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Tax-Exempt Hospitals' Investments in Community Health and Local Public Health Spending: Patterns and Relationships

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Abstract

Objectives: To investigate whether tax-exempt hospitals' investments in community health are associated with patterns of governmental public health spending focusing specifically on the relationship between hospitals' community benefits expenditures and the spending patterns of local health departments.

Study design: We combined data on tax-exempt hospitals' community benefit spending with data on spending by the corresponding local health department that served the county in which a hospital was located. Data were available for two years, 2009 and 2013. Generalized linear regressions were estimated with indicators of hospital community benefit spending as the dependent variable and local health department spending as the key independent variable.

Principal findings: Hospital community benefit spending was unrelated to how much local public health agencies spent, per capita, on public health in their communities.

Conclusions: Patterns of local public health spending do not appear to impact the investments of tax-exempt hospitals in community health activities. Opportunities may, however, exist for a more active engagement between the public and private sector to ensure that the expenditures of all stakeholders involved in community health improvement efforts complement one another.

Key words: tax-exempt hospitals, community benefit, local health departments, governmental public health spending

Introduction

The Patient Protection and Affordable Care Act (ACA), the sweeping health reform legislation enacted in 2010, includes a number of provisions that embrace population health principles. For example, the ACA requires that hospitals with a federal tax exemption, which comprise almost all nonprofit hospitals in the U.S., conduct a community health needs assessment (CHNA) at least once every three years and adopt an implementation plan to address identified needs. As part of the CHNA requirement, hospitals are expected to seek input from stakeholders who represent the broad interests of the community, including those with special knowledge of or expertise in public health, namely local health departments (LHDs) (79 Federal Register at 78954). Traditionally, enhancing and maintaining community health has largely been the role of governmental public health agencies.

Public health agencies in communities across the U.S. are responsible for protecting, assessing, and assuring community health by engaging in population-based prevention and health promotion activities (Shah, Luo, and Sotnikov 2014). Often, public health agencies build partnerships with other public and private community stakeholders in an effort to better coordinate services and ensure a more efficient use of the resources available for community health improvement. Yet, even before the passage of the ACA, many tax-exempt hospitals invested in broader community health improvement initiatives as part of their community benefit activities (Mays and Scutchfield 2010; Shortell, Washington, and Baxter 2009; Woulfe et al. 2010), though the amounts spent were usually a small proportion of total community benefit spending (Gray and Schlesinger 2009; Young et al. 2013). Policy makers are hopeful that this level of investment by tax-exempt hospitals will increase as hospitals experience lower costs for uncompensated care due to the ACA's expansion of health insurance coverage to millions of Americans. According to a recent study, many tax-exempt hospitals have already experienced significant reductions in uncompensated care costs, primarily as a result of state-level expansion of Medicaid programs. (Dranove, Garthwaite, and Ody 2016).

These developments raise important considerations about the roles of and collaborations between tax-exempt hospitals and local public health systems in community health activities. Empirical evidence on the interplay between public and private investment in community health in communities across the U.S. is scarce. A recent study of the contributions of hospitals to the

delivery of public health activities in select metropolitan areas found that collaborations between hospitals and public health agencies play an important role in the overall availability of public health services in local public health systems (Hogg, Mays, and Mamaril 2015). However, a state-level study of the relationship between governmental public health spending and the community benefit activities provided by tax-exempt hospitals in a community found no association between public and private spending (Singh et al. 2015a).

In this manuscript, we report the results of our study which was intended to further explore the relationship between public and private investment in community health by focusing on local dynamics between public and private stakeholders. Specifically, we examined the relationship between tax-exempt hospitals' investment in community health, as evidenced by their spending on community benefit activities, and local public health spending. Our study addressed the following research questions: (1) Do hospitals' investments in community health differ based upon the levels of spending by the LHD? (2) Did the relationship between hospital investment in community health and LHD spending change with the passage of the ACA?

The conceptual framework for our study is based on recent work by Varda and colleagues (2016) who developed a framework for hospital interaction with and investment in the public health system. Specifically, Varda and colleagues (2016) identified four broad factors as important to a hospital's interaction with and investment in public health systems: community demographics, the legal/policy environment, market conditions, and characteristics of the internal systems and workings of both the hospital and the public health system. The framework presents all four factors as influencing the types and extent of partnerships formed between hospitals and public health organizations, which, in turn, influence hospitals' financial investments in public health.

Building on this framework, we hypothesize that with respect to hospitals' investment in community health specifically, a particularly important characteristic of the public health system is the level of spending by the LHD. For this hypothesized relationship, two possible pathways might be involved. One, LHD spending may function as a signal for other community stakeholders, such as tax-exempt hospitals, to invest in community health initiatives. LHDs' spending decisions are to a large degree determined by underlying health needs in their communities. Higher spending by the LHD thus signals to hospitals to also spend more on the health needs of the broader community. Moreover, with the passage of the ACA, the strength of

this signal from LHDs has likely grown stronger. Prior to the ACA, hospitals were predominantly focused on providing care to individual patients and had limited incentives to invest in community health (Burke et al. 2014). However, as noted, the ACA generally aims to promote population health initiatives within the healthcare sector. In addition to the CHNA requirement for tax-exempt hospitals, the law includes other provisions relating to population health such as those authorizing payment reforms under Medicare (e.g., Medicare Shared Savings Program) that create financial incentives for all hospitals to become more engaged in community health initiatives. As a result, hospitals may pay closer attention to the level of spending by the public health system, in particular the LHD.

Another pathway entails the organizational capacity of the LHD itself. Better-resourced LHDs may have the human capital, in the form of strong leadership and dedicated advocacy staff, necessary to engage hospitals in partnerships and convince them to invest in community health. For purposes of this pathway, the level LHD spending is not important in and of itself. Rather it is a proxy of an LHD's organizational capacity and this capacity is the catalyst for engaging hospitals in population health goals. Again, the passage of the ACA has likely enhanced the viability of this pathway as even very well-resourced LHDs may have had difficulty in the past engaging hospitals when population health goals were not a feature of the larger policy environment. Of course, both these pathways, and possibly others, may underlie a relationship between LHD spending and hospital investment in community health initiatives.. Our study was intended as an exploratory investigation of a relationship between LHD spending and the level and pattern of tax-exempt hospitals' investment in community health.

Methods

Data and sample

Data for this study came from multiple sources. Data for hospital community benefit spending was obtained from hospitals' tax filings (IRS Form 990 Schedule H). Data for LHD spending was obtained from the Profile Surveys of the National Association of City and County Health Officials (NACCHO). Additional data on hospital, LHD, community and market-level characteristics came from the American Hospital Association's Annual Survey, the NACCHO

Profile surveys, the Centers for Medicare and Medicaid Services, and the Area Health Resource File. The study employed data for 2009 and 2013, the two most recent years for which data from all above-mentioned sources were available for all variables of interest.

The unit of analysis was the individual hospital. Based on IRS tax filings, we identified all tax-exempt hospitals that reported their community benefit spending to the IRS at the individual hospital level. There were 1,832 such hospitals in fiscal year 2009 and 1,592 in fiscal year 2013. For each of these hospitals, the Federal Information Processing Standards (FIPS) county code was identified for the county in which the hospital was located. On the basis of FIPS county codes, the LHD that serves the respective county was identified. We then obtained data for the LHD from the 2010 and 2013 NACCHO Profile Surveys and merged them with the available hospital-level data. Not all LHDs participated in both the 2010 and 2013 NACCHO Profile Surveys. As such, this process allowed us to pair 1,512 of the 1,832 hospitals (83 percent) for 2009 and 1,275 of 1,592 hospitals (80 percent) for 2013 with their corresponding LHD. Because of missing data in the NACCHO Profile surveys (in particular, missing data on LHD expenditures), the sample was further reduced to 1,277 hospitals (69 percent of the full sample of 1,832 hospitals) in 2009 and 1,021 hospitals (64 percent of the full sample of 1,592 hospitals) in 2013.

The study sample comprised general hospitals that were in operation in the United States in 2009 and/or 2013 and that reported their community benefit spending at the individual hospital level. Some hospitals are members of a hospital system that have a group exemption from the IRS permitting them to provide a consolidated report of community benefit spending to the IRS for all member hospitals. For these hospitals, which account for approximately one-third of all tax exempt hospitals, there is no publicly available data for their community benefit spending at the individual hospital level. Estimating from consolidated reports the amounts of community benefit spending provided by individual system member hospitals is also problematic because systems do not allocate community benefit resources in the same way across their member hospitals. To examine whether the exclusion of these hospitals presented a possible sample bias, we used AHA survey data to compare the study sample to the general population of nonprofit hospitals in the U.S. on a number of surface characteristics including system membership, number of beds, teaching status and geographic location. The two groups were highly

comparable with the exception of system membership for which the study sample slightly under represented the general population.

Measures

Our analysis included three types of indicators of hospital community benefit spending: (1) total community benefit spending, (2) spending on direct patient care services, and (3) spending on broader community health activities. Total community benefit spending was measured as the sum of the net cost of all of a hospital's eligible community benefit activities, as reported on IRS Form 990 Schedule H. Total community benefit spending included the following seven categories of community benefit activities: charity care, care provided to patients covered under Medicaid and other means-tested government programs; community health improvement services; health professions education; subsidized health services; research; and cash and in-kind contributions for community benefit. Spending on direct patient care services was measured as a hospital's net cost of charity care, the unreimbursed costs of services provided to patients covered under Medicaid and other means-tested government programs, and the net cost of subsidized health services, as reported on hospitals' IRS Form 990 Schedule H. Spending on broader community health activities was measured as the net expenditures for programs and services that benefit the community more broadly, in particular community health improvement programs, as well as cash and in-kind contributions from the hospital to community groups, as reported on Form 990.

For all three indicators, spending was expressed as a percentage of a hospital's total operating expenses, which was calculated as the ratio between a hospital's community benefit spending in the respective category and the hospital's total operating expenses. When expressed as a percentage of total operating expenses, community benefit spending indicators can be compared across hospitals as this formulation standardizes such spending indicators for differences in the scale and scope of hospitals' patient care activities.

For governmental public health spending, we used the expenditures of the LHD that served the county in which a study hospital was located. LHD spending was measured as spending per

capita, i.e., total expenditures of the respective LHD divided by the size of the population served by the LHD, as reported in the NACCHO Profile Surveys.

Analytical strategy

Generalized linear regression models were estimated to examine the association between tax-exempt hospitals' investment in community health and the expenditures of the LHDs serving the county in which study hospitals were located. Formally,

$$CommBenefit_i = \beta_0 + \beta_1 * LHDSpending_i + \beta_2 * X_i + \varepsilon_i,$$

where $CommBenefit_i$ equals the community benefit spending of hospital i, $LHDSpending_i$ equals the expenditures of the LHD that serves the county in which hospital i is located, and X_i is a vector of hospital, LHD, community, and market-level control variables based on the conceptual framework developed by Varda and colleagues (2016). Separate regressions were estimated for each of the three community benefit spending indicators (total community benefit, direct patient care services, and community health activities) and for each of the two years for which data were available (2009 and 2013).

In all regressions, hospital-level control variables included the number of beds, system affiliation, network affiliation, church affiliation, case mix index, wage index, teaching status, whether or not the hospital was contract managed, whether or not the hospital was a sole community provider, and indicators of hospital profitability (Young et al. 2013). LHD-level control variables included jurisdiction size, type of jurisdiction served (i.e., city, county, or multi-county area), type of governance (i.e., LHD governed by local authorities, the state health agency, or shared governance), and whether the LHD had a local board of health. Community and market-level control variables included the percentage of nonelderly residents without health insurance, median household income, market competition (measured in terms of the Herfindahl-Hirschman Index), the percentage of hospital beds in the local community controlled by for-profit and public hospitals, and urban/rural location (Young et al. 2013).

In addition, all regressions included state fixed effects to account for the circumstances in each state that may impact hospitals' community benefit spending and LHDs' spending patterns.

Hospitals' spending on community benefits, for instance, has been shown to vary with the extent to which states have passed legislation requiring hospitals to report their community benefit expenditures (Young et al. 2013). Likewise, spending patterns of LHDs may be affected by the activities and expenditures of the state health department, for instance as a result of the specific division of labor between the state and local health departments (Mays et al. 2003; Leviss 2007).

Results

Table 1 presents descriptive statistics for hospitals' community benefit spending in 2009 and 2013. In 2009, median spending on total community benefit activities amounted to 6.3 percent of a hospital's total operating expenses. Median spending on direct patient care services amounted to 5.4 percent of total operating expenses while investments in community health activities came to approximately 0.2 percent. The remainder went toward health professions education and research. In 2013, median spending on total community benefit activities increased to 7.5 percent of a hospital's total operating expenses. Median spending on direct patient care services and community health activities amounted to 6.2 percent and 0.3 percent of total operating expenses, respectively, while the remainder went toward health professions education and research.

There was substantial variation in hospitals' community benefit spending as indicated by the interquartile ranges. This was true in both 2009 and 2013. In 2009, hospitals in the top quartile of community benefit expenditures spent 9.2 percent or more of total operating expenses on community benefit activities whereas hospitals in the bottom quartile dedicated less than 4.0 percent of total operating expenses to such activities. Similarly, in 2013, hospitals in the top quartile spent 10.6 percent or more of total operating expenses on community benefit activities whereas hospitals in the bottom quartile dedicated less than 5.1 percent of total operating expenses to such activities.

Table 1 also reveals different patterns of hospital spending in the subcategory of broader community health activities. In 2009, hospitals in the top quartile spent 0.54 percent or more of total operating expenses on community health activities, while hospitals in the bottom quartile reported almost no investment in these types of activities (0.05 percent of total operating

expenses). Similarly, in 2013, hospitals in the top quartile spent 0.62 percent or more of total operating expenses on community health activities, while hospitals in the bottom quartile reported almost no spending (0.08 percent of total operating expenses).

< Table 1 here >

Table 2 presents descriptive statistics for LHD spending in 2009 and 2013. In 2009, median total spending per LHD was $3.6 million. By 2013, median total spending per LHD had grown to $5.2 million. Per capita spending, however, remained largely the same: In 2009, median per capita spending amounted to $42 compared to per capital spending of $41 on 2013. As was the case for hospital community benefit spending, LHD spending varied quite substantially. In 2009, LHDs in the top quartiles of spending spent over $65 per person while LHDs in the bottom quartile spent less than $27 per person. Likewise, in 2013, LHDs in the top quartiles of spending spent over $70 per person while LHDs in the bottom quartile spent less than $24 per person.

< Table 2 here >

Table 1 also presents the results of our bivariate analysis. Results of an ANOVA indicated that hospital expenditures on community benefits did not vary much across quartiles of LHD spending. In 2009, neither hospitals' spending on total community benefits nor their spending on direct patient care and community health services exhibited significant variations in relation to LHD spending quartiles. In 2013, hospitals did have relatively higher spending on total community benefits when they were located in communities where LHD per capita spending was in the top quartile. This difference between hospitals in the top quartile of LHD spending and hospitals in the other three quartiles was primarily the result of higher spending by these hospitals on direct patient care services. As in 2009, hospitals spending in 2013 on activities that

benefit the community more broadly did not vary with the level of LHD per capita spending in a community.

Table 3 presents results from the GLM regression analyses. These results showed that – irrespective of the type of hospital community benefit activity and the study year examined – hospital spending on community benefits was unrelated to the level of spending by the LHD in a community. Neither a hospital's spending on total community benefit activities direct patient care, nor community health initiatives was associated with local public health per capita spending. With one exception, none of the LHD-level characteristics included in the analysis was significantly associated with hospitals' community benefit investment. In particular, neither local governance nor a local board of health was associated with hospital community benefit spending in either year. The only LHD-level characteristic that was significantly associated with hospital community benefit spending in one of the two year, 2009, was the type of jurisdiction served by the LHD. Hospitals' decisions about the size and composition of their community benefit portfolios thus appeared to be largely independent of the structure and capacity of the local public health system.

For both 2009 and 2013, the factors that were significantly associated with a hospital's spending on both total community benefits and direct patient care services were primarily institutional characteristics of the hospital itself, including size, teaching status, contract management, and financial performance. Size was positively associated with spending on all three categories of community benefit spending in 2009 (but not in 2013), partially confirming earlier findings that larger hospitals tend to provide more community benefit than smaller hospitals (Bazzoli et al. 2010; Ferdinand et al. 2014; Singh et al. 2015b). Teaching status was associated with higher total community benefit spending in both 2009 and 2013, a finding in line with prior research (Bazzoli et al. 2010; Young et al. 2013; Ferdinand et al. 2014; Singh et al. 2015b). Hospitals under contract management spent less on all three categories of community benefits in 2013, yet there was no significant relationship between contract management and any of the three spending categories in 2009. Finally, more profitable hospitals spent more on community health services in 2013, but not in 2009, while no relationship between hospital profitability and community benefit spending was found for total community benefits and direct patient care services in either year.

Additionally, with one exception, none of the community and market-level characteristics included in the analysis was associated with a hospital's spending on any of the three community benefit spending categories. In 2009, hospitals located in counties with more uninsured nonelderly residents spent more, on average, on both total community benefit and direct patient care services. No such association was observed for 2013. Furthermore, state-level activities and policies did appear to impact hospitals' investment in community health across the country. In both 2009 and 2013, a large number of the state fixed effects included in the regressions were statistically significant indicating that state-level characteristics, such as possibly the activities and spending patterns of the state health department as well as state-level legislation and regulations governing nonprofit hospital tax exemption, may impact hospital community benefit spending.

< Table 3 here >

Discussion

In 2013, median spending by tax-exempt hospitals on broader community health activities amounted to over $240,000. This investment represented, in the aggregate, less than four percent of a hospital's median total spending on community benefits of over $7.3 million in that year. This occurred just one year before key provisions of the ACA for expanding access to health insurance took effect, which are expected to reduce hospitals' uncompensated care costs. As noted, some evidence already exists that the Medicaid eligibility reforms that many states have adopted are having such an impact. At present, hospitals are not required to reinvest any savings from reduced uncompensated costs but, as noted, there is some expectation that hospitals will redirect at least some of the savings toward programs and infrastructure targeted at upstream determinants of health (Hester et al. 2015; Rubin, Singh, and Young 2015). As such, in the near future, the community benefit activities of tax-exempt hospitals may play an increasingly important role in the funding of population health initiatives for communities across the US (Kindig and Isham 2014; Singh et al. 2015a).

Although the results from our bivariate analysis point to a possibly emerging relationship between hospitals' investment in community health and local public health spending, this relationship did not hold up with multivariate analysis. For the bivariate analysis with 2013 data, hospitals in communities with the highest LHD spending invested more in total community benefit activities, in particular direct patient care activities. Yet, the multivariate analyses for both 2009 and 2013 indicated that tax-exempt hospitals' spending on community benefit was unrelated to LHD spending patterns. More importantly, however, for hospital investment in community health improvement activities, neither the bivariate nor the multivariate analyses pointed to a relationship between these types of hospital investments and spending by the LHD.

Several explanations are possible for these results. One possible explanation may be that private-sector activities complement rather than substitute for public-sector activities. For instance, hospitals might offer services or otherwise engage in community health activities that public health agencies can or do not offer in their communities. In this case, the level of LHD spending may not have much direct impact on hospitals' investments in community health. Another possible explanation is that greater spending by the public health system addresses most key health needs of a community and thus leaves less opportunity for hospitals to make meaningful investments in improving community health. If so, relatively high levels of LHD spending may, even if not entirely crowding -out private-sector activity in this area, lead hospitals to limit their own investments in the public health system. A third possible explanation is the low levels of investment in public health in the U.S. (Institute of Medicine 2012). Given such low investment, it is perhaps not surprising that we did not observe a relationship between local public health spending and tax-exempt hospitals' spending on community health. At the same time, low levels of public funding for community health activities may point to the need for additional private- sector funding. Programs targeted at improving the social determinants of health typically involve long-term investments. New and innovative financing vehicles, such as increased spending by tax-exempt hospitals on community health activities (Kindig and Isham 2014), may represent one such vehicle.

One other possible explanation is the general lack of collaboration between the private and the public sector with respect to both assessing community health needs and coordinating activities aimed at addressing community health needs. Historically, governmental public health has been

the locus of accountability for community health (Hester et al. 2015). More recently, given such developments as the passage of the ACA, private-sector stakeholders, including employers, health plans, hospitals, and other healthcare providers, have realized the importance of healthy communities and have begun to support efforts targeting community health. Opportunities may thus exist for local public health to more actively engage with the private sector to ensure that public spending indeed complements the initiatives of private-sector stakeholders. Improved coordination of the activities of diverse private stakeholders with the programs and services offered by local public health agencies is critical if available resources are to be used efficiently to achieve the greatest possible improvements in community health outcomes (Lurie and Fremont 2009; Shortell et al. 2009).

One vehicle that has been shown to foster coordination between the public and the private sector is jointly conducted community health needs assessments (CHNAs). CHNAs are a core activity of many local health departments, and many of these agencies have been conducting CHNAs on a regular basis for years (Carlton and Singh 2015). As noted, under the ACA, all nonprofit hospitals with a federal tax exemption are required to conduct periodic CHNAs. Opportunities may thus exist for LHDs, hospitals, and other community stakeholders to come together and conduct joint needs assessments. As of 2013, more than half of all LHDs in the U.S. were already partnering with hospitals in their communities in the development of their CHNA and early evidence indicates that the quality of the assessment process improves with meaningful cross-sector collaboration (Carlton and Singh 2015; Frank and Drake 2015). Once relationships have been established among public and private community stakeholders, joint assessment activities have also been shown to pave the path for joint community health improvement planning and thus better coordination of the diverse set of community health improvement activities offered in a community (Singh and Carlton 2016). Ideally, joint community health improvement planning will result in each partner focusing on the areas that they are best. This will help ensure that limited financial resources are spent in an effective and efficient manner so as to achieve the greatest possible improvements in community health.

Limitations

This study has several limitations. First, for analyses we linked each hospital with an LHD based on the county in which both entities were located. A hospital located in county A was merged with data for the LHD that served county A. Hospital service areas, however, often differ from the county in which they are located. A hospital may serve only a part of the county in which it is located and may also serve patients in neighboring counties, which might, in turn, be served by different LHDs. Also, in the case of rural hospitals, hospitals may serve not only the counties in which they are located but also surrounding counties, which may, again, be the jurisdiction of multiple different LHDs. Second, the subsample of LHDs included in our study differed from all LHDs along a number of key characteristics. Sample LHDs were larger both in terms of size of the population served and total expenditures, more likely to serve counties or multi-county areas, and more likely to be locally governed. The percentage of LHDs with a local board of health, however, did not differ significantly between the two groups, and neither did median per capita spending. Finally, the analysis did not take into account the community health investments made by other stakeholders in a community, such as the spending of healthcare providers other than tax-exempt hospitals, insurers, employers, and community non-profits. Future work that aims to develop inventories of the community health activities of all stakeholders in a community is needed to understand the relationship between governmental public health spending and the activities of other public and private community stakeholders.

Conclusion

Greater local public health spending patterns in a community do not appear to impact the investments of tax-exempt hospitals in community health activities. Given the low levels of investment in public health in the U.S., this finding is encouraging. Opportunities may, however, exist for LHDs to more actively engage with the private sector to ensure that public spending complements the initiatives of private stakeholders. The requirement that tax-exempt hospitals conduct periodic CHNAs with input from local public health partners may represent a first step in this direction. Once hospitals, LHDs, and other stakeholders in a community have established the relationships necessary to conduct meaningful joint CHNAs, they will be better prepared to build on their joint assessments by engaging in joint community health improvement planning, which may lead hospitals to invest more in community health.

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Table 1: Hospital spending on community benefit activities, total sample and by quartile of local health department per capita spending, 2009 and 2013

		LHD per capita spending			
	Total sample	**Quartile 1 (Lowest spending)**	**Quartile 2**	**Quartile 3**	**Quartile 4 (Highest spending)**
Year 2009	n=1,277	n=319	n=319	n=319	n=320
Hospital spending on					
Total community benefit	6.3% (4.0% - 9.2%)	6.5% (4.1% - 9.0%)	6.0% (3.7% - 9.0%)	6.6% (4.4% - 9.9%)	6.3% (3.8% - 9.3%)
Direct patient care services	5.4% (3.3% - 8.0%)	5.4% (3.7% - 8.1%)	5.2% (3.1% - 7.8%)	5.6% (3.6% - 8.3%)	5.2% (3.1% - 7.8%)
Community health services	0.22% (0.05% - 0.54%)	0.24% (0.08% - 0.57%)	0.22% (0.05% - 0.57%)	0.22% (0.05% - 0.56%)	0.18% (0.03% - 0.50%)
Year 2013	n=1,021	n=252	n=263	n=252	n=254
Hospital spending on					
Total community benefit**	7.5% (5.1% - 10.6%)	7.2% (5.0% - 9.5%)	7.5% (4.9% - 10.7%)	7.3% (4.9% - 10.2%)	8.5% (5.6% - 12.5%)
Direct patient care services*	6.2% (4.2% - 9.0%)	6.0% (4.1% - 8.0%)	6.0% (4.0% - 9.4%)	6.2% (4.2% - 8.7%)	6.6% (4.5% - 9.9%)
Community health services	0.27% (0.08% - 0.62%)	0.27% (0.10% - 0.66%)	0.25% (0.07% - 0.61%)	0.26% (0.09% - 0.56%)	0.28% (0.06% - 0.67%)

Source: Authors' calculations.

Notes: Table shows medians with interquartile ranges in parentheses; * ANOVA showed variation across quartiles was significant at p<0.05; ** ANOVA showed variation across quartiles was significant at p<0.01.

Table 2: Total spending and per capita spending by local health departments, 2009 and 2013

	2009	**2013**
Total spending	$3,566,110 ($1,306,562 - $9,209,581)	$5,253,749 ($2,161,923 - $19,300,000)
Per capita spending	$42.09 ($26.87 - $65.32)	$41.03 ($24.09 - $70.67)

Source: Authors' calculations.

Notes: Table shows medians with interquartile ranges in parentheses for the 688 and 1,002 unique LHDs in our sample for the years 2009 and 2013, respectively.

Table 3: Multivariate relationship between hospital's expenditures on select community benefit activities (as a percentage of hospitals' total operating expenditures) and local health departments' per capita spending, 2009 and 2013

	Total community benefit		**Direct patient care services**		**Community health services**	
	2009	**2013**	**2009**	**2013**	**2009**	**2013**
Per capita LHD spending	0.0014 (0.0018)	0.0011 (0.0014)	0.00068 (0.0017)	0.0013 (0.0012)	0.00031 (0.00027)	-0.00031 (0.00030)
Hospital characteristics						
Number of beds	0.0041** (0.0011)	0.0012 (0.0012)	0.0023** (0.00098)	0.000053 (0.0011)	0.0010* (0.00051)	0.00024 (0.00024)
System affiliation	-0.11 (0.40)	0.54 (0.39)	-0.13 (0.37)	0.36 (0.37)	-0.089 (0.13)	0.074 (0.069)
Network affiliation	-0.20	0.10	-0.24	0.24	0.079	-0.027

	(0.26)	(0.37)	(0.25)	(0.35)	(0.063)	(0.056)
Case mix index	-1.93	-0.75	-2.60*	-1.66	-0.36	0.16
	(1.31)	(0.98)	(1.22)	(0.95)	(0.28)	(0.24)
Wage index	-0.078	-0.030	-0.064	-0.026	-0.028	-0.0015
	(0.069)	(0.018)	(0.066)	(0.017)	(0.019)	(0.0024)
Teaching hospital	2.43**	2.01**	0.58	-0.27	-0.094	-0.20
	(0.64)	(0.68)	(0.59)	(0.61)	(0.13)	(0.11)
Contract managed	0.97	-1.55*	0.94	-1.16*	0.23	-0.18*
	(1.05)	(0.60)	(1.01)	(0.57)	(0.20)	(0.078)
Church affiliation	-0.43	-1.07*	-0.41	-0.82	0.21	-0.13
	(0.36)	(0.49)	(0.33)	(0.45)	(0.12)	(0.096)
Sole community	0.35	-0.99	-0.48	-1.19	0.56	-0.055
provider	(0.69)	(0.79)	(0.57)	(0.75)	(0.35)	(0.11)
Profit margin						
High	0.23	0.13	0.39	-0.043	-0.13	0.15**
	(0.44)	(0.48)	(0.40)	(0.45)	(0.18)	(0.055)
Negative	0.12	0.56	0.25	0.62	-0.13	0.0022
	(0.44)	(0.59)	(0.42)	(0.57)	(0.12)	(0.083)
LHD characteristics						
Size of population	-0.11	0.079	-0.23	-0.078	0.028	0.0046
served (in millions)	(0.21)	(0.17)	(0.21)	(0.15)	(0.34)	(0.035)
Local governance	-0.25	-0.38	-1.17	-0.65	0.23	-0.11
	(0.77)	(0.91)	(0.68)	(0.88)	(0.28)	(0.15)
Local board of health	0.27	0.41	0.66	0.22	-0.090	0.20
	(0.50)	(0.71)	(0.50)	(0.64)	(0.12)	(0.16)
County health	-4.04*	-2.09*	-2.85*	-1.20	-0.45	-0.068
department	(1.37)	(1.00)	(1.30)	(0.85)	(0.34)	(0.19)
Community and						

market characteristics						
Market competition	0.17 (0.80)	0.64 (0.69)	0.80 (0.76)	0.85 (0.65)	-0.25 (0.22)	-0.034 (0.14)
Percentage of hospital beds in local community controlled by						
For-profit hospitals	-0.77 (1.32)	-1.83 (1.59)	0.19 (1.27)	-1.61 (1.48)	0.28 (0.35)	-0.068 (0.30)
State or local government	-0.21 (0.86)	0.31 (1.26)	-0.082 (0.84)	0.46 (1.26)	-0.087 (0.12)	-0.14 (0.16)
Median household income (in $000)	0.030 (0.023)	-0.033 (0.020)	0.026 (0.022)	-0.030 (0.020)	0.010 (0.009)	0.036 (0.031)
Percent of non-elderly population without health insurance	0.29** (0.12)	0.099 (0.098)	0.33** (0.11)	0.11 (0.093)	0.0090 (0.019)	-0.011 (0.017)
Urban setting	-0.87* (0.42)	-0.31 (0.50)	-0.38 (0.41)	-0.15 (0.48)	-0.39 (0.21)	-0.025 (0.078)

Source: Authors' calculations.

Notes: Table shows generalized linear regression coefficients with standard errors in parentheses. * $p<0.05$; ** $p<0.01$.