



## RESEARCH ARTICLE

# Association between non-profit hospital community benefit spending and health outcomes

Grant Wen BA<sup>1</sup>  | Hossein Zare PhD<sup>2</sup>  | Matthew D. Eisenberg PhD<sup>2</sup> | Gerard Anderson PhD<sup>2</sup>

<sup>1</sup>Johns Hopkins University School of Medicine, Baltimore, Maryland, USA

<sup>2</sup>Department of Health Policy and Management, Johns Hopkins University Bloomberg School of Public Health, Baltimore, Maryland, USA

## Correspondence

Hossein Zare, Department of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health, 624 N Broadway, Hampton House 337, Baltimore, MD 21205, USA.

Email: [hzare1@jhu.edu](mailto:hzare1@jhu.edu)

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## Abstract

**Objective:** To determine if greater non-profit hospital spending for community benefits is associated with better health outcomes in the county where they are located.

**Data Sources and Study Setting:** Community benefit data from IRS Form 990/Schedule H was linked to health outcome data from Area Health Resource Files, Map the Meal Gap, and Medicare claims from the Center for Medicare and Medicaid Services at the county level. Counties with at least one non-profit hospital in the United States from 2015 to 2019 ( $N = 5469$  across the 5 years) were included.

**Study Design:** We ran multiple regressions on community benefit expenditures linked with the number of health professionals, food insecurity, and adherence to diabetes and hypertension medication for each county.

**Data Collection:** The three outcomes were chosen based on prior studies of community benefit and a recent survey sent to 12 health care executives across four regions of the U.S. Data on community benefit expenditures and health outcomes were aggregated at the county level.

**Principal Findings:** Average hospital community benefit spending in 2019 was \$63.6 million per county (\$255 per capita). Multivariable regression results did not demonstrate significant associations of total community benefit spending with food insecurity or medication adherence for diabetes. Statistically significant associations with the number of health professionals per 1000 (coefficient, 12.10; SE, 0.32;  $p < 0.001$ ) and medication adherence for hypertension (marginal effect, 0.27; SE, 0.09;  $p = 0.003$ ) were identified, but both would require very large increases in community benefit spending to meaningfully improve outcomes.

**Conclusions:** Despite varying levels of non-profit hospital community benefit investment across counties, higher community benefit expenditures are not associated with an improvement in the selected health outcomes at the county level. Hospitals can use this information to reassess community benefit strategies, while federal, state,

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and local governments can use these findings to redefine the measures of community benefit they use to monitor and grant tax exemption.

#### KEYWORDS

health care disparities, health care organizations and systems, health economics, health policy/politics/law/regulation, hospitals, state health policies

#### What is known on this topic

- Non-profit hospitals spend billions of dollars on community benefits with the expectation that they will provide benefits to their local communities.
- The impact of these investments is not well known.

#### What this study adds

- Hospital community benefit expenditures are not associated with better health outcomes at the county level.

## 1 | INTRODUCTION

In a report released by the American Hospital Association in 2021, non-profit hospitals claimed to be spending \$105 billion on community benefit services in 2018.<sup>1</sup> Proponents argue that this large investment in community health is one justification for nonprofit hospitals' tax-exempt status, as it is assumed that this investment will have a demonstrable, positive impact on the health of the communities where these hospitals are located.

To report their contributions to community benefit efforts, hospitals are required to conduct community health needs assessments every three years and submit a form detailing their community benefit contributions annually (Schedule H of IRS Form 990). Prior work using this data has demonstrated that hospitals allocate community benefits spending to a variety of programs and services, with improving access to care, managing chronic conditions, and reducing levels of obesity, diabetes, and cancer being the most common investment targets.<sup>2-4</sup>

Notably, the current federal reporting system does not require hospitals to report data on outcomes, but only to document hospital reporting of community needs and spending on community benefits. Because reporting on outcomes is not required, the relationship between community benefit investment and community health has not been well studied. Some hospitals have assessed the return on investment in their respective communities,<sup>5,6</sup> but we only found one cross-sectional study that examined this issue nationally, and it focused on hospital readmission rates, a measure aligned with not only community benefit but also hospital profit incentives.<sup>7</sup>

Our study expands this literature by examining the following question: Is greater community benefit spending by nonprofit hospitals associated with improved community health? We analyze this relationship by assessing change over five years (2015–2019) across U.S. counties with at least one non-profit hospital. This study is important because previous work has shown that the dollar value of tax benefits received by non-profit hospitals can be greater than their spending on community benefits.<sup>8-10</sup> Better understanding of the relationship between hospital

spending on community benefit and community health can help hospitals refine investment strategies and inform policy makers about the true welfare implications of non-profit hospitals' tax exemptions.

### 1.1 | Methods

This study was marked as exempt by the institutional review board at the Johns Hopkins University Bloomberg School of Public Health.

### 1.2 | Selecting health outcomes related to community benefit spending

We reviewed prior literature on community benefits to determine hospital investment priorities.<sup>8,11,12</sup> Recognizing that these priorities can evolve over time, we also conducted a nationally random sample of 12 executives responsible for allocating community benefit spending in their respective hospitals. We surveyed hospitals from each of four regions (Northeast, Midwest, South, and West), and within each region, one large (>300 beds), medium (100–300 beds), and small hospital (<100 beds). The hospitals were chosen at random from a list of all hospitals in that category. The survey targeted individuals who oversaw community benefits at their respective hospitals. If their contact information was not publicly available, we contacted the public or community relations department and were connected to the corresponding individual. If a hospital did not respond within two weeks after three emails, a second hospital from that category was chosen.

In the survey, the hospital executives were given a list of 16 health outcomes developed from the Healthy People 2030 objectives<sup>13</sup> and items from prior studies of community benefit (eAppendix 1). They were asked to select the five outcomes they believed community benefit spending would most greatly impact or suggest other outcomes. We then tabulated the results and choose the three that received the most votes—number of health care professionals, food insecurity, and

medication adherence for common conditions such as diabetes and cardiovascular disease. These three measures also reflect the results of prior, large-scale surveys as commonly identified community needs and community benefit investment priorities.<sup>2-4</sup>

### 1.3 | Measuring the impact of community benefits

We aggregated hospital community benefits spending data from Schedule H (IRS Form 990) at the county level from 2015 to 2019. A total of 2450 non-profit hospital systems were included in the analysis. We focused on total community benefit spending and charity care (additional details about all subcategories of community benefit are provided in eTable 1). Because counties vary in population, we divided total dollar amounts of community benefit spending by county population to produce community benefit spending per capita. Counties without any non-profit hospitals were excluded from analysis. On IRS Form 990, community benefit is reported at the health system level. Large health care organizations may span multiple counties, but they only report one aggregate number. Our analysis included 267 such hospital systems. To approximate the division of their spending across counties, we disaggregated spending based on the percentage of the individual hospital's level of charity care compared to all hospitals within that system. This percentage was obtained from the Centers for Medicare and Medicaid Services Hospital Cost Reports, a database that reports data on the hospital rather than the health system level.<sup>8</sup>

We linked community benefit data to data on the three outcomes identified in the survey aggregated at the county level—the number of health professionals per 1000 people, food insecurity rate, and medication adherence rate to diabetes and hypertension medication. This data was provided by the Area Health Resource Files (2015–2019), Map the Meal Gap (2015–2019), and Medicare claims from the Center for Medicare and Medicaid Services (2015–2019).<sup>14-16</sup>

Health professionals were defined as the total number of active physicians (allopathic and osteopathic), including residents, along with pharmacists (PharmDs), physician assistants (PAs), registered nurses (RNs), and advanced practice registered nurses (APRNs), a category comprising of advanced practice midwives, certified registered nurse anesthetists, clinical nurse specialists, and nurse practitioners.

Food insecurity was measured for each county using data from Map the Meal Gap, which adopts the US Department of Agriculture food insecurity measure by utilizing responses from questions in the food security supplement of the Current Population Survey while controlling for unemployment, income, poverty, homeownership, and race/ethnicity (African American and Hispanic). The ultimate output was an adjusted level of food insecurity for each county after considering county characteristics.

We defined antihypertensive drugs as first-line pharmacological treatments listed in UpToDate, including angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, thiazide diuretics, and calcium channel blockers.<sup>17</sup> Likewise, diabetes medication consisted of metformin, the only first-line pharmacological treatment for diabetes mellitus type II.<sup>18</sup> Specific drug names were searched using Lexicomp and included in eAppendix 2.<sup>19</sup> We defined medication

adherence as the proportion of days covered, or the proportion of days in which a person has access to the medication over a period of interest, which in our case is over the calendar year. This was done for Medicare claims from 2015 to 2019 and individual proportion of days covered were aggregated at the county level for analysis.

### 1.4 | Statistical analysis

Multivariable beta regressions were used to model the association of community benefits spending with food insecurity and with medication adherence (ratio-dependent variables), while linear regression was used with the number of health care professionals (linear dependent variable). County and/or hospital level characteristics were included as covariates in all models. Covariates included rural/urban location, county population, rates of common medical conditions (acute myocardial infarction, congestive heart failure, diabetes mellitus, hypertension, stroke, and hyperlipidemia), a social vulnerability index<sup>20</sup> that measures socioeconomic status, household composition, minority status, and housing/transportation, percent of population with rent more than 30% of income, percent of population receiving public assistance, health insurance status, Herfindahl index (hospital concentration), number of hospital beds in a county, percent of teaching hospitals in a county, percent of for-profit, non-profit and government hospitals in a county, and if the county was located in a Medicaid expansion state prior to January 1, 2015.<sup>14,16,21-23</sup>

Analysis was performed with Stata version 17.0. Due to the number of covariates, a Bonferroni correction<sup>24</sup> was applied to achieve significant levels of  $p < 0.0036$  (health professionals),  $p < 0.0056$  (food insecurity), and  $p < 0.0033$  (medication adherence). All statistical tests were 2-sided.

We also performed several sensitivity analyses. We used alternate definitions of our outcome variables including the number of primary care physicians per 1000 people, the number of groceries per 1000 people, and the rate of diabetes self-management counseling. We also examined subcategories of community benefit such as spending on health professions education. Details on data sources for sensitivity analyses and covariates are provided in the eAppendix 3.

## 2 | RESULTS

### 2.1 | Survey results

Food insecurity, number of health professionals, and medication adherence for diabetes and hypertension received the most votes in the survey and were selected as the three outcome measures.

### 2.2 | Descriptive statistics

The sample consisted of an average of 1093 counties per year that had non-profit hospitals reporting community benefits, for a total of 5469 total observations for all five years from 2015 to 2019 (Table 1). Average hospital community benefit spending across all counties in

**TABLE 1** Descriptive analysis of variables used in regression models

	2015 (n = 1146)	2019 (n = 1002)	2015–2019 (n = 5469)
<b>Dependent variables</b>	Mean (SD)	Mean (SD)	Mean (SD)
Health professionals per 1000	9.26 (8.58)	9.78 (9.19)	9.45 (8.78)
Food insecurity rate	0.13 (0.04)***	0.12 (0.03)	0.13 (0.04)
Adherence rate to diabetes medication	0.68 (0.08)***	0.74 (0.07)	0.71 (0.07)
Adherence rate to antihypertensives	0.80 (0.05)***	0.83 (0.04)	0.83 (0.04)
<b>Independent variables</b>			
Total community benefit (in \$1000,000)	50.90 (163)	63.60 (208)	58.60 (191)
Charity care (in \$1000,000)	9.03 (28.2)	11.60 (40.2)	10.30 (33.2)
Total community benefit (per capita, \$)	203 (426)**	255 (496)	231 (489)
Charity care (per capita, \$)	36.3 (70.8)*	44.0 (71.5)	39.5 (70.1)
<b>Hospital characteristics</b>			
Hospital beds per 1000	5.80 (9.05)	5.78 (8.96)	5.76 (9.05)
Herfindahl index (hospital concentration)	75.10 (29.9)	74.30 (30.6)	75.0 (30.1)
Teaching hospitals, %	19.8 (33.8)	21.8 (35.1)	20.7 (34.4)
<b>Hospital ownership</b>			
Government, %	9.88 (25.4)	9.52 (24.8)	9.58 (25.0)
Non-profit, %	80.6 (32.8)	83.0 (30.2)	81.6 (31.7)
For-profit, %	9.53 (22.8)*	7.50 (19.0)	8.79 (21.3)
<b>County characteristics</b>			
Social vulnerability index	0.47 (0.27)	0.46 (0.27)	0.46 (0.27)
Receiving public assistance, %	2.68 (1.43)***	2.44 (1.32)	2.54 (1.36)
Rent >30% income, %	47.2 (8.25)***	45.0 (8.06)	45.9 (8.13)
Acute myocardial infarction rate <sup>a</sup>	0.30 (0.20)**	0.32 (0.20)	0.31 (0.20)
Congestive heart failure rate <sup>a</sup>	4.39 (1.73)**	4.64 (1.87)	4.53 (1.82)
Diabetes rate <sup>a</sup>	8.45 (2.79)	8.67 (2.97)	8.61 (2.89)
Hypertension rate <sup>a</sup>	16.8 (5.86)*	17.5 (6.26)	17.3 (6.11)
Stroke rate <sup>a</sup>	1.01 (0.40)	1.01 (0.43)	1.02 (0.42)
Hyperlipidemia rate <sup>a</sup>	12.9 (4.72)***	13.7 (5.10)	13.3 (4.93)
Rurality	4.20 (2.53)	4.26 (2.59)	4.22 (2.56)
Located in Medicaid expanded state	0.50 (0.50)	0.51 (0.50)	0.51 (0.50)
<b>Insurance status</b>			
Medicaid, %	15.5 (5.78)***	16.9 (6.56)	16.3 (6.23)
Medicare only, %	4.82 (1.53)***	5.47 (1.68)	5.20 (1.64)
Private, %	59.7 (9.93)**	60.8 (9.68)	60.4 (9.78)
Uninsured, %	11.9 (4.89)***	8.54 (4.45)	9.93 (4.79)

Abbreviations: SD, standard deviation. \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$  for unequal t-test between 2015 and 2019 values.

<sup>a</sup>Per 1000 people.

2019 was \$63.6 million per county (\$255 per capita), and charity care spending was \$11.6 million per county (\$44 per capita), comprising 17% of total community benefits. County characteristics are shown in Table 1, and an expanded set of characteristics is shown in eTable 2.

### 2.3 | Regression results

The results show either statistically insignificant or very small associations between community benefit spending on the three health

outcomes. The overall outcomes for linear and beta regressions are depicted in Table 2A,B respectively.

### 2.4 | Number of health professionals

There was a statistically significant, but very small, association (coefficient: 12.1; SE: 0.32; CI: [11.41, 12.68];  $p < 0.001$ ) between total community benefit per capita (in thousands of dollars) and number of health professionals (Table 3). For an increase of one health

**TABLE 2** Regression results: Association of community benefit spending and health outcomes

	Model 1: Total community benefits	Model 2: Charity care
Health professionals <sup>a</sup> (n = 5469)		
Coefficient (SE)	12.10 (0.32)***	64.3 (19.5)**
Food insecurity, % (n = 5469)		
Coefficient (SE)	0.12 (0.14)	2.27 (1.12)*
Marginal effect (SE)	0.15 (0.14)	21.3 (9.27)*
Adherence to diabetes medication, % (n = 5469)		
Coefficient (SE)	0.14 (0.16)	-3.12 (1.62)
Marginal effect (SE)	0.20 (0.21)	-15.20 (7.30)*
Adherence to antihypertensives, % (n = 5469)		
Coefficient (SE)	0.26 (0.08)***	-0.91 (1.30)
Marginal effect (SE)	0.27 (0.09)**	-7.34 (8.62)

Note: All models represent spending per capita in units of \$1000.

\* $p < 0.05$ ; \*\* $p < 0.0036$  (health professionals) or  $< 0.0056$  (food insecurity) or  $< 0.0033$  (adherence); \*\*\* $p < 0.001$ .

Abbreviations: SE, standard error (clustered by county).

<sup>a</sup>Per 1000 people.

professional per 1000 people, total community benefit spending per capita would have to increase by 32% of its value in 2019. Counties with more health professionals had more hospital beds per 1000 people (coefficient: 0.15; SE: 0.04; CI: [0.06, 0.23];  $p = 0.001$ ), more teaching hospitals (coefficient: 0.05; SE: 0.01; CI: [0.04, 0.06];  $p < 0.001$ ), and more people spending greater than 30% of their income on rent (coefficient: 0.07; SE: 0.02; CI: [0.03, 0.11];  $p < 0.001$ ). Health professions education is a particularly relevant subcategory of community benefits for the number of health professionals, but we found that community benefit investment in health professions education would have to increase by 133% of its value in 2019 (coefficient: 37.7; CI: [34.4, 41.1];  $p < 0.001$ ) to obtain an increase of one health professional per 1000 people (eTable 3).

As a sensitivity analysis, the effect of community benefit spending on the number of primary care physicians was studied. The association (coefficient: 0.50; SE: 0.02; CI: [0.43, 0.51];  $p < 0.001$ ) was less than that for all health professionals.

## 2.5 | Food insecurity

Greater community benefit spending did not have a statistically significant association with a lower food insecurity rate (Table 4; marginal effect, 0.15; SE: 0.14; CI: [-0.12, 0.42];  $p = 0.28$ ). Our findings showed that counties with more food insecurity were associated with a higher social vulnerability index, higher percentage of the population paying more than 30% of their income on rent, and higher percentage of Medicaid patients. They also had a lower percentage of patients with private insurance, were less likely to be rural, and more likely to be in a state without Medicaid

**TABLE 3** Multivariable regression results: Association of total CB spending and number of health professionals

Variable	Health professionals per 1000
Total CB spending	12.10 (0.32) ***
Hospital characteristics	
Hospital beds per 1000	0.15 (0.04)***
Herfindahl index (hospital concentration)*	-0.01 (0.01)
Teaching hospitals, %	0.05 (0.01)***
Government, %	-0.01 (0.01)
Non-profit, %	-0.02 (0.01)*
County-level variables	
Social vulnerability index	1.27 (0.83)
Receiving public assistance, %	-0.07 (0.12)
Rent >30% income, %	0.07 (0.02)***
Rurality	-0.09 (0.44)
Located in Medicaid expanded state	-0.06 (0.35)
Medicaid, %	-0.07 (0.05)
Medicare only, %	-0.16 (0.11)
Private, %	0.02 (0.04)

Note: All values represent spending per capita in units of \$1000. \* $p < 0.05$ ; \*\* $p < 0.0036$ ; \*\*\* $p < 0.001$ .

Abbreviations: CB, community benefit; SE, standard error (clustered by county).

expansion (Table 4). Sensitivity analysis showed that total community benefit spending did not have a statistically significant association with the number of groceries per 1000 people (eTable 3).

## 2.6 | Medication adherence

The association between adherence to diabetes medication and total community benefit was statistically insignificant (Table 5; marginal effect: 0.20; SE: 0.21; CI: [-0.22, 0.61];  $p = 0.36$ ). Counties with better adherence to diabetes medication had a lower social vulnerability index and higher percentage of patients with private insurance. We found a statistically significant association between total community benefit spending and adherence to antihypertensives (marginal effect, 0.27; SE, 0.09; CI: [0.09, 0.45];  $p = 0.003$ ). However, the association was very small—an additional \$3704 spending per capita per 1000 people (1452% of 2019 expenditures) is associated with a 1% increase in medication adherence. Counties with higher adherence had a lower social vulnerability index, higher percentage of patients with private insurance, higher rates of acute myocardial infarction, and lower rates of stroke (Table 5). In our sensitivity analysis, no significant associations were found between total community benefit spending and diabetes self-management counseling.

## 2.7 | Sensitivity analysis

Sensitivity analysis using fixed effects and lagging the outcome variables did not significantly alter any results. Refer to the supplement

**TABLE 4** Multivariable regression results: Association of total CB spending and food insecurity

Independent variable	Food insecurity, % Marginal effect (SE)
Total CB spending	0.15 (0.14)
County level variables	
Social vulnerability index	3.51 (0.39)***
Receiving public assistance, %	-0.02 (0.06)
Rent >30% income, %	0.04 (0.01)***
Rurality	-0.63 (0.19)***
Located in Medicaid expanded state	-1.31 (0.14)***
Medicaid, %	0.12 (0.02)***
Medicare only, %	0.14 (0.05)*
Private, %	-0.08 (0.02)***

Note: All values represent spending per capita in units of \$1000. \* $p < 0.05$ ; \*\* $p < 0.0056$ ; \*\*\* $p < 0.001$ .

Abbreviations: CB, community benefit; SE, standard error (clustered by county).

for additional tables showing associations with subcategories of community benefit (eTables 3 and 4).

## 3 | DISCUSSION

The results suggest that higher hospital expenditures on community benefits are not associated with better outcomes at the county level for most community benefit outcomes we measured. The two exceptions are that community benefit spending had a statistically significant association with the number of health professionals per 1000 and adherence to antihypertensives. However, the effect size was extremely small and not likely to be meaningful in practice.

There are three possible explanations for these statistically insignificant or relatively minor associations. First, we may not have included all relevant control variables or may have an inappropriate functional form. To address this, we tried several sensitivity analyses, but none of them showed drastically different results. We also examined subcategories of community benefit, but associations at the subcategory level were similarly either statistically insignificant or practically insignificant, requiring extensive increases in spending to be associated with even a minor change in outcomes.

Second, our choice of outcomes may not measure the real impact of community benefit investments. However, we chose three measures identified by hospital leadership as priorities, and they also

Independent variable	Adherence to diabetes medication, % Marginal effect (SE)	Adherence to anti-hypertensives, % Marginal effect (SE)
Total CB spending	0.20 (0.21)	0.27 (0.09)**
County level variables		
Social vulnerability index	-10.15 (1.84)***	-6.06 (0.56)***
Receiving public assistance, %	0.19 (0.14)	0.20 (0.09)*
Rent >30% income, %	-0.03 (0.03)	-0.02 (0.02)
Rurality	1.12 (0.86)	1.10 (0.37)*
Located in Medicaid expanded state	0.43 (0.32)	0.27 (0.18)
Medicaid, %	0.12 (0.05)*	0.07 (0.03)*
Medicare only, %	0.33 (0.12)*	0.13 (0.07)
Private, %	0.21 (0.06)**	0.16 (0.02)***
Acute myocardial infarction rate	2.28 (0.93)*	1.10 (0.38)*
Congestive-heart failure rate	0.40 (0.31)	0.06 (0.10)
Diabetes rate	-0.01 (0.20)	-0.03 (0.09)
Hypertension rate	-0.06 (0.12)	-0.06 (0.05)
Stroke rate	-1.78 (0.08)*	-1.38 (0.28)***
Hyperlipidemia rate	0.11 (0.09)	0.19 (0.05)***

Note: All values represent spending per capita in units of \$1000. \* $p < 0.05$ ; \*\* $p < 0.0033$ ; \*\*\* $p < 0.001$ . Abbreviations: CB, community benefit; SE, standard error (clustered by county).

**TABLE 5** Multivariable regression results: Association of total CB spending and medication adherence



reflect the results of prior surveys. Most importantly, there are plausible causal mechanisms through which community benefits can affect these three measures. First, the health professions education subcategory of community benefits directly funds training for health professionals, but our results demonstrate that the components of community benefits with the largest positive association with the number of health professionals are cash and in-kind contributions and charity care, not health professions education (eTable 3). In addition, it is well documented in the literature that primary care physicians increase the quality of care and reduce poor health outcomes, whereas evidence supporting the same effects for specialists is not as clear.<sup>25-28</sup> This would suggest that community benefit spending should have a larger association with the number of primary care physicians compared to the total number of health professionals, but our results suggest the opposite. This may be partially explained by our inclusion of other professionals like nurses and pharmacists in the tally for the total number of health professionals, and it represents a potential route for further exploration. Second, possible mechanisms for hospitals to address food insecurity include using ancillary food services and outreach programs such as hosting food pantries, screening patients for Supplemental Nutrition Assistance Program enrollment, and offering subsidized meal or grocery delivery services. A 2014 article reported that the Ohio-based ProMedica hospital system repackaged unserved food for food-insecure community members.<sup>29</sup> Likewise, Hillsboro Area Hospital in Illinois provided free lunch in the summer for children in the Hillsboro School District, where around 50% of students were on the free and reduced lunch program during the school year.<sup>30</sup> By lowering food insecurity rates, hospitals could decrease rates of diseases such as asthma, anemia, depression, hypertension, and diabetes.<sup>31</sup> Third, hospitals could also increase medication adherence via community benefit spending by investment in patient education, medication management programs, or prescription drug delivery services. Improved medication adherence has been shown to improve health outcomes and reduce wasted spending on health care.<sup>32,33</sup> For instance, MedStar Good Samaritan Hospital provides a free prescription drug delivery service for the vulnerable patients that it serves.<sup>34</sup> Unfortunately, our results suggest that current community benefit spending has no statistically significant associations with food insecurity or adherence to diabetes medication, and a positive, but very minor, association with adherence to antihypertensives at the county level. There is, however, the possibility that this could be significant at the individual hospital level.

The third explanation—what we believe to be the most appropriate conclusion from the results—is that the multibillion-dollar annual community benefit investment by hospitals has a minimal relationship with health outcomes in their communities. One plausible explanation for this finding is how the community benefit dollars are being spent. Almost half of community benefit spending per capita comprises of Medicaid shortfall (eTable 5, 45%). It is unclear how Medicaid shortfall improves community health. The most expensive hospitals tend to have the greatest Medicaid shortfall, simply because the disparity

between what the Medicaid program pays and what these hospitals charge is greater. Some of the cost of Medicaid shortfall is also provided through disproportionate share hospital payments—which are not included in community benefit calculations.<sup>35,36</sup> As a result, some of the Medicaid shortfall spendings may actually be compensated through disproportionate share payments instead of by the hospital. Moreover, prior research has demonstrated that health care, such as services funded by Medicaid shortfall, is a relatively weak determinant of community health.<sup>37,38</sup> Community benefit categories more likely to provide direct and sustainable community health improvements by addressing social determinants of health<sup>39</sup> receive very little hospital investment. For example, community health improvement services represent 4% of community benefit spending and community building consists of only 1% (eTable 5).

Given a hospital's expertise in clinical care, financial incentives, and the relative ease to measure investments in clinical services, it is understandable that hospitals lean heavily on spending on clinical categories of community benefit and maintaining their own profit margin.<sup>40</sup> However, as our findings suggest, this pattern of spending is not associated with improving county health outcomes, at least for the outcomes we have included in this analysis. Many state governments have begun to realize this and are revising their definitions of community benefit. For instance, Oregon now enforces a community benefit spending floor set every two years, a process that considers a hospital's expenditures on social determinants of health.<sup>41</sup> Connecticut requires non-profit hospitals to increase total dollars spent on community benefits by at least 1 percent every year for the next five years, specifying that this spending cannot go towards hospital expenses or Medicaid shortfall, and must be used to address the social determinants of health.<sup>41</sup> There are now five states that have set a minimum community benefit spending requirement and 31 that have a state level reporting requirement in addition to Schedule H of Form 990.<sup>42</sup>

The results of this study suggest that there is a need for refinement of the definition of community benefit. Categories of community benefit such as Medicaid shortfall represent a large portion of community benefit spending, yet we see such little association of these items with improved outcomes. Federal and state policy makers should consider which community benefits they want hospitals to provide and focus their attention on these activities. Although it may be difficult to draw a causal relationship between better outcomes and specific activities, it is possible to examine which of the expenditures is most likely to have a positive community benefit and highlight these. As noted earlier, some states are already attempting to do so, and the federal government should consider similar approaches. For instance, the Centers for Medicare and Medicaid Services could revise the Hospital Compare website, which provides standardized hospital quality information to consumers, to disclose each hospital's community benefit to tax benefit ratio, with the refined definition of community benefit that excludes categories like Medicaid shortfall.<sup>43</sup> This would improve transparency and incentivize non-profit hospitals to increase provision of community benefit that actually reaches its desired impact.

## 4 | LIMITATIONS

This study has several limitations. First, only 12 hospital executives participated in the survey. This small sample size may not have been truly representative of hospital community benefit priorities, though this was mitigated by selecting hospitals of three different sizes in four distinct regions in the country with significant agreement across the categories of hospitals. The main purpose of the survey was simply to assess if current priorities of community benefit corresponded to earlier surveys. Our review of the much larger surveys that were administered in past years showed agreement with the results of our survey. Second, we recognize that the selection of other health outcomes could have demonstrated significant results. We also recognize that the outcomes are not necessarily direct measures of health outcomes. For instance, the number of health care professionals can increase without a corresponding rise in quality or access to care. Nevertheless, we decided to choose the outcomes that were cited by both prior research and hospital executives as top investment priorities. Third, the effect of investments may only be seen long term, but our analysis was limited to the 5 years of observation. Fourth, the control variables may not have captured the full impact of prior investments by the hospitals. Fifth, while other geographic entities could have been chosen, we believe that most hospitals focus their community benefit investments within the county that they are located. Ideally, we would be able to assess this on the level of an individual hospital, but it would be extremely difficult to identify individual hospital objectives and define the perfect geographic zone of influence for each hospital. Sixth, community benefit spending is reported at the organizational level, not the individual hospital level, so it is difficult to accurately divide up community benefit spending of large health systems spanning multiple counties. In this study, we allocate the dollars based on charity care, with the assumption that charity care and community benefit provision are correlated, as described in the methods section. Lastly, as documented by prior work, the true impact of community benefit spending may be difficult to quantify due to its complicated nature.<sup>44</sup> Because many subcategories of hospital community benefit investment are done in conjunction with other entities, such as community-based organizations and public health departments, it may be challenging to distinguish the hospital's impact from these other entities. Moreover, due to the loose definition of community benefit, hospitals have the freedom to include or exclude very different activities as community benefit. Ideally, the government would collect data that allowed assessment of an individual hospital's impact on community health outcomes, but this may be challenging to realize. An alternative solution would involve restricting community benefit categories to ones that have a plausible association with improving community benefit outcomes. Further enactment of laws that require community partners to be involved in the implementation and execution of community benefit programs may allow for better assessment of community impact without having to collect explicit data on health outcomes.

## 5 | CONCLUSION

The billions of community benefit investments by non-profit hospitals are not associated with demonstrable benefits to the community at the county level. Communities with greater community benefit investment by the hospitals do not necessarily have better health outcomes as measured by a greater number of health professionals per 1000 people, lower food insecurity, or better medication adherence. Hospitals can use this information to reassess their community benefit strategies, while federal, state, and local governments can use these findings to redefine the parameters of community benefit used to justify tax exemption for these hospitals.

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### ORCID

Grant Wen  <https://orcid.org/0000-0001-8429-5982>

Hossein Zare  <https://orcid.org/0000-0002-5832-0854>

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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