statistics, ensuring good medical and dental care for the indigent, environmental control, and health education."<sup>22</sup> In recent years, these agencies have taken on increased responsibilities for emergency preparedness planning and practice in the wake of bioterrorism threats, emerging infectious diseases, and natural disasters.

Local health departments vary widely in the scope of services they provide, as well as in the methods and intensity with which these services are provided. A survey conducted by the National Association of County and City Health Officials (NACCHO) found that more than 9 out of every 10 local health departments (LHDs) across the nation provide immunizations, but only about 6 in 10 provide screening for blood lead. And while over three-quarters of LHDs perform food service inspections, fewer than one-half inspect the public drinking water supply.<sup>23</sup>

Departments serving smaller populations tend to provide fewer services and employ less-trained personnel than departments

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22 See "Strengthening Local Public Health in Massachusetts: A Call to Action," Results of a Statewide Workforce Assessment Conducted for the Coalition for Local Public Health," report prepared by Justeen Hyde and Alison Tovar, Institute for Community Health, June 28, 2006, p. 6.

23 NACCHO 2010 National Profile of Local Health Departments, August 2011. Of the 2,565 LHDs across the nation, 2,107 responded to the survey. Hawaii and Rhode Island were not included in the survey because they have statewide health departments. The figures cited in the text refer to the proportion of local health districts that perform the services directly; they do not include those that contract out for services.

servicing larger populations. In particular, public health units serving smaller populations carry out fewer of the activities that the national Centers for Disease Control and Prevention (CDC) considers essential.<sup>24</sup> They also tend to face greater difficulties in preparing for public health emergencies or developing website capacity.<sup>25</sup> To the extent that low-population LHDs provide substantially fewer services (or lower-quality services) than high-population LHDs, local health spending per capita may be lower in areas with fragmented LHDs. The range of clinical services provided is especially important in determining costs, as clinical services tend to be more expensive than nonclinical services.

For a given service level, however, high-population health departments tend to be more cost efficient than low-population health departments. Econometric studies have found economies of scale in populations up to anywhere between 100,000 and 500,000.<sup>26</sup>

This means that, for a fixed service mix, health departments covering larger populations would spend less on a per capita basis than those serving smaller populations.

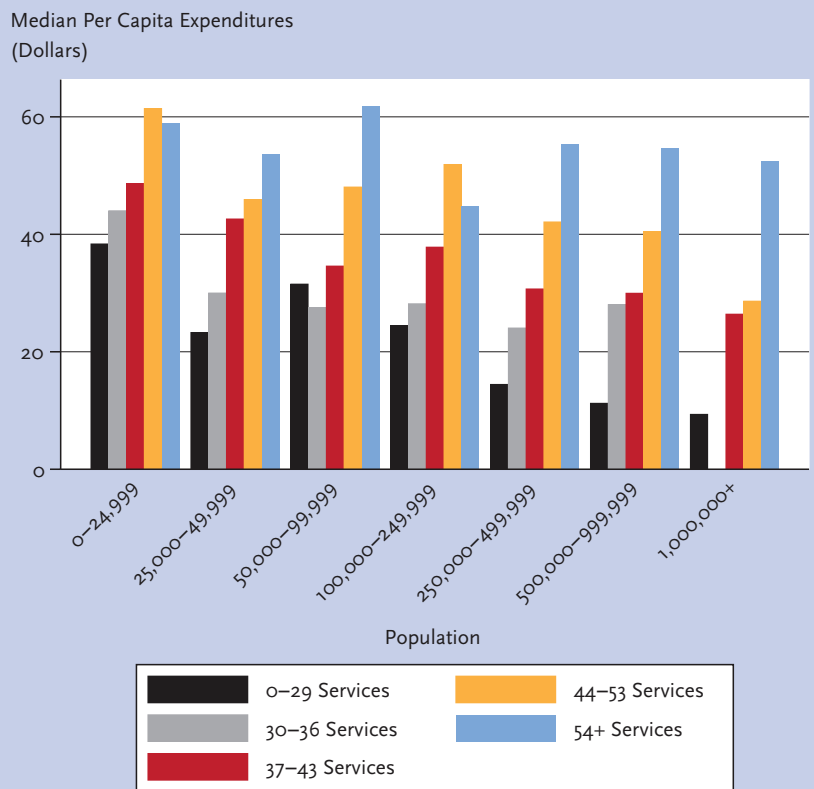
Figure 2 illustrates the relationship between per capita expenditures, the size of the population served, and the number of services offered. NACCHO identified 87 distinct public health services and surveyed local departments as to whether or not they were provided by the responding agency. The graph shows per capita expenditures for LHDs in seven population categories broken down according to five coverage levels: up to 29, 30 to 36, 37 to 43, 44 to 53, and 54 or

24 The Centers for Disease Control and Prevention website lists the 10 essential public health services identified by the Core Public Health Functions Steering Committee in 1994 as a guiding framework for the responsibilities of local public health systems. Each of the essential services is broad. For example, the first is “Monitor health status to identify and solve community health problems.” See <http://www.cdc.gov/nphsp/essentialServices.html>.

25 See Glen P. Mays, Sharla A. Smith, Richard C. Ingram, Laura J. Racster, Cynthia D. Lamberth, and Emma S. Lovely, “Public Health Delivery Systems: Evidence, Uncertainty, and Emerging Research Needs,” *American Journal of Preventive Medicine*, volume 36 (2009), number 3, pp. 256–265; Quiram, Barbara, Michael Meit, Kay Carpenter, Cara Pennel, Graciella Castillo, and Delia Duchicela, “Rural Public Health Infrastructure: A Literature Review,” in Gamm, Larry D. and Linnae L. Hutchison, eds., *Rural Healthy People 2010: A Companion Document to Healthy People 2010*, volume 3, The Texas A&M University System Health Science Center, School of Rural Public Health, Southwest Rural Health Research Center; Stoto, Michael A., “Regionalization in Local Public Health Systems: Variation in Rationale, Implementation, and Impact on Public Health Preparedness” in *Public Health Reports*, volume 123, July–August 2008, pp. 441–449; and Savoia, Elena, Angie Mae Rodday, and Michael A. Stoto, “Public Health Emergency Preparedness at the Local Level: Results of a National Survey,” *Health Services Research*, volume 44, issue 5 (October 2009), part II, pp. 1909–1924.

26 See Mays et al. op. cit. (2009) and Rexford E. Santerre, “Jurisdiction Size and Local Public Health Spending,” *Health Services Research*, volume 44, issue 6 (December 2009), pp. 2148–2166.

**Figure 2. The Effect of Number of Services Offered and Population Size on Per Capita Costs (U.S. Local Health Departments)**



Source: Author’s calculations based on data from National Association of County and City Health Officials (NACCHO) 2010 survey of public health departments.

Notes: Population groupings were derived from NACCHO profile. Service groupings were derived by breaking the whole sample into quintiles based on the number of services offered. The maximum number of services offered was 107. Service counts include both clinical and nonclinical services, and contracted and directly provided services. As explained in the text, a service was counted twice if it was provided directly and through contract. For any given service, fewer than 100 local health departments of the entire sample provided it both directly and via contract.

more services. Not surprisingly, within each population range, LHDs offering more services almost always spend more per capita. For almost every level of coverage, LHDs serving fewer than 25,000 people had the highest per capita costs. This evidence suggests that merging the smallest LHDs into departments serving larger populations would reduce per capita costs. Among the LHDs serving populations of 25,000 or greater, the cost patterns varied somewhat, depending on the number of services offered. However, LHDs serving between 25,000 and 49,999 people never emerged as the lowest-cost providers. This is further support for the argument that consolidation into larger units would reduce the overall costs of providing public health services.

As is the case with PSAPs, the organization of local health departments differs from state to state (Table 4). Rhode Island has a single department serving the entire state. By contrast, Connecticut and Massachusetts have 77 and 330 local health departments, respectively. These are large numbers relative to their populations and land areas. Even accounting for the number of local governments, Connecticut and Massachusetts have the most fragmented organization of local health departments among all the states in the United States. Massachusetts in particular has nearly as many LHDs

as cities and towns (351), implying very little regionalization.

As with PSAPs, LHDs serving very small populations have particularly high operating costs, so another relevant metric in considering consolidation initiatives is the proportion of LHDs that serve relatively few people. NACCHO refers to health departments serving populations up to 50,000 as small. By this categorization, only one of the 10 local health departments in Maine is small. Between 60 percent and 67 percent of LHDs in Connecticut, New Hampshire, and Vermont are small, proportions that are roughly in line with the national average. In Massachusetts, by contrast, over 90 percent of LHDs serve populations of 50,000 or fewer; 77 percent serve populations of 25,000 or fewer.

Our analysis of the potential cost savings from consolidating LHDs in Massachusetts and Connecticut is based on nationwide data from the 2010 NACCHO survey, along with additional demographic data from the U.S. Census Bureau. Here we provide a summary of these estimates; full details are found in Appendix C.

We estimated per capita local health department expenditures as a function of population using regression analysis, based on data from the national sample. The regression allowed per capita costs to vary with the size of the population served. It also accounted for

**Table 4. Fragmentation of New England’s Local Health Department (LHD) System**

	Total LHDs	Per 100K Population (1=Most Fragmented)		Per 1,000 Square Miles (1=Most Fragmented)		Per Government (1=Most Fragmented)	
		Number	Rank	Number	Rank	Number	Rank
Connecticut	77	2.2	9	15.9	2	0.43	2
Maine	10	0.8	27	0.3	35	0.02	46
Massachusetts	330	5.0	2	42.1	1	0.93	1
New Hampshire	5	0.4	35	0.6	27	0.02	45
Rhode Island	1	0.1	49	1.0	23	0.03	41
Vermont	12	1.9	10	1.3	17	0.04	32
New England	435	3.0		6.9		0.27	
United States	2,566	0.8		0.7		0.07	

Source: Author’s calculations based on data from National Association of County and City Health Officials (NACCHO) 2010 survey of public health departments.  
Note: The number of governments excludes special-purpose governments.



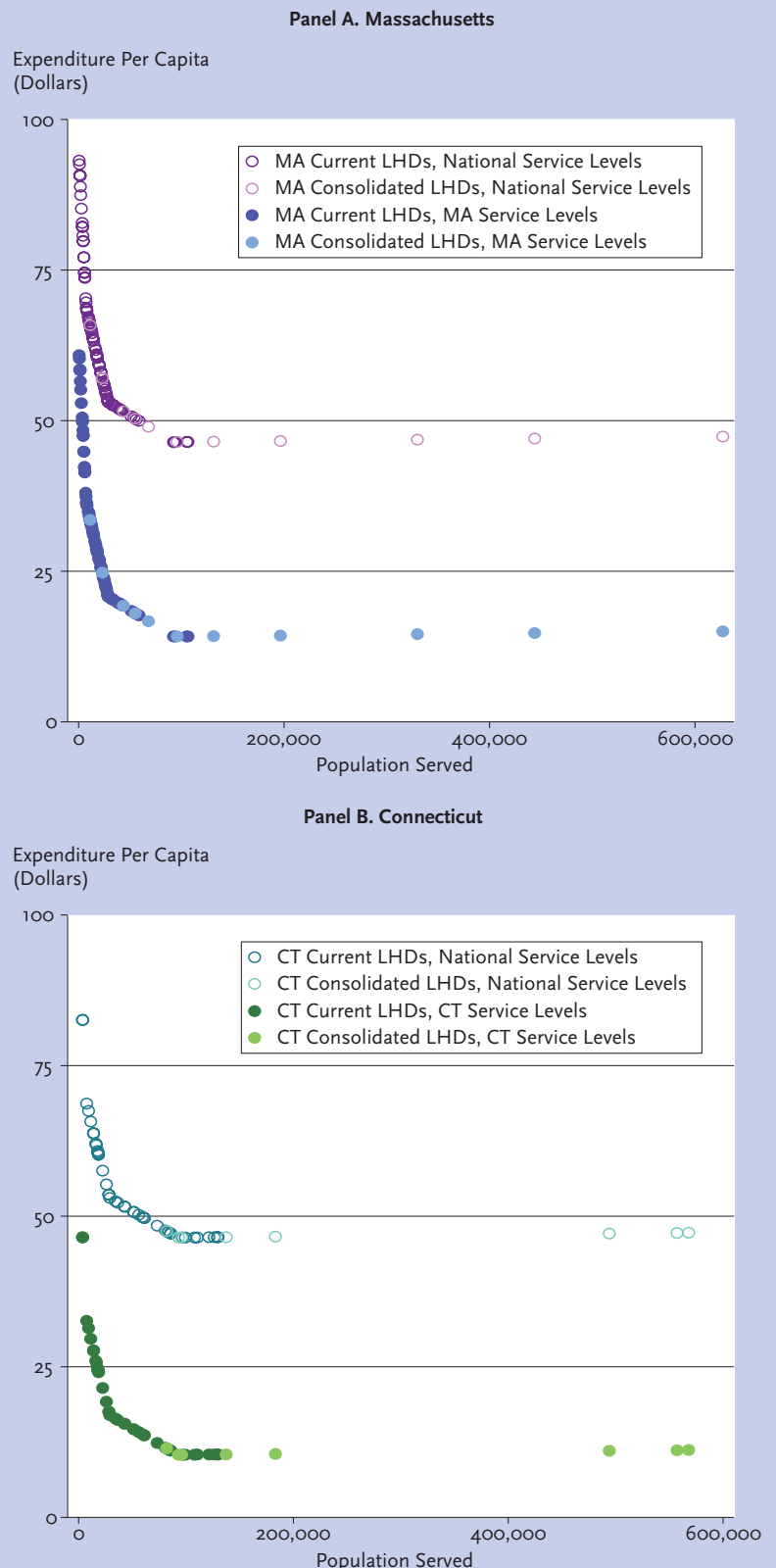
the number of clinical and nonclinical services provided and the extent to which the health department contracted with outside providers. In addition, the specification included demographic characteristics that may affect the demand for public health services. According to our estimates, per capita costs decline sharply until population size reaches about 100,000, and flatten out as population size increases above this threshold. This is consistent with the findings of prior studies.

In reality, local per capita spending on public health is considerably lower in Massachusetts and Connecticut than in many other states. This is because Massachusetts and Connecticut LHDs tend to offer fewer services than many other states. For example, one study found that Massachusetts local public health authorities have limited disease prevention and health promotion services. Panel A of Figure 3 focuses on current and consolidated structures in Massachusetts. The deep purple open circles and dark blue dots show the predicted values for the state's current LHDs at national and state service levels, respectively. As noted, the current structure of Massachusetts local public health areas is governed largely by city and town boundaries, resulting in many small-scale departments. (The graph and analysis exclude the Boston Public Health Department, which serves a population of about 600,000, above the range where studies indicate falling costs per capita.)<sup>27</sup>

In order to generate hypothetical consolidated health departments, we assumed that consolidation would take place along county lines (as in the case of PSAPs). We omitted Suffolk County from the calculations because the Boston Public Health

**Figure 3. Estimated Per Capita Savings from Local Health Department (LHD) Consolidation in Massachusetts and Connecticut**

Estimated Costs Per Capita at Median Service Levels



Source: Author's calculations based on data from National Association of County and City Health Officials (NACCHO) 2010 survey of public health departments.

<sup>27</sup> In addition, the NACCHO survey indicates that spending by the Boston Public Health Department was \$159 million in 2010, putting it among the highest spending departments nationwide. Because our regression analysis employs fairly rudimentary controls for the scope and quality of services provided by each local health department, it is not able to account for this level of spending. The graph and analysis also exclude the remaining health departments in Suffolk County.

Department already covers most of the county's population and is of sufficient scale that further consolidation-related savings would likely be minimal. The sizes of the consolidated LHDs can be seen in the light purple open circles and light blue dots of Figure 3, Panel A. As the graph shows, consolidation would move most health departments to the flat portion of the cost curve, yielding significant per capita savings.

In order to simulate savings from consolidation, we also needed an assumption about which services would be provided by the consolidated departments. We assumed that the consolidated health department would offer a service if the population-weighted majority of the LHDs in that county currently offer the service.<sup>28</sup> All other cost-determining factors (such as the poverty rate and share of the population ages 0 to 19) were assumed to be the population-weighted average of the respective factors of the localities in the consolidated department. We call this methodology “rounded services.”

As shown in Table 5, the total cost of consolidated Massachusetts local public health services outside of Suffolk County

is estimated to be just above one-half of the current cost. Approximately one-half of the savings result from a more efficient scale of production. The remaining one-half reflects net reductions in services under the “rounded services” scenario. While the residents of cities and towns that currently provide limited public health services tend to receive more extensive services as a result of regional consolidation, those who currently receive public health services that are not commonly provided in other cities and towns in their area tend to lose those services.<sup>29</sup> The components of savings vary widely by county. Relative to the rest of the state, savings in western Massachusetts and Cape Cod are driven more heavily by the effects of scale. Savings in more populous areas such as Middlesex County are largely the result of service reductions.<sup>30</sup>

In addition to equalizing public health services within counties, consolidation has the potential to reduce disparities in public health services across the state. Figure 4 shows the distribution of the number of health-related services offered across the current LHDs and under a consolidated structure. Under the current structure, 35 of the 89 LHDs (39 percent) offer between 30 and 39 services, and 54 (the remaining 61 percent) offer either fewer than 30 services or 40 or more services. Under the hypothetical structure, 7 of the 11 regional LHDs (64 percent) offer between 30 and 39 services. Three of the regional LHDs offer fewer than 30 services, and 1 offers more than 30 services.<sup>31</sup>

We performed a similar analysis for Connecticut (Figure 3, Panel B and Table 5). Like Massachusetts, Connecticut has a highly fragmented LHD structure and could

**Table 5. Local Health Department (LHD) Costs under Current and Consolidated Structures in Massachusetts and Connecticut**

	Massachusetts	Connecticut
Current Structure (Millions) <sup>1</sup>	\$59.9	\$61.4
Consolidated Structure (Millions)	\$30.4	\$36.0
Total Savings (Percent)	49.2	41.3
Savings Due to Scale (Percent)	24.8	13.2
Savings Due to Service Reduction (Percent)	24.3	28.1

Source: Author's calculations as described in text and appendix.

Note: Estimates cover LHDs included in the 2010 NACCHO Profile, with the exception of those serving Suffolk County in Massachusetts.

<sup>1</sup> Model-estimated. Actual total cost for the included LHDs is \$47.0 million for Massachusetts and \$61.0 million for Connecticut.

<sup>28</sup> This scenario is equivalent to having each county resident “vote” to keep the mix of services provided by his/her current LHD, and then using majority rule to determine the services offered by the consolidated LHD.

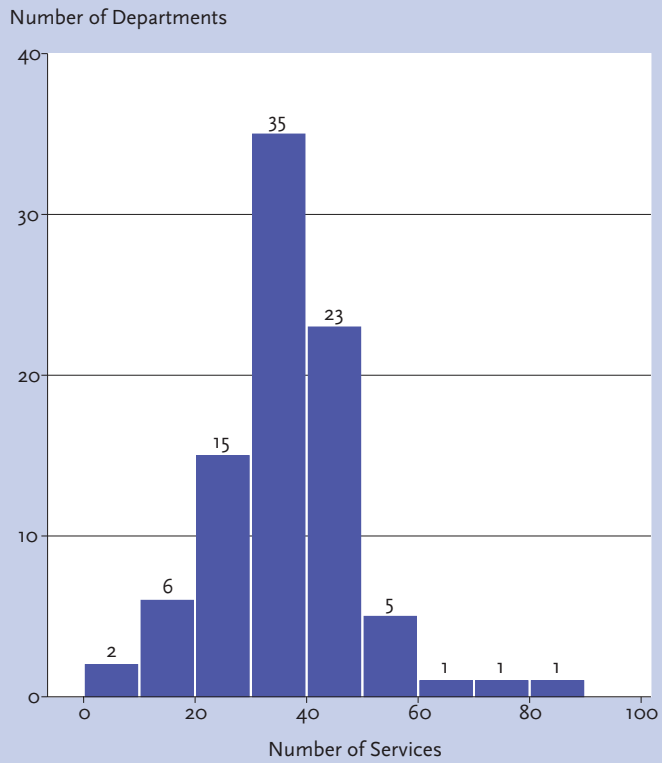
<sup>29</sup> Under the consolidation assumptions, a service is not provided unless 50 percent of the population previously had that service. Because service offerings currently vary widely across LHDs, only the most common ones are retained in the consolidated scenario.

<sup>30</sup> See Appendix C for more methodological detail on the components of savings.

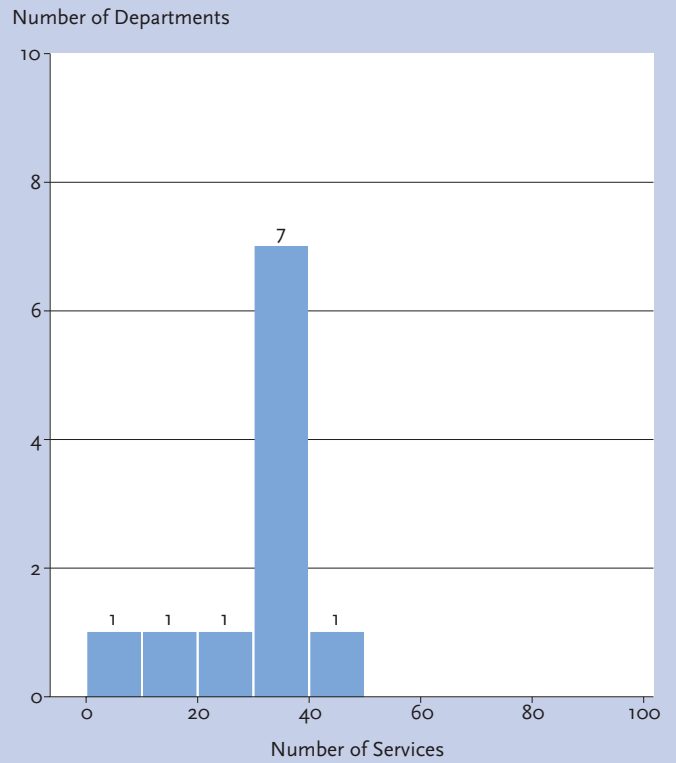
<sup>31</sup> These counts exclude Suffolk County, as well as the two counties that did not respond to the NACCHO survey (Dukes and Nantucket).

**Figure 4. Service Provision by Local Health Departments in Massachusetts and Connecticut under Current and Consolidated Departments**

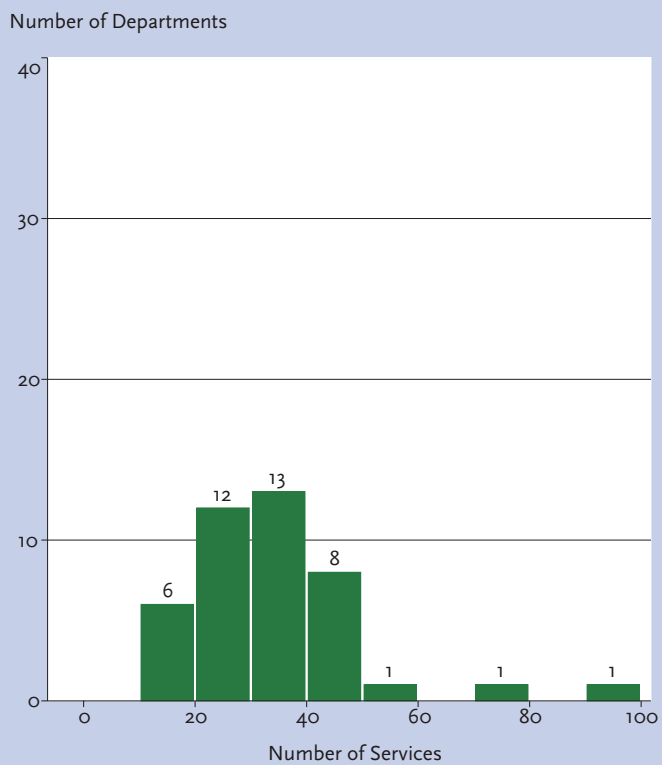
**Panel A. Current Massachusetts Departments**



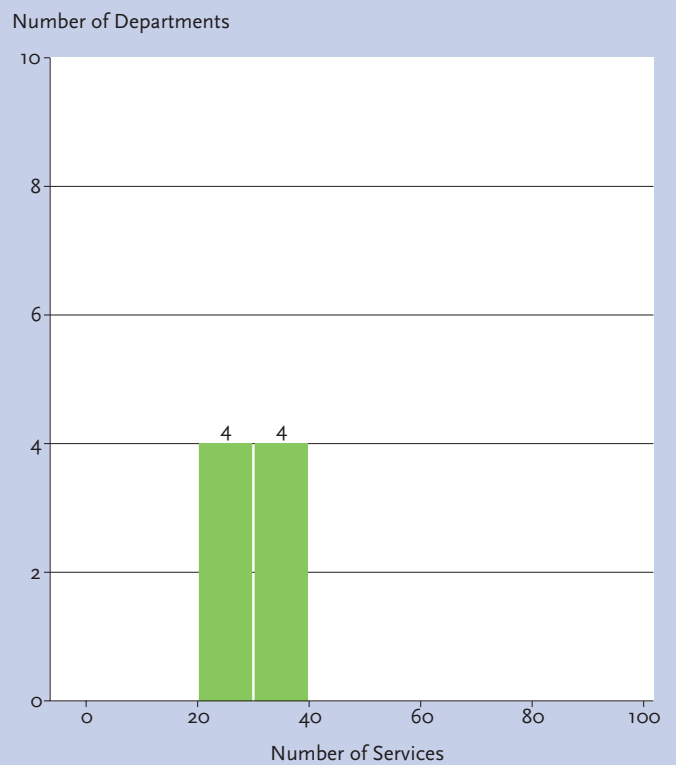
**Panel B. Consolidated Massachusetts Departments**



**Panel C. Current Connecticut Departments**



**Panel D. Consolidated Connecticut Departments**



Source: Author's calculations based on data from National Association of County and City Health Officials (NACCHO) 2010 survey of public health departments.

Note: Number of Services includes directly provided and contracted services, and both clinical and nonclinical services.

reduce expenses by 41 percent through the “rounded services” model of consolidation. The majority of the savings in Connecticut are driven by service reductions. We estimate that one-third of the savings are due to a more efficient scale, while two-thirds are a result of service reductions.

In addition to yielding cost savings, consolidation could sharply reduce service disparities in Connecticut. As displayed in Figure 4, the number of local health department services varies widely across the state. Currently, 13 of the state’s 42 LHDs (31 percent) offer between 30 and 39 services. At the

same time, six LHDs offer fewer than 20 and three offer 50 or more services. Consolidation would reduce the disparity, with all LHDs offering between 20 and 39 services under a consolidated structure.

As in the analysis of PSAPs, the estimates pertain to the long-run implications of consolidation and do not consider all of the details that would have to be worked out in deciding how to merge health departments. Moreover, our analysis implicitly assumes that the respondents to the NACCHO survey are representative of all LHDs. Nonetheless, the analysis indicates that regionalizing delivery of public health services has the potential to yield sizable reductions in both the costs and the disparities of service offerings.

It is important to emphasize that the degree of savings depends critically on the decisions made about which public health services to offer. Massachusetts public health advocates have long noted that the state’s LHDs tend to spend less than those in other parts of the nation, and the state of Connecticut is currently in the midst of assessing and enhancing the capacity of public health departments to carry out the essential services identified by the CDC. Expanding service offerings would mitigate but not necessarily eliminate the cost savings from consolidation. Thus, while some policymakers might view regionalization as a means to reduce costs, others might view it as a way of “paying for” an expansion of public health services.

Massachusetts recently began to encourage regionalization of health departments, by financing the formation of Local Health Districts to facilitate resource sharing among local health departments.<sup>32</sup> This move may eventually result in some cost savings or quality improvements. The Connecticut state government provides incentive funding of \$1.99–\$2.33 per capita

### **Box 3.** **Policy Options: State-Level Incentives and Funding for LHD Consolidation**

Some states have imposed direct requirements to promote regional consolidation of public health services, while others have offered financial incentives. The choice of which policy to pursue has depended on the relationship between local health departments and state government.

In centralized states, a single department runs all local facilities and can mandate the closing of centers. In Florida, a centralized state, regional consolidation has been a direct consequence of efforts to maximize efficiency. Although effective, this approach would be extremely difficult to implement in many states, especially those with a history of strong local control.

In states with shared control, localities run departments, but the state provides some funding and can incentivize consolidation. In Utah, for example, the state allocates approximately one-quarter of LHD funding based on level of regionalization.<sup>1</sup> This approach has been quite effective, as only six of 29 Utah county health organizations continue to be independent. Accreditation offers another lever for encouraging regionalization. Many states either require or allow local health departments to be accredited if they meet certain requirements, including service standards, and then tie funding levels to accreditation. Upon the recommendation of the federal Centers for Disease Control and Prevention, the nonprofit Public Health Accreditation Board was established in 2007 to set standards and perform accreditation nationwide. Connecticut’s current activities around evaluating and improving public health services are designed to lead ultimately to accreditation.

<sup>1</sup> Patrick M. Bernet, “Public Health Regionalization Study National Overview,” prepared for the Massachusetts Department of Public Health and the Kansas Association of Local Health Departments. November 9, 2007.

<sup>32</sup> “The Massachusetts Regionalization Initiative Moving Forward: Five Groups of Municipalities are Awarded Public Health District Incentive Implementation Grants to Strengthen Public Health Capacity Statewide - April 2011.” Accessed July 25, 2012. <http://sph.bu.edu/Regionalization/updates/menu-id-617703.html>



for regionalized centers. Judging by the fact that 20 of Connecticut's 77 departments are regionalized, the formula may have had some effect, albeit limited.<sup>33</sup> However, additional financial incentives or accreditation standards may be needed to accelerate more direct mergers between departments statewide (see Box 3 for examples from other states).

### Pension Administration

Regionalization studies indicate that higher-level finance, administrative, purchasing, and IT tasks are promising candidates for centralization. Lacking data separating out city and town costs for such activities, we turn to an analysis of how consolidation might reduce the costs of administering public pension plans. Pension plan administration involves recordkeeping, disbursing funds, counseling and communicating with participants, and managing investments—activities similar to the other financial and administrative functions performed by local governments.

Cities and towns do not pay for pension plan administration out of general funds or assign their own financial or administrative personnel to managing pensions. Instead, localities that establish defined-benefit retirement plans for their employees set up separate entities to oversee them. The operational costs—which often include fees paid to private investment firms—are funded through a combination of employer and employee contributions to the pension plan, as well as by investment earnings. The higher the administrative costs, the higher the contributions have to be in order to pay

for a given level of retirement benefits, or the less retirees would receive for a given level of combined contributions by governments and public employees. Public sector employees may bear much of the burden of high administrative costs—either through reduced pay while working or through lower benefits while retired—compared with what they would receive if administrative costs were lower. To the extent that high administrative costs are not reflected in reduced pay or benefits, however, their burden is usually borne by taxpayers.<sup>34</sup>

Researchers have found that per capita administrative costs are higher for small defined benefit pension plans than for large defined benefit pension plans, in both the private and the public sectors.<sup>35</sup> For this reason, some experts have argued in favor of consolidating pension plans within states in order to reduce costs.<sup>36</sup> Advances in information technology over time strengthen their position.

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33 Connecticut currently has 20 health departments regionalized into districts, while 32 municipal full-time and 25 part-time LHDs do not share services. See the local health section of the Connecticut Department of Public Health website, [https://www.han.ct.gov/local\\_health/](https://www.han.ct.gov/local_health/). According to Patrick M. Bernet in "Public Health Regionalization Study National Overview," a study prepared for the Massachusetts Department of Public Health and the Kansas Association of Local Health Departments, dated November 9, 2007, the state of Connecticut provides somewhat larger per capita support to local health districts serving populations of 5,000 and over than to those with smaller populations. This threshold population level is very low compared with the range over which per capita costs have been shown to fall.

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34 In extreme cases, where local public pension plans are chronically underfunded and localities seek financial assistance from state government, the burden is borne by state taxpayers.

35 Olivia S. Mitchell and Emily S. Andrews (1981) found that economies of scale were evident in private multi-employer pension plans and recommended that policymakers consider pension plan consolidation in the private sector and possibly in the public sector. See "Scale Economies in Private Multi-Employer Pension Systems," *Industrial and Labor Relations Review*, vol. 34, no. 4 (July), pp. 522–530. Ralph A. Pope (1986) conducted a similar study of state and municipal pension plans with at least 1,000 members and also found substantial economies of scale. Hence, consolidation of smaller plans would reduce costs per plan member. See "Economies of Scale in Large State and Municipal Retirement Systems," *Public Budgeting and Finance*, volume 6, issue 3 (Autumn), pp. 70–80. Additional evidence by size and type of plan is presented in Edwin C. Husted, "Administrative Costs of State Defined Benefit and Defined Contribution Systems," in Olivia S. Mitchell and Gary Anderson, eds., *The Future of Public Employee Retirement Systems*, Oxford and New York City: Oxford University Press, 2009.

36 Larger plans tend to have riskier and more diverse portfolios. Historically, this asset composition resulted in higher returns, but it adversely impacted investment earnings during the Great Recession. See National Education Association, "Does Scale Matter for Public Sector Defined Benefit Plans? Evidence of the Relationship among Size, Investment Return and Plan Expense," April 2009. See also Alexander Dyck and Lukasz Pomorski. "Is Bigger Better? Size and Performance in Pension Plan Management." Working Paper. November 2011.

**Table 6. Fragmentation of New England’s Public Pension System**

	Total Pensions	Per 100K Population (1=Most Fragmented)		Per 1,000 Square Miles (1=Most Fragmented)		Per 100 Governments (1=Most Fragmented)	
		Number	Rank	Number	Rank	Number	Rank
Connecticut	59	1.7	6	12.2	4	9.09	5
Maine	1	0.1	44	0.0	47	0.12	49
Massachusetts	100	1.5	7	12.8	2	11.61	2
New Hampshire	4	0.3	27	0.4	21	0.73	33
Rhode Island	13	1.2	9	12.4	3	9.70	4
Vermont	5	0.8	17	0.5	18	0.68	36
New England	182	1.3		2.9		4.83	
United States	2,540	0.8		0.7		2.84	

Source: Author’s calculations based on 2007 Census of Governments and 2010 Decennial Census.

Note: In contrast to the data shown on prior tables, the data for number of governments shown here include special-purpose governments. These types of governments are likely to have pension plans of their own and thus must be included for conceptual consistency.

Assuming that no countervailing forces would increase costs or reduce rates of return, consolidation could translate into reductions in government employer contributions (and thus a reduced burden on taxpayers) in order to maintain current funding ratios for local pension plans. Alternatively, government employers (and thus taxpayers) would need to increase their contributions by less in order to achieve higher funding ratios than under the current pension plan structure.

The extent of public pension plan consolidation varies across the New England states. At one extreme, Maine allows all state and local public employees to participate in a single retirement system (Table 6).<sup>37</sup> At the other extreme, Connecticut, Massachusetts, and Rhode Island have fragmented systems. Massachusetts in particular has 100 separate pension systems, the sixth highest number across all states.<sup>38</sup> All three southern New

England states rank among the top five in the number of pension plans relative to the number of governments.<sup>39</sup>

While having numerous plans in relation to their populations and government structures, Connecticut, Massachusetts, and Rhode Island do not actually diverge very much from national norms in the percentage of small plans. The Center for Retirement Research at Boston College defines small pension plans as those with up to \$500 million in assets. By this definition, 90 percent of U.S.

37 According to the Census Bureau, Maine has only one public retirement system. However, participation is not mandatory and the Maine Public Employees Retirement System (MainePERS) reports that some localities do not participate in the state system. However, the number of participating entities has increased over the past few years. See “Public-Employee Retirement Systems State- and- Locally-Administered Pensions Summary Report: 2010” Erika Becker-Medina. April 30, 2012. See also MainePERS CAFRs, available at <http://www.maineperc.org/Publications/Publications.htm>.

38 According to the Census Bureau, Pennsylvania had the largest number of public employee retirement systems

(1,425) in 2010, followed by Illinois (457 systems), Florida (303 systems), Minnesota (145 systems), and Michigan (138 systems). See “Public-Employee Retirement Systems State- and Locally-Administered Pensions Summary Report: 2010” available at [www.census.gov/prod/2012pubs/g10-arec-sl.pdf](http://www.census.gov/prod/2012pubs/g10-arec-sl.pdf). Calls for consolidation of local plans have been longstanding in Pennsylvania, and include a report of the Public Employee Retirement Commission of Pennsylvania issued in 2011. The count for Massachusetts includes some local pension plans whose assets are invested by a statewide authority. In recent years, government pension plans that are less than 65 percent funded and underperform a specified benchmark must transfer their assets to the Massachusetts Pension Reserve Investment Management Fund. In Connecticut, cities and towns are eligible to join the state-run Municipal Employees Retirement Fund only if they comply with certain funding requirements.

39 These statistics refer to both state and local retirement plans. For similar statistics pertaining to local plans only, see Tracy Gordon, Heather M. Rose, and Ilana Fischer, “The State of Local Government Pensions: A Preliminary Inquiry,” Lincoln Institute of Land Policy Working paper, July 2012.

plans are small. The shares in Connecticut, Massachusetts, and Rhode Island are only slightly above that threshold.

As in the previous examples, our analysis of potential cost savings focuses on Massachusetts and Connecticut, with full methodological details relegated to Appendix C. The data are drawn from the U.S. Census Bureau's nationwide surveys of public employee retirement systems for 2002 to 2008.<sup>40</sup> Administrative expenses include employees' salaries, investment fees, and equipment and building rentals or costs, as well as some smaller categories of operating costs.<sup>41</sup>

Drawing on previous econometric research, we measure scale by the number of pension plan members.<sup>42</sup> The regression specification allows for administrative costs per participant to vary with both the number of members and the value of assets per member. The regression results indicate that per capita administrative expenses are higher for smaller plans. Costs per participant fall sharply as plan size increases up to about 70 participants, corresponding to the smallest 30 percent of pension plans nationally. Costs continue to fall at a moderate rate until the number of members reaches about 1,500 members, the national 70th percentile. Costs fall more modestly as the number of participants increases above this level, and flatten around 90,000 participants.

For 2007, 54 local government pension plans and 11 state-level pension plans in Massachusetts reported administrative costs to the Census Bureau.<sup>43</sup> We first consider

consolidation of all local plans into a combined plan. Such a merger would eliminate the smallest public pension plans in the state (Figure 5, Panel A). According to the regression analysis, the overall cost of administering pensions for local government employees would fall by about 38 percent (Table 7). Combining all the state-level plans into a single plan (Figure 5, Panel B) would reduce the cost of administration by 13 percent. Incorporating all state and local plans into a single plan with some 500,000 participants (Panel C) would realize even greater economies of scale. The regressions indicate that aggregate administrative costs would fall on the order of about 28 percent from current levels.<sup>44</sup>

A similar analysis for Connecticut yields smaller savings (see Figure 5, Panels D–F, and the bottom of Table 7). In 2007, the Census of Governments recorded administrative costs for 48 local plans and five state plans in Connecticut.<sup>45</sup> As shown in Table 7, we estimate that consolidating Connecticut's local plans would reduce expenses by more than 14 percent, consolidating state plans would cut costs by about 8 percent, and combining all plans would reduce costs by about 17 percent.<sup>46</sup> A key reason for the smaller cost savings in Connecticut is that the two largest existing plans, the Teachers Retirement Board and the State Employees Retirement Commission, already cover roughly 80 percent of the employees and retirees in the Connecticut sample.

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include those plans that did not report expenses (and thus are not included in our analysis), there are 87 local plans and 13 state plans in Massachusetts.

40 More plans are represented in 2002 and 2007 than in the other years because the Census Bureau strives to collect data from all plans every five years, while surveying only a representative sample of plans in other years. Nonetheless, even the 2002 and 2007 data are incomplete because compliance with the Census of Governments is voluntary, and many plans either fail to respond or respond only partially.

41 In some systems, most notably the California Public Employees' Retirement System, investment losses are included in administrative expenses. Source: personal communication with Erika Becker-Medina, U.S. Census Bureau.

42 The terms "members" and "participants," as used in this paper, include active employees, vested employees, and beneficiaries.

43 The Census Bureau included six regional Massachusetts pension plans in the "state" category. These counts reflect only plans that reported administrative expenses. If we

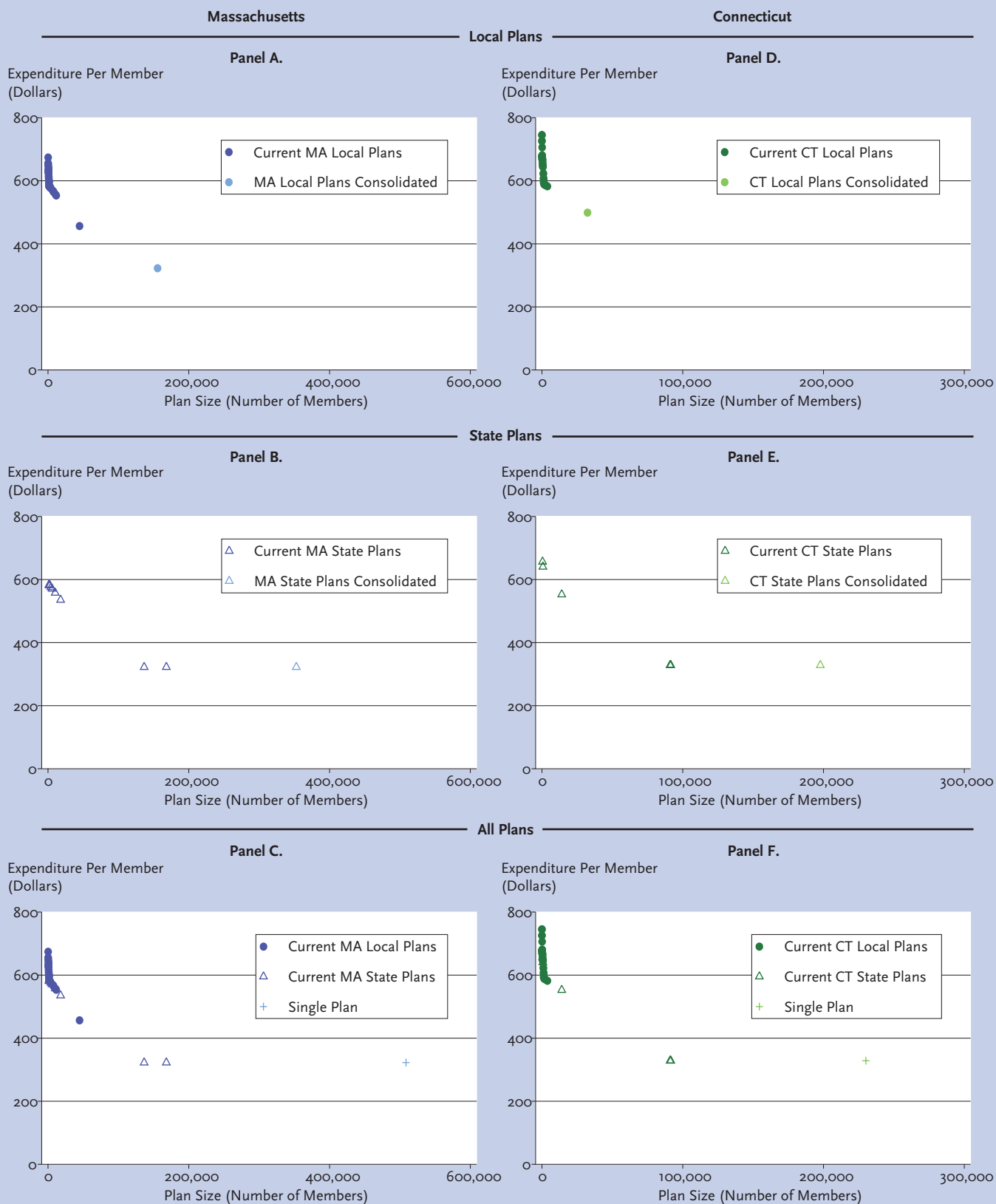
44 We also investigated whether plans investing in Massachusetts' Pension Reserves Investment Trust (PRIT), a pooled fund for public plans, have lower administrative costs per member than non-PRIT plans. Because most of the expansion of PRIT took place late in our sample period, we were unable to discern such an effect using econometric methods.

45 These reflect plans that reported administrative expenses. If we include those plans that did not report expenses (and therefore are not included in our analysis), there are 55 local plans and six state plans in Connecticut.

46 These plans have roughly 90,000 participants each (compared with about 230,000 individuals in all reported plans statewide).

# Figure 5. The Effect of Pension Plan Size on Estimated Per Capita Costs

Estimated Savings From Consolidation



Source: Author's calculations using Census Bureau data on Retirement Systems, 2002–2008.

Note: Asset level medians are not weighted by member size. Plans are displayed at 2007 sizes.

**Table 7. Estimated Public Pension Administration Costs under Current and Consolidated Structures**

Massachusetts							
Current Structure <sup>1</sup>	Type of Consolidation						
	Local Plans Only		State Plans Only		All Plans		
Costs (Millions)	Costs (Millions)	Savings (Percent)	Costs (Millions)	Savings (Percent)	Costs (Millions)	Savings (Percent)	
Local Plans	\$86.4	53.7	37.8	\$86.4	0.0	\$48.7	43.7
State Plans	\$130.5	\$130.5	0.0	\$113.4	13.1	\$107.4	17.7
Total	\$216.9	\$184.2	15.1	\$199.8	7.9	\$156.0	28.1

Connecticut							
Current Structure <sup>2</sup>	Type of Consolidation						
	Local Plans Only		State Plans Only		All Plans		
Costs (Millions)	Costs (Millions)	Savings (Percent)	Costs (Millions)	Savings (Percent)	Costs (Millions)	Savings (Percent)	
Local Plans	\$19.4	\$16.6	14.5	\$19.4	0.0	\$11.0	43.1
State Plans	\$61.2	\$61.2	0.0	\$56.2	8.2	\$55.7	8.9
Total	\$80.6	\$77.8	3.5	\$75.5	6.2	\$66.8	17.1

Source: Author's calculations based on Census Bureau data on Retirement Systems, 2002–2008.

Note: Table entries refer to average costs over the 7-year period for the pension plans covered in the census or survey.

<sup>1</sup> Model-estimated. Actual costs are \$59.6 million for local plans, \$119.9 million for state plans, and \$179.5 million for all plans.

<sup>2</sup> Model-estimated. Actual costs are \$18.5 million for local plans, \$89.8 million for state plans, and \$108.4 million for all plans.

As discussed in relation to the other examples, these are ballpark estimates of the possible savings in the long run as a result of economies of scale. We assume that the pension plans covered by the Census Bureau data are representative of all public pension plans in Massachusetts and Connecticut, and that the actual and hypothetical combined plans have portfolio compositions similar to those of the currently existing public pension plans of comparable size throughout the nation. To the extent that the combined plans pursued costlier investment strategies or provided participants more extensive financial services than the comparably sized existing plans, the savings would tend to be smaller than estimated.

A review of the evidence indicates that only a handful of states have consolidated their state and local public pension plans to any appreciable degree (see Box 4). Pension plan mergers have typically involved expanding statewide plans to include employees of smaller plans. To a large extent, these mergers have been motivated by factors other than

cost. One of the key aims has been to enhance labor mobility, as consolidation allows public employees to move from one covered job to another without losing retirement credits. The consolidations have taken place sequentially over a course of decades, rather than all at once.

While the evidence on costs supports pension plan consolidation, the practical obstacles remain substantial in many states because the individual plans differ in their eligibility requirements, employer and employee contributions, and retirement benefits. Furthermore, in many of these states, the state legislatures have limited authority over public pensions, and local governments must negotiate any changes with employee representatives—potentially a protracted and contentious process. Finally, unlike some other states around the nation, the New England states do not provide financial subsidies to local plans, further weakening the states' vested interest in plan structure. While these barriers are arguably substantial, the



#### Box 4. Examples of Public Pension Plan Consolidation Outside of New England

Large cities were the first public employers to establish retirement systems for their employees. The first plan for state employees was started by Massachusetts in 1911. Over time, many local plans for teachers were merged into statewide teacher plans, but employees of large cities usually remained in separate plans.<sup>1</sup>

Among states, Wisconsin has the best-documented history of pension plan consolidation.<sup>2</sup> In 1947, prompted by the proliferation of separate employee retirement systems, some of which were very small and appeared financially unsustainable, a committee of the Wisconsin state legislature recommended the consolidation of public pension systems in the state. The legislature passed such a law, but allowed for gradual phase-in.

In the initial phase, new employees were enrolled in an umbrella state plan, while existing local employees continued to participate in local plans. By 1967, Wisconsin had a combined retirement system covering most state and local government employees, including teachers. Finally, in 1977, the remaining police and fire department retirement systems began to be merged into the consolidated state plan. The resulting Wisconsin Retirement System is one of the largest retirement systems in either the public or private sector, and is one of the best-funded plans in the nation.<sup>3</sup>

Colorado, Florida, and New York also operate consolidated state-local retirement systems. Exceptions continue to exist, however, and public officials continue to press for further expansion of consolidated plan coverage to additional localities and worker categories.<sup>4</sup>

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1 For a comprehensive history of public pension plans in the United States, see Robert L. Clark, Lee A. Craig, and John Sabelhaus, *State and Local Retirement Plans in the United States*, Northampton, MA: Edward Elgar Publishing, 2011.

2 A particularly good summary appears in “Oversight of the Wisconsin Retirement System,” State of Wisconsin Legislative Reference Bureau, Information Bulletin 06-2, February 2006.

3 According to the Pew Center on the States, the Wisconsin Retirement System (WRS) was the only fully funded pension system in the country as of 2010. State laws prohibit the use of pension funds for any other purpose, and the WRS can increase contributions without legislative approval. In addition, the WRS can withhold funds from local aid if contributions from localities are not paid in full. Finally, the plan includes flexibility to adjust benefits based on investment returns. WRS investment return assumptions are lower than those of most large plans in the nation, reflecting a higher aversion to risk. See “The Widening Gap Update.” The Pew Center on the States. June 2012. Also see Ronald A. Wirtz. “Top of the Pension Class.” Federal Reserve Bank of Minneapolis Fedgazette. January 2011, pp. 8. <http://www.minneapolisfed.org/pubs/fedgaz/11-01/pensions.pdf>.

4 The most common exceptions in these and other states are for teachers and the employees of large cities. See John Moran, “Unified Pension Systems for State and Municipal Employees in Colorado, Florida, and New York,” OLR Research Report 2005-R-0885, December 14, 2005, and United States Government Accountability Office, “State and Local Government Pension Plans: Governance Practices and Long-term Investment Strategies Have Evolved Gradually as Plans Take on Increased Investment Risk,” GAO-10-754, August 2010.

current statutes governing the Massachusetts retirement system help to set the stage for consolidation. In Massachusetts, legal statutes already harmonize benefits, contribution requirements, and accounting and funds structure across an array of different public plans, reducing the need to reconcile differences in the event of consolidation.<sup>47</sup> Connecticut, by contrast, lacks a uniform statute covering all retirees.<sup>48</sup>

As a result of these obstacles, further instances of the consolidation of pension plans are likely to be limited to new employees (with existing members continuing to be covered by existing plans), or to situations where local governments are experiencing severe financial distress. Since some New England states and localities are already considering (and in some cases introducing) major reforms in employee contributions and retiree benefits—either for all employees or just for new employees—they may have greater opportunities to pursue plan consolidation than they have had in the past.<sup>49</sup>

More broadly, the findings on pension plan consolidation can be viewed as indicative of the potential cost savings from consolidating other high-level financial and administrative functions across cities and towns. Back-office tasks associated with accounting and purchasing tend to be quite similar, regardless of the state agency or locality.<sup>50</sup> For this reason, the practical barriers to

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47 See Chapter 32 of the Massachusetts General Laws.

48 In Connecticut, retirement plans for state employees and municipal employees are governed by the Connecticut General Statutes, Section 5-155a. Plans for teachers are governed by the Connecticut General Statutes 10-183.

49 For accounts of recently enacted reforms at the state level, see “The Widening Gap Update” by the Pew Center on the States, June 2012, available at [www.pewstates.org/state-pensions-update](http://www.pewstates.org/state-pensions-update).

50 The State of Ohio has consolidated back-office functions across state agencies, and similar measures are currently under consideration by state legislatures in Minnesota and New York State. A further step toward consolidation might involve allowing localities to use such state resources. In Ohio, the shared services division of the Office of Budget and Management provides accounts payable services, travel reimbursement processing, and/or vendor management to 15 state agencies. The consolidation is estimated to save the state \$26 million annually

consolidation may be considerably less than in the case of pensions.

## Summary and Conclusions

New England has a well-deserved reputation for allowing its residents to exert strong local control over many matters that affect their economic and social well-being. This public policy stance enables people to “vote with their feet” in choosing a community that provides the public services that are most closely aligned with their own individual preferences. However, to the extent that the costs of government-provided services appear likely to rise more than the electorate’s willingness to pay for them, many local officials (in both New England and elsewhere) are being forced to reconsider cost-saving options that once would have generated widespread resistance. These changes include service sharing and other forms of consolidation across localities in order to take advantage of economies of scale. This report attempts to bring some quantitative evidence to bear on the issue as policymakers assess such options.

On the one hand, New England is a good target for regional consolidation efforts. Many local governments in New England serve small populations or land areas. On the other hand, agreeing on how to coordinate the delivery of specific public services is complicated and cannot be accomplished as a “quick fix” in the midst of a budget crisis. Consolidating services across jurisdictions offers the potential for saving costs in the long run and should be considered seriously if the alternative is permanent reductions in the scope or quality of public services provided by cities and towns. And while consolidation cannot be completed quickly, a local fiscal crisis can serve

as a catalyst, particularly when it is serious enough to prompt state intervention.

Some local public services can be provided at lower cost and at similar or even improved quality levels through regionalization, while others should continue to be provided by individual cities and towns, barring specific evidence to the contrary. It appears that up to roughly 20 percent of overall local government spending in New England is for services that rely heavily on capital equipment, technology, or specialized skills, and could be provided more cost-effectively at a regional rather than a local scale without sacrificing service quality.

This study focuses on three specific service types that have been identified nationally as prime candidates for consolidation across cities and towns: 9-1-1 call handling and dispatch, public health, and high-level administrative and financial functions (as exemplified by public pension administration). Although these services tend to be delegated to local governments or authorities, in fact the New England states differ in the degree to which service areas cross geographic or political boundaries. For all three functions, Maine has extensive service sharing and centralization. The remaining two northern New England states (New Hampshire and Vermont) tend to have more service sharing and centralization than the southern New England states (Connecticut, Massachusetts, and Rhode Island). The major exception is that Rhode Island has only one public health department serving the entire state.

This study applies regression analysis to actual data from other states to gauge how much Massachusetts and Connecticut governments could save by consolidating service provision for each of the three services. The potential savings vary, depending on the service and the hypothetical consolidation scenario considered. Regional consolidation of emergency call handling and dispatch yields the most cost reduction—over 50 percent in the scenarios

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and to cut travel processing expenses by 68 percent. See “Examining the Effective & Efficient Delivery of Public Services in Connecticut.” Presentation from Connecticut Institute for the 21st Century. February 1, 2012. See also Jerry Mechling. “Case Study: Ohio Shared-Service Project Succeeds With Internal Path to Process Efficiency and Cost Savings.” Gartner Industry Research. August 6, 2010.

considered for both Massachusetts and Connecticut. Moving to larger-scale public health departments offers somewhat smaller but still substantial cost reduction for these two states. Consolidating the administration of public pension plans would bring about much larger percentage savings in Massachusetts than in Connecticut, owing to the greater existing degree of fragmentation in Massachusetts.

While the methodology underlying these estimates undoubtedly leaves out many of the details that would be needed to examine specific cases, it at least indicates that local control for 9-1-1 call handling and dispatch, public health, and some administrative and financial functions comes at a nontrivial cost to taxpayers. (In the case of public pensions, the higher costs may fall largely on plan participants rather than taxpayers.)

The study also discusses policies that other states have used to promote regionalization or consolidation of these services, including direct mandates and financial incentives, and it contrasts these policies with policies currently in place in New England. Although the direct evidence focuses on three specific service types, states may be able to accelerate regionalization of additional local services using similar tools.

In summary, the study comes to three broad conclusions. First, policymakers should not expect regionalization to offer immediate, major relief from the budgetary stresses that many local governments are experiencing. Rather, policymakers should consider regional consolidation in addition to other measures that could bring local budgets into structural balance over the medium to long term. Second, based on both cost and quality considerations, a strong case can be made for sharing or centralizing some services that are currently provided mostly at the local level throughout much of New England, particularly in the three southern states. Third, in states with fragmented public service provision, state legislatures could encourage further regionalization by adopting stronger and more targeted regulations and fiscal incentives.

Such measures would likely result in accelerated regionalization, compared with the situation in which local governments pursue intermunicipal partnerships and service sharing without these types of intervention.

## Appendix A: Comparing the Size and Spending Allocations of New England's Localities with National Norms

Determining the degree to which public services are provided in a fragmented or consolidated manner in different parts of the United States is a difficult undertaking. The division of responsibilities between states and local governments varies across both states and expenditure categories. For example, in some areas, cities and towns are responsible for local road maintenance, whereas elsewhere this function is performed by counties or special transportation districts. Another example is firefighting: in some locations it is provided by standalone fire districts, in others by governments that provide a broad range of services. Allowing for the fact that some local governments contract with private providers who may also work for other local governments complicates the analysis still further.

To gain a basic understanding of the size of local governments in New England versus elsewhere, we look at the total number of local governments and two broad subcategories of local government: general-purpose governments and special-purpose governments. General-purpose governments include entities such as counties, municipalities, and towns that provide a broad range of public

services within a specified geographic area. Special-purpose governments have sufficient administrative and fiscal autonomy to operate as standalone entities, but they are very limited in the types of services they are authorized to provide.

Nationwide, special-purpose governments outnumber general-purpose governments. This is also the case in all of the New England states except Maine, (Table A1, right panel). Outside of New England, school districts mostly operate independently of cities, towns, or counties, and therefore are included in the special-purpose category. New England has some regional school districts, but many of its special-purpose governments concentrate on non-education services (such as economic development, transportation, housing, utilities, and conservation) and have relatively small budgets.

The left panel of Table A1 shows the number of local governments per million residents (including both general-purpose and special-purpose governments). New England has 261 local governments per million residents. Somewhat surprisingly, this is slightly *lower* than the national figure, implying that the average local government in New England serves a slightly *larger* population than is true nationally. However, there is considerable variation across the six New England states. Vermont, with 1,171 local

**Table A1. Number of Local Governments in New England and Nationwide**

	Number			Type of Government			
	Total	Per Million Residents	Per 1,000 Square Miles	General Purpose		Special Purpose	
				Total		Total	Special Districts
Connecticut	649	181.6	134.0	179	470	453	17
Maine	850	639.9	27.5	504	346	248	98
Massachusetts	861	131.5	109.8	356	505	423	82
New Hampshire	545	414.0	60.8	244	301	137	164
Rhode Island	134	127.3	128.2	39	95	91	4
Vermont	733	1171.4	79.2	296	437	144	293
New England	3,772	261.1	60.1	1,618	2,154	1,496	658
United States	89,476	289.8	25.3	39,044	50,432	37,381	13,051

Source: Author's calculations based on 2007 Census of Governments and 2010 Decennial Census.

**Table A2. Local Government Direct General Spending**

	Percentage of Direct General Expenditures Spent on:		Total Direct General Expenditure (Millions)
	Education	Non-education	
Connecticut	59.0	41.0	\$13,729
Maine	54.2	45.8	\$4,058
Massachusetts	51.7	48.3	\$23,923
New Hampshire	54.0	46.0	\$4,496
Rhode Island	55.9	44.1	\$3,691
Vermont	66.3	33.7	\$2,001
New England	54.9	45.1	\$51,898
United States	44.1	55.9	\$1,293,639

Source: Author's calculations based on 2007 Census of Governments.

governments per million residents, has the most fragmented structure, while Rhode Island, with 127 local governments per million residents, has the least fragmented. Overall, the data reveal a divide between the northern and the southern parts of New England. Maine and New Hampshire (along with Vermont) have more governments per capita than the New England or U.S. averages, while Massachusetts and Connecticut (along with Rhode Island) have fewer.

Land area provides an alternative metric for comparing the sizes of local governments. The left panel of Table A1 also shows the number of local governments per 1,000 square miles. According to these data, of the six New England states, only Maine looks similar to the nation. Maine has 27.5 local governments per 1,000 square miles, slightly above the U.S. total of 25.3. In each of the remaining New England states—and particularly in Connecticut, Massachusetts, and Rhode Island—local governments are responsible for relatively small land areas. This suggests that governments throughout much of the New England region could regionalize services without incurring high transportation costs or imposing high transportation costs on their residents.

Turning to the functions of local government, the allocation of local government spending varies across states, depending on factors such as the division of responsibilities

between state government and local governments, as well as on the scope and intensity of services provided.<sup>51</sup> Table A2 shows the breakdown of total local government spending into education and non-education functions for each of the New England States, all six New England states combined, and the United States. Nationwide, 44 percent of local government spending is allocated to education, with the remaining 56 percent to other services. In the New England region, the proportions are almost exactly reversed, with education accounting for a little more than one-half of local government spending and other, non-education functions accounting for a little less than one-half of the total.

Table A3 shows the breakdown of non-education spending into more specific functions. The major categories are: social services & income maintenance; transportation; public safety; environment & housing; government administration; interest on general debt; and general expenditure, NEC (not elsewhere classified). Both in New England and elsewhere, local governments perform a wide range of functions, and no one function (outside of education) accounts for a particularly large share of the overall budget.

Roughly one-fifth of local government non-education spending goes to public safety, mostly police and fire protection. Nationwide, police protection is the single largest category (both within public safety and overall), accounting for about 10 percent of local government non-education spending. Except in Maine, police protection accounts for a greater share of nonschool municipal spending in the New England states than in the nation as a whole. Another one-fifth of total local non-school spending in both New England and the nation falls in the environment & housing category, which includes housing and community

51 Previous New England Public Policy Center research analyzes the degree to which differences in the allocation of state and local combined spending are the result of the circumstances facing different states versus the choices made by policymakers in different states. See Jennifer Weiner, "How Does New Hampshire Do It? An Analysis of Spending and Revenues in the Absence of a Broad-based Income or Sales Tax," NEPPC Research Report No. 11-1 (April 2011).



**Table A3. Local Direct General Expenditure (Minus Education Spending) by Function: All Local Governments (Percent of Total)**

	CT	ME	MA	NH	RI	VT	NE	US
Total direct general expenditures (minus education services)	100	100	100	100	100	100	100	100
<b>Social Services &amp; Income Maintenance</b>	<b>3.6</b>	<b>7.1</b>	<b>9.0</b>	<b>11.3</b>	<b>1.0</b>	<b>1.4</b>	<b>7.0</b>	<b>21.6</b>
Public welfare	1.6	1.9	0.6	9.9	0.5	0.2	1.7	6.7
Hospitals	0.0	3.8	7.5	0.0	0.0	0.0	4.0	9.8
Health	2.0	1.5	1.0	1.4	0.5	1.3	1.3	5.1
<b>Transportation</b>	<b>9.1</b>	<b>16.7</b>	<b>6.7</b>	<b>14.0</b>	<b>6.2</b>	<b>26.9</b>	<b>9.3</b>	<b>11.0</b>
Highways	8.5	13.7	6.2	10.4	6.1	23.8	8.2	7.8
Other	0.6	3.0	0.5	3.5	0.2	3.1	1.0	3.2
<b>Public Safety</b>	<b>21.5</b>	<b>19.6</b>	<b>23.8</b>	<b>23.3</b>	<b>34.8</b>	<b>16.6</b>	<b>23.4</b>	<b>19.2</b>
Police protection	12.5	8.7	11.8	12.0	16.4	10.4	12.0	10.1
Corrections	0.0	3.7	2.4	2.6	2.6	0.0	1.9	3.3
Fire protection	8.6	6.7	8.5	8.2	15.2	6.1	8.7	5.1
Protective inspection & regulation	0.4	0.4	1.2	0.5	0.6	0.1	0.8	0.8
<b>Environment &amp; Housing</b>	<b>23.9</b>	<b>24.9</b>	<b>23.4</b>	<b>18.9</b>	<b>19.9</b>	<b>25.0</b>	<b>23.0</b>	<b>19.6</b>
Natural resources	0.1	0.2	0.2	0.6	0.1	0.4	0.2	1.2
Parks and recreation	3.9	3.7	1.9	3.9	3.5	3.5	2.9	4.5
Housing and community development	9.2	6.4	11.5	4.0	8.5	7.3	9.5	5.2
Sewerage	6.8	8.4	6.4	5.3	4.9	9.5	6.6	5.9
Solid waste management	3.8	6.3	3.4	5.0	2.8	4.4	3.9	2.8
<b>Government Administration</b>	<b>10.4</b>	<b>12.4</b>	<b>7.9</b>	<b>12.3</b>	<b>12.9</b>	<b>12.4</b>	<b>9.7</b>	<b>9.7</b>
Financial administration	3.9	3.4	2.5	3.7	3.1	4.3	3.1	2.4
Judicial and legal	0.8	0.9	0.6	1.2	0.8	0.9	0.7	2.7
General public buildings	1.8	2.8	3.4	2.0	4.4	1.5	2.9	1.4
Other	4.0	5.3	1.4	5.4	4.6	5.8	3.0	3.1
<b>Interest on General Debt</b>	<b>5.6</b>	<b>5.3</b>	<b>5.2</b>	<b>4.7</b>	<b>4.6</b>	<b>4.6</b>	<b>5.2</b>	<b>7.2</b>
<b>General Expenditure, NEC</b>	<b>26.0</b>	<b>13.9</b>	<b>24.1</b>	<b>15.6</b>	<b>20.5</b>	<b>13.2</b>	<b>22.4</b>	<b>11.6</b>

Source: Author's calculations based on 2007 Census of Governments.

Note: General Expenditure, NEC (not elsewhere classified) was formed by summing miscellaneous commercial activities and other unallocable expenditures. Other categories within major groups were created by summing small categories of expenditure.

development, sewerage, and several additional, typically smaller, subcategories.

A major difference between New England and the nation is that local governments in New England spend a far lower share of their non-education budgets on social services & income maintenance (7 percent) than the nationwide norm (over 21 percent). This is because state governments in New England tend to bear a greater share of the funding for health and welfare programs than other state governments. Compensating for their lower shares of spending on social services & income maintenance, local governments in New

England devote more of their spending to the miscellaneous category (general government expenditure not elsewhere classified).

There are also some notable differences within New England. Rhode Island local governments spend heavily on public safety—roughly one-third of their non-education expenditures are in this category. On the other hand, Vermont, Maine, and New Hampshire have more geographically dispersed populations and devote more of their local government budgets to transportation than the three southern New England states.

## Appendix B: Guide to Non-School Regional Consolidation Findings by Researchers and Practitioners

**Table B1. Summary of Findings on Consolidation Opportunities for Local Public Services, by Service Area**

Service Area	Relevant Characteristics
<b>Public Safety</b>	
Police Patrol	Labor-intensive
Firefighting	Labor-intensive; uses relatively expensive vehicles, equipment, and facilities; requires on-demand services
Emergency Medical Services (EMS)	Similar to firefighting
Dispatch (for police, fire, and emergency medical services)	Moderately costly equipment and facilities; requires on-demand service; technology increasingly substitutes for dispatcher need for knowledge of local area
Police Investigation and Laboratory Analysis; Fire Investigation, Inspections, and Enforcement of Regulations	Require specialized expertise; police laboratory analysis also requires specialized and somewhat costly equipment. Police investigation requires more interaction with local force than fire investigation.
<b>Public Works</b>	
Solid Waste Collection and Recycling; Road Maintenance and Sweeping	Labor-intensive; use specialized and somewhat expensive equipment
Removal of Snow and Leaves	Labor-intensive; use specialized and somewhat expensive equipment; concurrent demand in all municipalities
Building and Grounds Maintenance	Labor-intensive
Expert Tasks in Engineering, Waste Water, Storm Water, Water Supply, Forestry	Require specialized skills
Maintenance of Sewers, Water, Storm Water, and Trees	Somewhat costly, specialized equipment; require on-demand services
Infrastructure Replacement or Development	Capital-intensive; requires specialized expertise; infrequent demand; regional perspective provides valuable input to decision-making
<b>Public Health</b>	
Immunizations and Clinic Care, Multi-Unit Residential Inspections, Commercial Inspections, Enforcement of Regulations for Environmental and Sanitation Concerns, Animal Control	Require specialized expertise; provided infrequently
<b>Administration</b>	
Land Use Planning; Economic Development; Enforcing Zoning Regulations, Municipal Codes, and Construction Code	Labor-intensive; requires specialized expertise; requires regional perspective
Municipal Courts and Local Administration of Justice	May require specialized skills and/or expensive facilities
Information Requests and Filing of Forms Regarding Municipal Records, Property Taxes, Election Laws; Licensing and Permitting	Some services are on-demand; require somewhat expensive technology
Expert Tasks in Finance, Administration, Purchasing, and Legal	Some services require specialized expertise and expensive technology
Technology Infrastructure Development	Requires specialized expertise; cost prohibitive to all but the largest municipalities
Distribution of Consumables	Capital-intensive
<b>Recreation and Cultural Programs</b>	
Sports and General Youth Activities; Social Events and Celebrations; Music and Arts Entertainment; Cultural and Tourism Sites	Capital-intensive
<b>Specialized Services</b>	
Structured Parking, Airports, Electric Power, Other Specialized Services	Uncommon services

Source: Holzer and Fry (2011)

Comments and Observations	Findings
Traditionally staunch resistance to measures that limit local control, but cost pressures are resulting in emerging openness to reforms	Some studies report diseconomies of scale, yet there is evidence of cost savings through merger of departments or centralized police services for small towns
Moving to larger service area smooths out peak demands, thereby reducing per capita resource requirements—especially for specialized equipment. May also improve response time, depending on station locations.	Centralized administration, centralization, or shared services may yield cost savings, but may result in staffing problems for volunteer fire departments.
	Combining with firefighting offers cost savings, but may result in staffing problems for volunteer EMS departments
Moving to larger service area smooths out peak demands, thereby reducing staffing requirements	Considerable evidence that centralized administration or large-scale collaboration reduces costs while ensuring appropriate response to 9-1-1 calls
	Centralized administration, centralization, or shared services may yield cost savings, especially for small towns
Local officials' desire to respond directly to requests, as well as identification issues (involving logos on trucks), may be barriers to consolidation	Centralized administration, centralization, or shared services may reduce per-capita costs, but must include mechanisms to respond to citizens' requests
Local officials' desire to respond directly to requests, as well as identification issues, may be barriers to consolidation	Concurrent demand results in minimal economies of scale
	Little opportunity for economies of scale
	Shared services may yield cost savings, especially for towns that cannot support full-time staff
Moving to larger service area smooths out peak demands, thereby reducing per capita resource and staffing requirements	Shared services may reduce per capita costs, but must include provision of adequate emergency response
	Assistance of regional government or authority can help in managing the costs of large capital contracts
Standards are generally set by higher levels of governments, but municipalities often determine in what manner and how much of these services to provide. Any revised structure must provide convenient location for clinics.	Considerable evidence of economies of scale. Many municipalities have looked to centralization, centralized service administration, or shared services in order to lower per-capita costs.
Differences in zoning restrictions across municipalities may make full consolidation difficult	Centralized service administration may produce economies of scale and provide a valuable regional perspective while maintaining local control
Although local laws may be formed by municipality, interpretation of laws should not change and can be done at a regional level. A convenient location is not important.	Centralization or shared services reduces per-capita capital costs
Desire for services to be offered in municipal buildings may be a barrier to centralization	Should consider centralization of facilities and specialized personnel
Consolidation can provide a higher level of expertise and better equipment and technology at lower per capita costs. Any more consolidated structure must provide local customer service personnel access to centralized systems and personnel with specialized expertise.	Consider centralization, central services administration, or shared services in order to reduce costs and adopt new technologies
Consolidation can provide a higher level of expertise and better equipment and technology at lower per capita costs. Any more consolidated structure must provide appropriate access to local users.	Consider large-scale centralization, central services administration, or shared services in order to reduce costs and improve service.
Storage must be in a convenient location so travel expense does not outweigh capital savings	Municipalities should consider cooperation, shared services, or centralization, provided centralized facility is in a convenient location
Growing trend of competition among towns, especially in music and arts entertainment	A regional perspective may be valuable, especially in planning facility use and entertainment
May generate revenue for municipality; often become separate agencies and result in duplication of administrative tasks	If service is offered within only one municipality, should be managed locally; if possible, avoid establishing separate administration

## Appendix C: Estimating Cost Savings from Regionalization

### 9-1-1 Call Centers

#### Data Sources and Variable Definitions

9-1-1 call volume and financial data are not readily available on a nationwide basis. Extensive work on the part of NEPPC researchers turned up data for 15 states. Of these, only three states provided PSAP-level expenditure or budget data: Maryland, Michigan, and Pennsylvania. Because accounting standards differ from state to state, the definitions of expenditure are not comparable across the three states. For Maryland, we used “9-1-1 related operational costs as reported by county selected independent

auditors.”<sup>52</sup> For Michigan, we used the sum of “Total Operating Budget” and “Other Allowable Expenses.”<sup>53</sup> For Pennsylvania, the data utilized were described as “PSAP Reported Total Expenditures.”<sup>54</sup> Expenditures per call were calculated as the total expenditure for the year (as defined in that state) divided by the number of calls that year.

#### Regressions

The regressions were estimated using ordinary least squares. Based on trial and error, we used a cubic spline of call volume with Stata-determined knots. The estimates using 2010 data are shown in Table C1. Where possible, we performed similar analyses using 2008 and 2009 data, with broadly similar results. We also performed specific sensitivity tests on regressions estimated with the Michigan data, owing to a lack of information on individual PSAPs within several counties.<sup>55</sup>

#### Consolidation Methodology

From state sources, we obtained call volume data (but were unable to obtain financial data) for 263 Massachusetts PSAPs and 111 Connecticut PSAPs.<sup>56</sup> In order to simulate

**Table C1. Public Safety Answering Point (PSAP) Regression Output Using 2010 State Data**

Dependent Variable = Expenditures Per Call

	State		
	Maryland	Michigan	Pennsylvania
Number Of Calls (Annual)			
Cubic Spline 1	-0.00125 (0.0014)	-0.0165*** (0.0035)	-0.0127*** (0.0022)
Cubic Spline 2	0.354 (1.532)	9.180*** (2.602)	2.420*** (0.498)
Cubic Spline 3	-0.387 (2.083)	-13.57*** (3.978)	-5.105*** (1.095)
Cubic Spline 4	-0.0013 (0.579)	4.395*** (1.430)	2.717*** (0.617)
Constant	104.2*** (30.36)	246.4*** (24.41)	249.0*** (28.60)
Observations	24	77	69
R-squared	0.494	0.469	0.430
Adjusted R-squared	0.387	0.440	0.395
Memo: Estimated Knots			
Knot 1	11,730.25	1,866.8	3,780
Knot 2	24,552.38	8,989.45	18,772.75
Knot 3	64,728.50	24,000	32,964
Knot 4	159,572.90	67,126.7	90,059.25
Knot 5	1,291,045	513,410.7	476,758

Source: Author's regressions.

Note: Standard Errors displayed below coefficients in parentheses.

\*\*\* Indicates significance at 1% level

52 Data from Maryland Emergency Numbers Systems Board 2010 Annual Report.

53 Data from Michigan 2011 State 9-1-1 Committee Annual Report to the Michigan Legislature.

54 Data from Pennsylvania Emergency Management Agency, Bureau of 9-1-1, 2010 Annual Report

55 In Michigan, PSAPs are managed at the county level, and financial and call volume data are available by county. Most counties in the state have exactly one PSAP, but several have either more than one PSAP or are served by a PSAP located in another county. We re-ran the Michigan regressions excluding any county that did not have exactly one PSAP. With these modifications, we achieved results largely similar for the lower call volumes (up to roughly 400 calls per day). We were left with no observations above 700 calls per day for the 2010 data, and therefore our upper tail showed a somewhat different trajectory.

56 Massachusetts data were obtained from the State 9-1-1 Department through a public information request to the Administrative Attorney, Louise McCarthy. Connecticut's PSAP call volumes were obtained from the Office of Statewide Emergency Telecommunications E-911 Total Call Volume Reports. There is a slight discrepancy between the state and FCC numbers for Massachusetts. The FCC reports 268 PSAPs in Massachusetts. The state and FCC tallies for Connecticut are identical.

regionalization of call centers in Massachusetts and Connecticut, we matched PSAPs to counties. The Massachusetts state 9-1-1 department provided a crosswalk that matched Massachusetts localities to the PSAPs that serve them. Similarly, NEPPC researchers developed a crosswalk for Connecticut based on a PSAP service area map from the Office of Statewide Emergency Telecommunications. Using these crosswalks, we were able to then match PSAPs to counties using county locations of cities and towns. In the event that a PSAP served localities in multiple counties, its calls were apportioned by the populations of the localities.<sup>57</sup> Because we were unable to implement this procedure for several PSAPs, they were excluded from the analysis. Most notably, the state police PSAPs could not be assigned to counties because they tend to receive cellular calls within large geographic areas rather than areas defined by local government borders.<sup>58</sup>

### Savings Estimates

We generated a predicted cost per call for the consolidated Massachusetts and Connecticut PSAPs by applying the regression results and using the total number of calls by county. We used the Michigan, Maryland, and Pennsylvania results to create three separate estimates each for Massachusetts and Connecticut. Where necessary, we capped

the estimated costs per call at the actual minimum and maximum values in the respective Michigan, Maryland, or Pennsylvania data. This was done to prevent extreme predictions. By scaling the estimated per call costs up by the number of calls in each PSAP we were able to generate a predicted level of spending. Savings were then calculated as the difference between the estimated spending under the current system and the spending under a county system.<sup>59</sup>

It is likely that some Massachusetts and Connecticut 9-1-1 call-takers perform other, unrelated work duties while not handling requests for emergency assistance, particularly at sites handling small numbers of calls. The available data for the comparison states do not specify whether the reported expenditures include or exclude time spent on other functions.

### Estimates Based on New Jersey Data

Our estimates using the New Jersey data are based on a different methodology. Data were sourced from Appendix D of “New Jersey 9-1-1 Consolidation Study: Saving Lives, Increasing Value.” These data, which were constructed by the New Jersey Office of Emergency Telecommunications Services, provide an estimate of equipment replacement costs for the state’s PSAPs. Because these equipment cost estimates were based largely on the number of positions that would be required to provide continuous coverage, many of the PSAPs have exactly the same estimated equipment costs per call. The data are as follows: \$74.50/call for population 19,000 or fewer and receiving 10 calls/day or fewer; \$28.07/call for population 19,000 or fewer and receiving more than 10 calls/day; \$44.59/call for population between 19,000 and 40,000 and receiving 10 calls/day or fewer; \$18.95/call for population between 19,000 and 40,000 and receiving more than 10 calls/day; \$4.26/call for population greater than 40,000.<sup>60</sup>

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57 Calls were split only for Census Designated Places (CDP) with official population counts. Villages or sections of towns that were served by different PSAPs than their corresponding CDPs were not allocated separate call counts. In the Connecticut dataset, Haddam Neck (in the Colchester ECC) and East Putnam (Quinebaug Valley ECC) were not allocated calls; Colchester and Quinebaug Valley’s calls were allocated among the remaining locations in their service areas.

58 In addition to the state police PSAPs, the Massachusetts PSAPs of Hanscom, Devens, and Plainfield and the University of Connecticut (UConn) PSAP were dropped. In both Massachusetts and Connecticut, the state police PSAPs are much larger than most other PSAPs, and we would expect more limited savings from their consolidation. The four state police PSAPs in Massachusetts receive an average of almost 500 calls per day, as compared to an average of about 50 calls per day among other PSAPs. The 11 state police PSAPs in Connecticut receive on average about 170 calls per day (as opposed to approximately 40 calls per day among non-state-police PSAPs), with the largest receiving over 700 calls per day.

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59 Lacking access to actual spending by PSAP in Massachusetts and Connecticut, we were unable to determine how accurately the estimates reflect current spending levels.

60 All New Jersey PSAPS serving populations greater than 40,000 received at least 10 calls per day.



These averages were applied to the current and consolidated Massachusetts and Connecticut PSAPs. Under this method, consolidation reduces costs only if the hypothetical combined PSAP falls into a lower-cost group than at least one of the actual PSAPs in that county.

## Public Health Departments

### Data Sources

2010 survey data on public health departments were purchased from the National Association of County and City Health Officials (NACCHO).<sup>61</sup> These data pertain to 2,107 of the 2,565 LHDs across the country. Hawaii and Rhode Island were excluded from the NACCHO survey because they have no sub-state health departments. Among the 49 jurisdictions covered by the survey (48 states plus the District of Columbia), Massachusetts had the largest number of respondents (136) but the lowest response rate (41 percent). All other jurisdictions had response rates above 60 percent. Of the responses, just over 1,600 had the requisite information to be used in our regression analysis.

Using a crosswalk provided by NACCHO we were able to match the local health departments (LHDs) to the 2010 Demographic Summary files from the Census. This allowed us to incorporate information on total population and its composition, population density, and the poverty status of the population. Because of some errors in the crosswalk, we matched the Georgia LHDs to Census data based on information from the Georgia Department of Public Health website, and also made corrections to the data for some Massachusetts localities. We made an effort to remove localities that might result in a double counting of population. For example, many of the villages in Vermont were removed because they are wholly subsumed by larger localities. Certain duplicate observations were

dropped even if they were listed as separate units in the profile.<sup>62</sup>

The 2010 NACCHO dataset has 2008 Census population estimates already merged into it. NACCHO made special adjustments while incorporating these data to avoid double counting certain populations. Conversations with NACCHO revealed that these adjustments were not systematically reproducible. Therefore, we could not replicate these adjustments when merging in the 2010 demographic data. As a means to address this problem, we identified LHDs that we suspected had special adjustments, by merging in the 2008 Census Population using our crosswalk. Observations that did not have the same 2008 population in both the NACCHO merged data and our merged data were dropped. This reduced our sample size by 125. These observations are likely to be layered public health departments (for example, a city that has its own LHD, but is located within the geographical boundaries of a county that also has its own LHD).

Approximately 400 local health departments did not respond to all of the survey questions regarding services provided. Rather than dropping these observations from our analysis, we replaced the missing values with predicted values from a probit regression based on population served and state. As a result, 2,116 missing values were replaced with a 1 (yes), while 5,024 were replaced with a 0 (no).

### Variable Definitions

Per capita expenditure was calculated as the reported expenditure divided by the 2010 population.

The number of clinical services was calculated by summing the dummy variables for the clinical services offered (items c6q55–c6q79 in the NACCHO data). Following Santerre (2009)<sup>63</sup>, services provided directly by the local health department (labeled “a” in the data) and services provided under

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61 National Association of County and City Health Officials – NACCHO (2012). *National Profile of Local Health Departments Survey, (2010): Core*. Obtained (January 2012) from NACCHO.

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62 In addition, health district NV026 was dropped because of the lack of an appropriate crosswalk.

63 Rexford E. Santerre, “Jurisdiction Size and Local Public Health Spending” *Health Service Research*, volume 44, issue 6 (December 2009), pp. 2148 – 2166.

## Table C2. Local Health Department (LHD) Regression Output Using 2010 National Sample

Dependent variable = Expenditures Per Capita

	State Dummies Excluded		State Dummies Included	
	OLS Estimate	Estimate with Clustered Standard Errors	OLS Estimate	Estimate with Clustered Standard Errors
Population Size				
Linear Spline 1	-0.00349*** (0.00117)	-0.00349 (0.00247)	-0.00422*** (0.000991)	-0.00422* (0.00218)
Linear Spline 2	-0.000777* (0.000449)	-0.000777 (0.000551)	-0.00122*** (0.000377)	-0.00122*** (0.000410)
Linear Spline 3	-0.000691* (0.000357)	-0.000691 (0.000451)	-0.000745** (0.000298)	-0.000745** (0.000337)
Linear Spline 4	-0.000104** (0.0000489)	-0.000104 (0.0000799)	-0.000248*** (0.0000430)	-0.000248*** (0.0000544)
Linear Spline 5	0.00000166 (0.00000523)	0.00000166 (0.00000752)	-0.00000614 (0.00000456)	-0.00000614 (0.00000719)
Number of Clinical Services	2.546*** (0.177)	2.546*** (0.337)	2.005*** (0.185)	2.005*** (0.247)
Number of Nonclinical Services	0.285*** (0.0876)	0.285* (0.148)	0.270*** (0.0814)	0.270*** (0.0893)
Percent Contracted Out	-58.03*** (7.139)	-58.03*** (6.839)	-58.25*** (6.285)	-58.25*** (8.880)
Percent of Population Age 0 to 19	-1.561*** (0.290)	-1.561*** (0.492)	-0.903*** (0.270)	-0.903*** (0.335)
Population Density	-674.7 (1360.5)	-674.7 (2174.5)	3621.5*** (1321.1)	3621.5* (2004.4)
Poverty Rate	1.554*** (0.177)	1.554*** (0.363)	1.506*** (0.186)	1.506*** (0.215)
Constant	81.08*** (9.940)	81.08*** (22.32)	94.87*** (29.76)	94.87*** (17.46)
Observations	1593	1593	1593	1593
R-squared	0.272	0.272	0.529	0.529
Adjusted R-squared	0.267	0.267	0.511	0.511
Memo: Specified Knots				
Knot 1	7,542	7,542	7,542	7,542
Knot 2	18,272	18,272	18,272	18,272
Knot 3	28,886	28,886	28,886	28,886
Knot 4	92,271	92,271	92,271	92,271

Source: Author's regressions.

Note: Standard errors displayed below coefficients in parentheses.

\* Indicates significance at the 10% level

\*\* Indicates significance at the 5% level

\*\*\* Indicates significance at the 1% level

contract with an outside vendor (labeled “b”) were counted separately.

The number of nonclinical services was calculated by summing the dummy variables for the remaining services offered (items c6q80a–c6q141a plus c6q80b–c6q141b).

Percent contracted was calculated by summing the dummy variables for the services offered if those services were offered via contract and then dividing by the total number of services offered.

Age shares were calculated by dividing the 2010 demographic summary file population within each age category by the total population in that district, then multiplying by 100.

Population density was calculated as the 2010 population divided by the land area in square miles reported in the Demographic Summary File.

The poverty rate for consolidated districts was calculated as the population weighted averages of the poverty rate within the localities served.

### Regressions

For purposes of regression estimation, we modified the data in two ways. First, to obtain the most relevant estimates, we used only the data pertaining to LHDs up to 125 percent of the size of the largest possible consolidated department in New England (Middlesex County, with a population of 1.5 million). Second, as a means of controlling for the effect of outliers, the dependent variable (per capita expenditures) was winsorized at the 5 percent level. Thus, all observations above the 95<sup>th</sup> percentile were set equal to the 95<sup>th</sup> percentile value, while all observations below the 5<sup>th</sup> percentile were set equal to the 5<sup>th</sup> percentile value. The percentiles were based on the national sample.

The regressions were estimated using ordinary least squares. Based on trial and error, we used a linear spline for population with knots corresponding to the 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 95<sup>th</sup> percentiles of Massachusetts population per LHD distribution.<sup>64</sup> We estimated the

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64 This corresponds to the 8th, 27th, 41st, and 72nd percentiles of the national distribution.

regressions both with and without state dummies, and with and without clustered standard errors. The results are presented in Table C2. If there had been explainable fixed effects by state, it would have been appropriate to use state dummies. The inclusion of state fixed effects (third and fourth columns) yielded higher significance among the first four population size groupings (up to approximately 92,000 members). However, we did not have a strong explanation for the fixed effects, and therefore we elected to use the regression without state dummy variables in our savings estimates. Additionally, if there had been unobserved effects common to all local health departments within a state, it would have been appropriate to cluster standard errors by state. This is shown in the second and fourth columns of results. However, in our sample, the number of observations per state varied from 91 in Massachusetts to only one observation each in Maine, South Dakota, Washington, DC, and New Hampshire. Nichols and Schaffer (2007) note that with “very unbalanced cluster sizes, the cure [clustering the standard errors] can be worse than the disease.”<sup>65</sup> Hence it is difficult to know which methodology, if either, provides the appropriate insight on statistical significance.

### Consolidation Methodology

Hypothetical consolidated systems were created by summing population counts for the available LHDs in each county. If an LHD served localities in multiple counties, its population was divided according to the Census figures.<sup>66</sup> Poverty rates, population density, and demographic population shares were calculated as population-weighted averages of the characteristics of the localities matched to each LHD. The “rounded

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65 See Austin Nichols and Mark Schaffer, “Clustered Errors in Stata,” September 10, 2007, available at <http://repec.org/usug2007/crse.pdf>.

66 Eight LHDs in Connecticut crossed county borders. No LHDs from Massachusetts in the 2010 profile crossed county borders. (NACCHOIDs MA095, and MA192 cross borders, but did not respond to the 2010 survey).

services” methodology for specifying service levels for the consolidated LHDs is described in the text. Although they are not shown in the tables, we also developed a “fractional services” estimate, in which the provision of a service in each hypothetical LHD was calculated as a population-weighted average of the localities matched to it. For each service, each current LHD carried a value of either 0 (not provided) or 1 (provided). In this model, each service for a hypothetical LHD received a population-weighted average of these dummy variables, a value between 0 and 1 (inclusive). Although this “fractional services” model was not a realistic scenario (an LHD could not offer a partial service), it provided a way for us to explore the effects of consolidation while leaving service levels constant.

### Savings Estimates

Using the results from the regression, we obtained an estimated per capita expenditure for each Massachusetts and Connecticut LHD. To prevent extreme estimates, we then restricted these figures to be no higher than the actual maximum, and no lower than the actual minimum, for the state. By scaling the estimated per capita expenditure by the population served by each LHD, we were able to find a predicted level of spending for the individual and consolidated LHDs. The total savings were calculated as the difference between the estimated spending under the current system and the spending under a “rounded services” county-based system. The difference between the current system and the “fractional services” model was attributed to scale, while the remainder was attributed to service reduction. As indicated in the text, Suffolk County was excluded from the consolidation exercise.

## Public Pensions

### Data Sources and Variable Definitions

The U.S. Census Bureau defines a retirement system as a “pension plan in which investments, contributions, and benefits are administered as a separate entity independent of the parent government general fund.”

Both single-employer systems (in which one government is solely responsible for the pension plan) and multiple-employer systems (in which two or more governments are responsible) are included. See <http://www2.census.gov/govs/retire/2010surveyemeth.pdf>.

We used the Census Bureau State and Local Public-Employee Retirement Systems data for 2002–2008. The data for 2002 and 2007 are drawn from the Census of Governments. However, because governments are not required to respond to the Censuses of Governments, the number of responding units is less than the actual number of state and local defined-benefit pension plans. Data for non-Census years are even less complete, as only a sample of pension plans are surveyed.

The number of members was created by summing active members, inactive members, former active members retired because of age or disability, and survivors of deceased former active members (data elements Z01 + Z02 + Z03 + Z04 + Z05).

Administrative costs (data element Z93) include the “salaries of employees, investment fees, building rentals or costs, and the like.”

Total assets were constructed by summing the reported holdings in each asset class (data elements X21, X30, Z77, Z78, X42, X44, and Z82).

### Regressions

Discussions with the Census Bureau revealed that there is no available crosswalk that would allow us to connect these data with other Census products. The lack of a crosswalk prevented us from including any additional data in the regression analysis (other than state or year dummies), thereby limiting their explanatory power.

As described in the case of local health departments, winsorization and size restrictions were applied. The size restriction in this case was the total of all members of Massachusetts public pensions multiplied by 1.25.<sup>67</sup>

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<sup>67</sup> Massachusetts has roughly 500,000 participants in public pensions, compared with 230,000 in Connecticut. The estimates for both states were run with the Massachusetts size restriction.

**Table C3. Public Pension Regression Output Using National Panel Data**

Dependent Variable = Administrative Expenses Per Member

	State Dummies Excluded		State Dummies Included	
	Ordinary Least Squares Estimate	Estimate With Clustered Standard Errors	Ordinary Least Squares Estimate	Estimate With Clustered Standard Errors
Number of Members				
Linear Spline 1	-1.103*** (0.375)	-1.103 (3.527)	-2.518*** (0.382)	-2.518 (3.415)
Linear Spline 2	-0.0663*** (0.0139)	-0.0663 (0.0536)	-0.0965*** (0.0153)	-0.0965** (0.0444)
Linear Spline 3	-0.00293*** (0.000431)	-0.00293*** (0.000823)	-0.00175*** (0.000438)	-0.00175** (0.000870)
Linear Spline 4	-0.000122 (0.000195)	-0.000122 (0.000200)	-0.000113 (0.000195)	-0.000113 (0.000180)
Assets Per Member	0.000108*** (0.0000116)	0.000108 (0.000119)	0.0000880*** (0.0000116)	0.0000880 (0.000113)
Constant	740.6*** (22.65)	740.6*** (206.3)	684.8*** (28.80)	684.8*** (202.3)
Observations	8,442	8,442	8,442	8,442
R-squared	0.056	0.056	0.168	0.168
Adjusted R-squared	0.054	0.054	0.162	0.162
Memo: Specified Knots				
Knot 1	68	68	68	68
Knot 2	1,447	1,447	1,447	1,447
Knot 3	90,647	90,647	90,647	90,647

Source: Author's regressions.

Note: Standard errors displayed below coefficients in parentheses. Regressions include year fixed effects.

\*\* Indicates significance at the 5% level

\*\*\* Indicates significance at the 1% level

Using the results from the regression (Table C3), we obtained estimated administrative expenses per member for each actual and hypothetical consolidated Massachusetts and Connecticut pension plan. To prevent extreme estimates, we then restricted these figures to be no higher than the actual maximum, and no lower than the actual minimum, for the state. By scaling the estimated expenses per member by the number of members in each pension plan, we were able to find a predicted level of expenses for the existing and hypothetical consolidated plans.<sup>68</sup> The savings were calculated

as the average yearly difference between the estimated expenses under the current retirement systems structure and those under a consolidated structure from 2002 to 2008.

<sup>68</sup> The predicted estimates for Massachusetts and Connecticut were similar to the actual figures. The actual cost of all

plans in Massachusetts was \$179.5 million, compared with an estimated \$216.9 million. The actual cost of all plans in Connecticut was \$108.4 million, compared with an estimated \$80.6 million.



## About the Author

Yolanda Kodrzycki is a vice president and the director of the New England Public Policy Center at the Federal Reserve Bank of Boston. The Policy Center conducts research on key economic and policy issues in New England, and engages with regional partners in advancing identified policy options.

Prior to assuming this position, Kodrzycki was a senior economist and policy advisor in the research department of the Boston Fed, specializing in regional, labor market, and public sector economics. Her research has examined topics such as economic development strategies for older industrial cities, the long-term implications of job loss, the migration patterns of college graduates, regional differences in educational attainment, and corporate tax policy at the national and state levels. She has been a senior contributor to “Toward a More Prosperous Springfield,” a multi-year commitment by the Boston Fed to support the economic revitalization of Springfield, Massachusetts. She serves as co-editor of *MassBenchmarks*, an economics publication issued jointly by the Federal Reserve Bank of Boston and the University of Massachusetts.

Kodrzycki has advised numerous organizations with an interest in the New England and national economies. During 1991–1992, Kodrzycki took a leave of absence from the Federal Reserve to consult for the U.S. Treasury advisory program in Central and Eastern Europe. Prior to joining the Boston Fed, she taught economics at Amherst College. A graduate of Radcliffe College (at Harvard University), Kodrzycki received her Ph.D. in economics from the University of Pennsylvania.







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