Not Only How Much but How: The Importance of Diversifying Funding Streams in a Reimagined Public Health System

J. Mac McCullough
Boise State University

Umesh Ghimire
Indiana University

Jason M. Orr
University of Minnesota

Sezan O. Onal
University of Minnesota

Ashley Edmiston
National Association of County and City Health Officials

See next page for additional authors

—

Authors

J. Mac McCullough, Umesh Ghimire, Jason M. Orr, Sezan O. Onal, Ashley Edmiston, Krishna Patel, Timothy
C. McCall, and Jonathon P. Leider

By J. Mac McCullough, Umesh Ghimire, Jason M. Orr, Sezan O. Onal, Ashley Edmiston, Krishna Patel, Timothy C. McCall, and Jonathon P. Leider

Not Only How Much But How: The Importance Of Diversifying Funding Streams In A Reimagined Public Health System

J. Mac McCullough
(MacMcCullough@boisestate
.edu), Boise State University,
Boise, Idaho.

Umesh Ghimire, Indiana
University, Indianapolis,
Indiana.

Jason M. Orr, University of
Minnesota, Minneapolis,
Minnesota.

Sezan O. Onal, University of
Minnesota.

Ashley Edmiston, National
Association of County and
City Health Officials,
Washington, D.C.

Krishna Patel, National
Association of County and
City Health Officials.

Timothy C. McCall, National
Association of County and
City Health Officials; and
George Washington University,
Washington, D.C.

Jonathon P. Leider, University
of Minnesota.

ABSTRACT Revenue diversification may be a synergistic strategy for transforming public health, yet few national or trend data are available. This study quantified and identified patterns in revenue diversification in public health before and during the COVID-19 pandemic. We used National Association of County and City Health Officials' National Profile of Local Health Departments study data for 2013, 2016, 2019, and 2022 to calculate a yearly diversification index for local health departments. Respondents' revenue portfolios changed fairly little between 2016 and 2022. Compared with less-diversified local health departments, well-diversified departments reported a balanced portfolio with local, state, federal, and clinical sources of revenue and higher per capita revenues. Less-diversified local health departments relied heavily on local sources and saw lower revenues. The COVID-19 period exacerbated these differences, with less-diversified departments seeing little revenue growth from 2019 to 2022. Revenue portfolios are an underexamined aspect of the public health system, and this study suggests that some organizations may be under financial strain by not having diverse revenue portfolios. Practitioners have ways of enhancing diversification, and policy attention is needed to incentivize and support revenue diversification to enhance the financial resilience and sustainability of local health departments.

Evidence suggests that substantial funding and staffing gaps exist across the state and local public health system. An estimated 80,000 additional full-time-equivalent positions were needed to fully staff Foundational Public Health Services at state and local health agencies before the COVID-19 pandemic, which could cost upward of $10 billion a year.[1,2] Trust for America's Health calculates an annual shortfall of $4.5 billion needed to fully fund just the foundational public health capabilities[3]—a figure that is based on detailed cost and activity calculations from several states involved in public health modernization work.[4,5]

During the COVID-19 pandemic, Congress passed the American Rescue Plan Act of 2021,[6] which originally provided $7.4 billion to strengthen the public health workforce, including infrastructure funding distributed through the Public Health Infrastructure Grant and other initiatives.[7] These funds, as well as other public and private investments, have supported different states' recent public health system transformation activities and may help close substantial funding gaps in public health. However, impacts of this one-time spending have yet to be fully realized, and even the largest potential dollar amounts given to governmental public health through the Public Health Infrastructure

Grant—some $4.35 billion as of January 2024[7]—would not match estimated funding gaps. In other words, financial pressures across the public health system are likely to remain, despite recent policy advances for a better-funded system.

Compared with estimates of how much funding is needed for a fully capable public health system, there is comparatively less evidence regarding how a fully funded system should be financially structured. Specifically, relatively little high-level policy attention has been paid to the sources of these funds and the diversification of revenues for public health agencies, including state health agencies and, particularly, local health departments. The types and relative amounts of revenues (that is, diversification) may influence the delivery of public health services—and therefore, population health—as much as or more so than the total revenues. For example, some funding sources are categorically limited and cannot be used to support the provision of services outside a narrow scope.[8] The practitioners planning and implementing public health programs in their communities in the face of budget, political, or other pressures might not be in the position of being selective in funding sources for their work. So although there may seem to be less urgency to parse funding sources and fiscal details for a "hollowed-out" public health system[9] facing a workforce "exodus,"[10] the reality is that these issues make it all the more important to do so from a high-level policy perspective. Understanding past, present, and potential future funding for public health and how financial structures and funding streams affect the ability of public health system leaders to implement programming in communities across the country is critical for a public health system that can effectively work toward community health improvement.

Revenue Diversification And Organizational Health

A main avenue by which local government financial structures and funding streams can affect practice, improving both service delivery and financial health, is through revenue diversification.[11] Broadly speaking, a diverse portfolio of revenues may be able to both sustain and enhance organizational performance. Diversification can sustain organizational performance by offering financial adaptability, resiliency, or sustainability.[12–14] Any of these potential effects of diversification may help ensure that changes in revenue from a specific source have a relatively manageable impact on the overall amount of resources available to the organization. In the public health system, this may correspond to continued service provision even in the face of long-term declines in system funding.

Diversification may also improve organizational performance by offering opportunities for entrepreneurial expansion, strategic partnerships, or enhanced reputation. Any of these potential effects of diversification may further improve organizational performance by allowing for synergies between existing and new revenue opportunities or by fundamentally improving an organization's ability to compete for additional resources. In the public health system, this may mean aligning service offerings with evolving community priorities or needs, even in the context of austerity.

Limited empirical work on public health system revenue diversification is available. Findings from one state suggest that diversification was not protective against revenue volatility for local health departments in that state.[15] Other sustaining or enhancing benefits of revenue diversification have been seen in public health agencies during times of recession and in reports from practitioners.[16,17] Findings from the nonprofit sector suggest that other organizational factors such as total expenses may also increase financial stability,[13] so there is an open question regarding the practical and theoretical importance of revenue diversification in the public health system.

The impacts of revenue diversification, and the overall financial structure of the public health system, is of central policy importance for a reimagined public health system in the US. There is current policy action to reprioritize and, in some cases, rightsize investments in the public health system. Are there benefits to ensuring that future public health revenues come from multiple, diverse sources? Or will similar practice results be obtained if the funds come from a more limited set of sources, such as primarily from the federal government?

In this study, we quantified the current state of revenue diversification in local public health and identified key ways in which it affects public health practices.

Study Data And Methods

We analyzed the types and amounts of revenues as reported by local health department respondents to the National Association of County and City Health Officials' National Profile of Local Health Departments (Profile Study) surveys for 2013, 2016, 2019, and 2022.[18] Subsequently, these data were used to calculate a revenue diversification index for each local health department and each year. Then, diversification index values were used in summary statistics and re-

gression analyses to investigate relationships between revenue diversification and agency characteristics hypothesized to be conceptually linked to agency finances and functioning.

SAMPLE AND DATA COLLECTION Surveys for each year's Profile Study were sent to all local health departments across the US, with response rates of 79 percent (2013), 76 percent (2016), 61 percent (2019), and 38 percent (2022). We considered the potential for outliers and analytical coding decisions to affect our findings, and we detail our approach to outliers in online appendix A.[19] Briefly, we Winsorized revenue data by setting outlier values equivalent to threshold amounts,[20] which is a common approach in public finance research.[1] To retain as many local health departments in the sample as possible, we set some missing revenue variables to zero dollar values; as detailed in appendix A, overall findings were not sensitive to this analytic decision.[19]

CALCULATION OF THE DIVERSIFICATION INDEX To quantify and describe the current state of revenue diversification in public health, we calculated the diversification index for each local health department according to the approach designed for the Hirschman-Herfindahl Index (HHI).[21] The HHI is a widely used measure that quantifies the degree of diversification of firms within markets, accounting for both the number of firms and the distribution of revenue across those firms.[22] Similarly, our diversification index measure quantifies the diversification of revenue sources within a public health department, accounting for both the number of sources and the distribution of revenue across sources.

Diversification indexes for individual local health departments ranged from near 0.00 (that is, high levels of diversification with a larger number of more equally sized revenue sources) to 1.00 (that is, low levels of diversification with more reliance on a smaller number of larger revenue sources). Additional detail on the diversification index, HHI, and calculations, including mathematical formulas, are in appendix B.[19] Following the approach of the Department of Justice and Federal Trade Commission, which use a threshold analogous to a 2-percentage-point change in market competitiveness and diversification when assessing potential mergers, we considered a change in the diversification index of 0.02 units to be of substantive importance for our analyses.

We used a five-step approach to calculate the diversification index. We first adjusted for inflation to 2022 dollars, using the Federal Reserve Economic Data state and local implicit price deflator.[23] Next, we converted from total to per capita revenue by dividing each revenue variable

Our findings show a clear gradient where greater revenue diversification is strongly associated with higher per capita revenues.

by the size of the population served. We then calculated the sum per capita total of reported revenue by adding all revenue subtypes for each local health department each year. Next, we calculated the percentage of total reported revenue that each revenue subtype represented. Finally, to calculate the diversification index, we squared each of these percentages and calculated the sum total of these squared values.

Univariate and bivariate summary statistics were calculated for the diversification index for the four Profile Study years, applying survey weights to account for complex survey design and nonresponse. We used regression models to examine associations between the diversification index and relevant local health department and community characteristics, including size of population served, state-local governance classification,[24] census region, and full-time-equivalent (FTE) staffing (median local health department staffing for 2013, 2016, 2019, and 2022 was approximately 40 FTEs per 100,000 population each year; we used a dichotomous measure of below versus above 40 FTEs per 100,000 as a simplified measure of low versus high staffing at a local health department). Regression models and diversification index trends were calculated using data from 2019 and earlier because of major influxes of COVID-19 supplemental funding in 2022. Univariate and bivariate statistics were calculated both overall and by diversification index quartile (that is, the most diversified and least diversified quartiles of local health departments). We performed the Mann-Kendall test to detect overall trends in revenue diversification over time. We performed the analysis of variance test to detect differences in overall means across quartiles and the post hoc Tukey Honest Significant Difference tests, as applicable, to detect quartile-specific differences. Results were analyzed using a statistical signifi-

Well-diversified local health departments saw multiple revenue sources increase during the pandemic.

cance threshold of $\alpha = 0.05$ and a practical significance threshold of an absolute change in the diversification index of at least 0.02 (equivalent to at least a 200-point change in the HHI, a substantively important threshold used by the Justice Department and Federal Trade Commission when assessing market diversification).[21] Additional details on the bivariate analyses and all regression models are in appendix C.[19]

Data analyses were performed using R and Stata, version 18.0. This study was reviewed by the University of Minnesota Institutional Review Board and was determined not to be human subjects research (STUDY00018488).

LIMITATIONS We acknowledge several limitations. Although the National Association of County and City Health Officials' Profile Study represents the largest and strongest source of data on local health department finances available, data are self-reported by local health department respondents and potentially subject to respondent bias, misclassification, or data entry errors (for example, underaccounting for revenues and missingness). Final respondents included in each study year may have differed, which impeded concluding whether specific local health departments' revenue diversification changed over time. Notably, although the National Association of County and City Health Officials' Profile Study team conducted extensive efforts to encourage completion of the 2022 questionnaire, the 2022 Profile Study concluded with a 38 percent response rate (with most states having response rates above 20 percent but receiving fewer responses from local health departments serving smaller populations), but it represented larger populations across the US[25] (see appendix D for greater detail).[19] We therefore analyzed and present these data as repeated cross-sectional data rather than longitudinal or panel data.

The challenge of reliably measuring public health spending is well documented, and substantial data harmonization and validation work has been undertaken to improve the quality of public health finance data available through the Profile Study.[2,26] To our knowledge, no alternative data set adequately captures the financial characteristics of local public health agencies in the US, and Profile Study data are regularly used in scholarly and grey literature as reliable sources for measuring local public health department spending.[8]

Our approach to measuring the diversification index did not allow us to ascribe causality to patterns of associations observed. The diversification index may cause or be caused by factors that were examined in this study or potentially by other unmeasured factors.

Our team sought to be maximally conservative and explored in detail whether our findings were sensitive to a range of approaches to identify and address outliers.

Study Results

TRENDS IN REVENUE DIVERSIFICATION Diversification of local public health revenues oscillated in the years leading up to and during the COVID-19 pandemic, with no statistically significant linear trend. Following a substantively (diversification index change >0.02), although not statistically (Mann-Kendall $p > 0.05$), important decrease in overall mean diversification index from 0.51 in 2013 to 0.44 in 2016 ($n = 1,590$ and 1,279, respectively), the overall mean diversification index remained largely unchanged, at 0.47 in 2019 and 0.49 in 2022 ($n = 544$ and 398, respectively). In other words, the diversification of revenue sources increased from 2013 to 2016 and decreased thereafter (data not shown).

ASSOCIATIONS BETWEEN DIVERSIFICATION AND ORGANIZATIONAL AND COMMUNITY CHARACTERISTICS Revenue diversification varied by local health departments' organizational and community characteristics, although there were few monotonic trends from 2013 to 2022 (exhibit 1). We present additional bivariate analyses in appendix exhibit C-2 for the diversification index across a larger set of organizational and community characteristics from 2013 to 2019.[19]

We found that revenue diversification generally increased as the size of population served by local health departments increased. Departments serving fewer than 50,000 people typically had the lowest levels of diversification (that is, the highest mean diversification index among that group), whereas departments serving more than 500,000 people had the highest levels of diversification.

Revenue diversification varied by the geographic region in which local health departments were located. Departments located in the West and Midwest census regions had the high-

EXHIBIT 1

Diversification indexes of local health departments (LHDs) in the National Association of County and City Health Officials' Profile Study, by local organizational and community characteristics, selected years 2013–22

Characteristics	Mean diversification index value, by Profile Study year[a]			
	2013 (N = 1,590)	2016 (N = 1,279)	2019 (N = 544)	2022 (N = 398)
Size of population served[b]				
Less than 50,000	0.54	0.47	0.49	0.50
50,000–499,999	0.46	0.39	0.43	0.42
500,000 or more	0.48	0.37	0.37	0.40
US census region[b]				
Midwest	0.43	0.39	0.43	0.44
Northeast*	0.72	0.71	0.69	0.63
South	0.51	0.42	0.45	0.48
West	0.47	0.38	0.41	0.39
State-local governance classification[b]				
State governed	0.64	0.53	0.56	0.55
Locally governed	0.50	0.44	0.47	0.46
Mixed or shared state-local governance	0.37	0.30	0.35	0.35
FTEs per 100,000 population served[c]				
Below median	0.58	0.50	0.49	0.50
Above median	0.46	0.38	0.45	0.45

SOURCE Authors' analysis of data from the National Association of County and City Health Officials' National Profile of Local Health Departments (Profile Study), selected years 2013–22, and the Census Bureau. **NOTES** Diversification index values were calculated for each LHD in each study year, and mean diversification index values were calculated for agency characteristics and staffing strata. Asterisks indicate p values for Mann-Kendall test for trend. [a]Standard errors for each mean ranged from <0.005 to 0.04; they are reported in appendix exhibit E-1 (see note 19 in text). Sample sizes are LHDs. [b]Organizational and community characteristics obtained from governmental sources (for example, the census). [c]Full-time equivalents reported by local public health respondents. Median staffing was approximately 40 full-time equivalents (FTEs) per 100,000 population in all study years. *$p < 0.10$

est revenue diversification (mean diversification index ranges: 0.38–0.47 and 0.39–0.44, respectively), followed by those in the South (mean diversification index range: 0.42–0.51). Departments located in the Northeast had lower revenue diversification than departments located elsewhere in the US (mean diversification index range: 0.63–0.72) and saw mean diversification indexes decrease from 2013 to 2022 ($p < 0.10$).

Revenue diversification varied by the public health state-local governance classification. Local health departments with governance shared with the state had more diversified revenues (mean diversification index range: 0.30–0.37) than local health departments with centralized (that is, state) governance (mean diversification index range: 0.53–0.64) (exhibit 1).

Local health departments with per capita staffing greater than the national median value (roughly 40 FTEs per 100,000 population) had more diversified revenues (mean diversification index range: 0.38–0.46) than departments with per capita staffing lower than the national median (mean diversification index range: 0.49–0.58).

FINANCIAL CHARACTERISTICS OF DEPARTMENTS WITH HIGH VERSUS LOW DIVERSIFICATION
The financial characteristics of local health de-

partments with high, middle, and low diversification are shown for 2019 in exhibit 2 and for 2022 in exhibit 3. We present 2019 and 2022 data separately because of the substantial increases in total revenues from 2019 to 2022, largely affected by COVID-19 funding.

Greater revenue diversification was associated with higher mean per capita revenues (exhibit 2). As of 2019, local health departments in the lowest quartile of revenue diversification, quartile 4 (that is, higher mean diversification index values among that group), received their largest share of revenue from local sources (53.9 percent of the quartile total; the second-highest was state funds, excluding federal pass-through, at 11.0 percent of the quartile total). In contrast, counterparts in the highest quartile of revenue diversification, quartile 1 (that is, lower mean diversification index values among that group), had a broader base of support from local (20.9 percent of the quartile total), state (excluding federal pass-through; 19.6 percent of the quartile total), and federal sources passed through the state (22.3 percent of the quartile total). Local health departments in the highest quartile of revenue diversification (quartile 1) generated larger shares of revenue from Medicare and Medicaid (12.1 percent of the quartile

EXHIBIT 2

Financial characteristics of local health departments (LHDs) from the 2019 National Association of County and City Health Officials' Profile Study, by quartile of diversification index

Characteristics	Diversification index quartiles				No. of LHDs
	Quartile 1	Quartile 2	Quartile 3	Quartile 4	
Per capita revenues					
Mean***	$98	$90	$64	$52	514
Median	$58	$63	$43	$42	514
Proportional share of reported revenues by source[a] (%)					
Local****	20.9	31.3	34.9	53.9	544
State (excluding federal pass-through)**	19.6	20.9	20.5	11.0	544
Federal					
Passed through state****	22.3	18.6	21.1	10.5	544
Direct****	4.1	2.5	1.6	0.8	544
Clinical					
Medicare and Medicaid*	12.1	11.5	9.2	5.0	544
Private health insurance***	7.7	3.4	1.6	0.5	544
Patient personal fees****	2.8	1.9	1.7	0.9	544
Nonclinical fees and fines****	7.3	6.7	6.9	2.3	544
Private foundations	1.5	0.7	0.7	0.2	544
All other sources*	1.8	2.6	1.6	15.1	544
Percent of LHDs that received any revenues from source[b] (%)					
Local*	98.7	98.6	93.7	92.1	542
State (excluding federal pass-through)***	97.7	97.0	92.1	78.2	541
Federal					
Passed through state*	98.8	94.6	90.3	83.6	537
Direct	41.3	31.9	18.3	19.2	524
Clinical					
Medicare or Medicaid****	97.7	99.3	89.7	75.1	530
Private health insurance****	91.0	78.7	69.7	64.6	535
Patient personal fees****	96.7	93.0	85.5	69.4	534
Nonclinical fees and fines	84.2	79.0	77.8	69.1	535
Private foundations*	47.8	41.5	29.2	26.4	526
All other sources	49.0	44.0	35.2	27.3	504

SOURCE Authors' analysis of data from the 2019 National Association of County and City Health Officials' National Profile of Local Health Departments (Profile Study). **NOTES** Quartile 1 has higher diversification, and quartile 4 has lower diversification. Mean per capita revenues were calculated across all responding LHDs; percentages within each quartile were calculated from LHDs within the respective quartile. Asterisks indicate p values for analysis of variance test for grand mean difference across the four quartiles; results for Tukey's Honest Significant Difference tests across quartiles are in appendix exhibit E-2 (see note 19 in text). An analysis of missingness recoding is in appendix exhibit A-2. [a]Proportional revenues per quartile arise from all LHDs' categorical revenues; proportions for each LHD and for each column in the exhibit sum to 100 percent. LHDs that were missing data for a given revenue source were assigned a zero value for that source. Proportional shares and percentages were calculated based on total sum of source-specific revenues. [b]Percentages of LHDs receiving revenues from any source are independent; percentages do not sum to 100. LHDs that answered "not sure" to these items on the Profile Study for a given source were not considered to have received any revenue from that source. *$p < 0.10$ **$p < 0.05$ ***$p < 0.01$ ****$p < 0.001$

total) and private health insurance (7.7 percent of the quartile total) than did local health departments in the lowest quartile (quartile 4); Medicare and Medicaid were 5.0 percent of the quartile total, and private health insurance was 0.5 percent of the quartile total. The general pattern observed was that local health departments with higher revenue diversification more often reported revenues from all sources analyzed. This finding suggests that observed differences in total revenue shares were not due to outlier local health departments reporting exceptionally high totals in one spending category, but instead due to more local health departments

reporting any revenues in a given category. It is notable that the patterns of revenue for more diversified local health departments (smaller share of total revenues from a larger number of sources, including clinical) were associated with significantly higher mean per capita revenues.

Exhibit 3 shows that associations between revenue diversification and per capita revenues persisted during the COVID-19 pandemic. Mean per capita revenues changed little between the 2019 and 2022 Profile Study years for local health departments in quartiles 1 (from $98 to $96), 2 (from $90 to $90), and 4 (from $52 to $55)

EXHIBIT 3

Financial characteristics of local health departments (LHDs) from the 2022 National Association of County and City Health Officials' Profile Study, by quartile of diversification index

Characteristics	Diversification index quartiles				No. of LHDs
	Quartile 1	Quartile 2	Quartile 3	Quartile 4	
Per capita revenues					
Mean***	$96	$90	$101	$55	390
Median	$67	$57	$49	$46	390
Proportional share of reported revenues by source[a] (%)					
Local****	23.6	23.7	25.7	52.8	398
State (excluding federal pass-through)**	16.2	20.5	22.3	11.9	398
Federal					
Passed through state****	26.7	33.9	35.8	17.5	398
Direct****	3.8	4.9	3.4	2.1	398
Clinical					
Medicare and Medicaid*	10.5	5.4	6.3	7.5	398
Private health insurance***	7.4	2.8	1.5	3.6	398
Patient personal fees****	2.8	1.2	0.7	0.5	398
Nonclinical fees and fines****	7.0	6.4	3.3	2.8	398
Private foundations	0.9	1.0	0.3	1.1	398
All other sources*	1.2	0.2	0.6	0.2	398
Percent of LHDs that received any revenues from source[b] (%)					
Local***	100.0	97.5	91.8	87.4	395
State (excluding federal pass-through)****	98.5	94.8	90.5	77.2	397
Federal					
Passed through state****	99.1	97.9	94.6	80.5	396
Direct	42.3	45.0	37.6	37.6	390
Clinical					
Medicare or Medicaid****	98.4	93.2	94.1	74.1	388
Private health insurance****	85.8	75.3	78.8	60.0	394
Patient personal fees****	93.2	87.0	86.5	68.8	396
Nonclinical fees and fines****	78.9	80.7	64.6	51.4	393
Private foundations	41.3	36.3	34.2	37.7	390
All other sources****	43.9	32.3	27.7	19.7	388

SOURCE Authors' analysis of data from the 2022 National Association of County and City Health Officials' National Profile of Local Health Departments (Profile Study). **NOTES** Quartile 1 has higher diversification, and quartile 4 has lower diversification. Mean per capita revenues were calculated across all responding LHDs; percentages within each quartile were calculated from LHDs within the respective quartile. Asterisks indicate p values for analysis of variance test for grand mean difference across the four quartiles; results for Tukey's Honest Significant Difference tests across quartiles are in appendix exhibit E-3 (see note 19 in text). An analysis of missingness recoding is in appendix exhibit A-3. [a]Proportional revenues per quartile arise from all LHDs' categorical revenues; proportions for each LHD and for each column in the exhibit sum to 100 percent. LHDs that were missing data for a given revenue source were assigned a zero value for that source. Proportional shares and percentages were calculated based on total sum of source-specific revenues. [b]Percentages of LHDs receiving revenues from any source are independent; percentages do not sum to 100. LHDs that answered "not sure" to these items on the Profile Study for a given source were not considered to have received any revenue from that source. *$p < 0.10$ **$p < 0.05$ ***$p < 0.01$ ****$p < 0.001$

but increased for those in quartile 3 (from $64 to $101). Median per capita revenues increased between the 2019 and 2022 Profile Study years. The shares of reported revenues in the 2022 Profile Study were very similar to the proportions reported in the 2019 Profile Study. As with total revenue share patterns in 2019, data from the 2022 Profile study showed that well-diversified local health departments (quartile 1) were more likely to receive funding from every one of the funding sources examined than local health departments in the lowest quartile of revenue diversification (quartile 4). These well-diversified local health departments also tended to rely less

on local funds as a share of total revenues than local health departments with less revenue diversification (23.6 percent versus 52.8 percent of total revenues from local sources, respectively).

Discussion

After accounting for inflation, spending on governmental public health had decreased in the fifteen years before the COVID-19 pandemic.[27] Our study was among the first to examine revenue diversification as a technical concept in public health,[15] and the first to do so with a nationwide lens.

Greater diversification of revenues can help reduce reliance on individual sources, which may be either volatile or stagnant for local health departments.

Increasing the quantity of revenue for public health has been a major recent policy focus, and for good reason.[9,10] Yet relatively little policy attention has been paid to the quality or flexibility of that revenue, and how public health agencies' funding portfolios are structured—types of considerations that are key for organizational health and longevity.[12–14] Core notions of flexibility, resiliency, autonomy, community connectedness, and growth potential afforded by greater revenue diversification in other industries apply similarly to public health agencies.[28,29]

Whereas the analysis by Abigail Viall and colleagues[15] of the Washington State experience showed that revenue diversification was not protective against revenue volatility, a study of local health departments during the Great Recession showed that the composition of agency budgets enhanced financial resiliency and protected against budget cuts.[16]

Our findings show a clear gradient where greater revenue diversification is strongly associated with higher per capita revenues. More diversely funded local health departments will tend to have a larger number of funding sources, whereas less diversely funded departments will tend to rely in large part on revenues from local sources to fund their work. Although this finding resulted in part from the calculation of the diversification index measure, our results show that higher diversification was not simply a different path to the same per capita funding outcome (that is, many smaller sources versus fewer larger sources).

Although the mean diversification index remained fairly flat for local health departments between 2019 and 2022, substantial changes were observed in overall financial patterns. The 2022 National Association of County and City

Health Officials' Profile Study data do not separate out COVID-19 revenues as their own revenue source, as COVID-19 moneys could come from a number of the revenue sources already surveyed (local, state, federal, clinical, and so on). So it was not possible to directly identify COVID-19 moneys, using our data.

Increased per capita revenues exacerbated pre-COVID-19 revenue source portfolio differences for high- versus low-diversification local health departments. The three largest and most commonly reported revenue sources—local sources, state sources (excluding federal pass-through), and federal sources passed through the state—made up roughly two-thirds of all revenue for well-diversified local health departments both before and during the COVID-19 pandemic. This set of three sources can, however, be the most difficult to parse from each other, as local health departments have anecdotally reported some challenge in determining federal versus state funds when federal funds flow through the state and are sometimes blended with state funds. In contrast, these sources made up 75 percent of all revenue for the least-diversified local health departments before the COVID-19 pandemic and 82 percent of all revenue sources as of 2022. Well-diversified local health departments saw multiple revenue sources increase during the pandemic, whereas less-diversified departments saw an even greater reliance on a few funding sources. Conceptually, this may speak to the hypothesized enhancing or synergistic effects of a diversified portfolio; findings suggest that well-diversified local health departments saw revenue increases from a wider array of sources during the pandemic than did less-diversified departments. From an organizational perspective, increased reliance on an already large funding source, in the context of no increase in overall funding, would not be consistent with literature regarding the beneficial effects of revenue diversification. To the extent that local health department funding begets workforce, and workforce begets public health capacity, this diversion presents a policy challenge for communities served by less-diversified health agencies.

Revenue diversification and its attendant benefits could be sought in a bottom-up or a top-down fashion. At the most local levels of public health practice, leaders can implement diversification strategies such as seeking new revenue sources or increasing the size of some smaller sources. For instance, we found that grants, fees and fines, and insurance reimbursements were used more commonly and to a greater extent by well-diversified than by less-diversified local health departments. However, increasing revenue diversification can be challenging for local

health departments. Special mechanisms that allow for levying local dollars to fund public health exist in many, but not all, states.[30]

In addition to establishing or increasing local levies and millage in general, some local health departments rely on clinical billing revenue to supplement other funding streams, enhance financial flexibility, or backfill against cuts.[31] A risk of departments' shifting toward clinical work is that it can crowd out other nonclinical efforts, such as population-based prevention work; a risk of shifting away from clinical work is the diminishment of an important revenue source.

Greater flexibility of funds is a complement to increasing revenue diversification and a strategy that state- or federal-level policy makers could pursue. Operational flexibility could also be pursued through additional use of block grants. Siloed funding sources with strict spending requirements and relatively little flexibility leave little local discretion to pursue local priorities or needs. Federal policy makers could consider further stipulations regarding additional parameters to pass-through funding that might inhibit local flexibility. Emerging population-level payment models are also potentially viable.[32]

Conclusion

Our study shined a light on the past and present state of revenue diversification in local public health systems across the US. Diverse funding portfolios are an evidence-based strategy for organizational health and longevity, yet very little policy attention is paid to not only how much funding is available for public health but also the ways in which that funding is received and ultimately used by agencies to protect and promote health. Overall, major advances in revenue diversification have not been observed during the past decade. More recent trends show an emerging disparity between well- and less-diversified local health departments, with the latter seeing far less revenue growth during the COVID-19 pandemic and an increasing reliance on fewer revenue sources. This not only represents an additional and heretofore underexamined funding gap for agencies to do more work using the same resource base but also places these organizations under even more financial strain as a result of not having diverse revenue portfolios.

Greater diversification of revenues can help reduce reliance on individual sources, which may be either volatile or stagnant for local health departments. Practitioners have ways of enhancing diversification (for example, pursuit of departmental excellence, conducting contracted community health assessments on behalf of others, hiring grant writers and related support staff in pursuit of grant funding opportunities, and billing public or private payers for clinical services delivery). Policy makers should consider incentivizing and supporting strategies that promote revenue diversification to enhance the financial resilience and sustainability of local health departments. Further, the Centers for Disease Control and Prevention and the National Association of County and City Health Officials have pursued a variety of capacity-building assistance programs for local public health financing and should continue to support local health departments toward the ends of increasing the types and amounts of funding. Additional investigations should be performed to connect diversification of revenues to population health outcomes, to identify key revenue sources, and to describe specific diversification strategies. Our article provides recommendations for local health departments and policy makers related to revenue diversification informed by the current state of revenue diversification in the public health system. ∎

NOTES

1 Leider JP, McCullough JM, Singh SR, Sieger A, Robins M, Fisher JS, et al. Staffing up and sustaining the public health workforce. J Public Health Manag Pract. 2023;29(3): e100–7.

2 Orr JM, Leider JP, Kuehnert P, Bekemeier B. COVID-19 revealed shortcomings of the US public health system and the need to strengthen funding and accountability. Health Aff (Millwood). 2023;42(3):374–82.

3 McKillop M, Lieberman DA. The impact of chronic underfunding on America's public health system: trends, risks, and recommendations 2023 [Internet]. Washington (DC):

Trust for America's Health; 2023 [cited 2024 Apr 19]. Available from: https://www.tfah.org/wp-content/uploads/2023/06/TFAH-2023-PublicHealthFundingFINALc.pdf

4 Mamaril CBC, Mays GP, Branham DK, Bekemeier B, Marlowe J, Timsina L. Estimating the cost of providing Foundational Public Health Services. Health Serv Res. 2018;53(Suppl Suppl 1):2803–20.

5 DeSalvo K, Parekh A, Hoagland GW, Dilley A, Kaiman S, Hines M, et al. Developing a financing system to support public health infrastructure. Am J Public Health. 2019;109(10):1358–61.

6 White House. Fact sheet: Biden-Harris administration to invest $7 billion from American Rescue Plan to hire and train public health workers in response to COVID-19 [Internet]. Washington (DC): White House; 2021 May 13 [cited 2024 Apr 19]. Available from: https://www.whitehouse.gov/briefing-room/statements-releases/2021/05/13/fact-sheet-biden-harris-administration-to-invest-7-billion-from-american-rescue-plan-to-hire-and-train-public-health-workers-in-response-to-covid-19/

7 Centers for Disease Control and Prevention. Public Health Infrastructure Grant, Grant overview [Internet]. Atlanta (GA): CDC; [last reviewed 2024 Jan 29; cited 2024 May 8]. Available from: https://www.cdc.gov/infrastructure/phig/program-overview.html

8 Orr JM, Leider JP, Hogg-Graham R, McCullough JM, Alford A, Bishai D, et al. Contemporary public health finance: varied definitions, patterns, and implications. Annu Rev Public Health. 2023 Dec 18. [Epub ahead of print]

9 Weber L, Ungar L, Smith MR, Recht H, Barry-Jester AM. Hollowed-out public health system faces more cuts amid virus. KFF Health News [serial on the Internet]. 2020 Jul 1 [cited 2024 Apr 19]. Available from: https://kffhealthnews.org/news/us-public-health-system-underfunded-under-threat-faces-more-cuts-amid-covid-pandemic/

10 Leider JP, Castrucci BC, Robins M, Hare Bork R, Fraser MR, Savoia E, et al. The exodus of state and local public health employees: separations started before and continued throughout COVID-19. Health Aff (Millwood). 2023;42(3):338–48.

11 National Advisory Council on State and Local Budgeting. Recommended budget practices: a framework for improved state and local government budgeting. 2nd ed. [Internet]. Chicago (IL): Government Finance Officers Association; c 1998 [cited 2024 May 8]. Available from: https://gfoaorg.cdn.prismic.io/gfoaorg/e4534548-fa06-47ad-9cc8-5f37e6e2f21e_RecommendedBudgetPractices.pdf

12 Froelich KA. Diversification of revenue strategies: evolving resource dependence in nonprofit organizations. Nonprofit Volunt Sector Q. 1999;28(3):246–68.

13 Carroll DA, Stater KJ. Revenue diversification in nonprofit organizations: does it lead to financial stability? J Public Adm Res Theory. 2009;19(4):947–66.

14 Kingma BR. Portfolio theory and nonprofit financial stability. Nonprofit Volunt Sector Q. 1993;22(2):105–19.

15 Viall AH, Bekemeier B, Yeager VA, Carton T. Local health department revenue diversification and revenue volatility: can one be used to manage the other? J Public Health Manag Pract. 2022;28(1):e226–34.

16 Erwin PC, Shah GH, Mays GP. Local health departments and the 2008 recession: characteristics of resiliency. Am J Prev Med. 2014;46(6):559–68.

17 Meit M, Knudson A, Dickman I, Brown A, Hernandez N, Kronstadt J. An examination of public health financing in the United States [Internet]. Bethesda (MD): NORC at the University of Chicago; 2013 Mar [cited 2024 May 8]. Available from: https://www.norc.org/content/dam/norc-org/pdfs/PH%20Financing%20Report%20-%20Final.pdf

18 National Association of County and City Health Officials. National Profile of Local Health Departments [Internet]. Washington (DC): NACCHO; c 2024 [cited 2024 May 8]. Available from: https://www.naccho.org/resources/lhd-research/national-profile-of-local-health-departments

19 To access the appendix, click on the Details tab of the article online.

20 Ghosh D, Vogt A. Outliers: an evaluation of methodologies. Proceedings of the Survey Research Methods Section, American Statistical Association [serial on the Internet]. 2012 [cited 2024 May 8]. Available from: http://www.asasrms.org/Proceedings/y2012/Files/304068_72402.pdf

21 Rhoades SA. The Herfindahl-Hirschman Index. Fed Reserve Bull. 1993;1993:188–9.

22 Chang CF, Tuckman HP. Revenue diversification among non-profits. Voluntas. 1994;5(3):273–90.

23 Federal Reserve Economic Data. Government consumption expenditures and gross investment: state and local (implicit price deflator) [Internet]. St. Louis (MO): Federal Reserve Bank of St. Louis; [updated 2024 Mar 28; cited 2024 May 8]. Available from: https://fred.stlouisfed.org/series/A829RD3A086NBEA

24 Association of State and Territorial Health Officials. State public health agency classification: understanding the relationship between state and local public health [Internet]. Alexandria (VA): ASTHO; 2012 [cited 2024 May 8]. Available from: https://www.norc.org/content/dam/norc-org/pdfs/ASTHO%20NORC%20Governance%20Classification%20Report.pdf

25 National Association of County and City Health Officials. 2022 National Profile of Local Health Departments [Internet]. Washington (DC): NACCHO; 2024 [cited 2024 May 8]. Available from: https://www.naccho.org/uploads/downloadable-resources/NACCHO_2022_Profile_Report.pdf

26 Leider JP, Sellers K, Shah G, Pearsol J, Jarris PE. Public health spending in 2008: on the challenge of integrating PHSSR data sets and the need for harmonization. J Public Health Manag Pract. 2012;18(4):355–63.

27 Alfonso YN, Leider JP, Resnick B, McCullough JM, Bishai D. US public health neglected: flat or declining spending left states ill equipped to respond to COVID-19. Health Aff (Millwood). 2021;40(4):664–71.

28 Chambré SM, Fatt N. Beyond the liability of newness: nonprofit organizations in an emerging policy domain. Nonprofit Volunt Sector Q. 2002;31(4):502–24.

29 Trussel JM. Revisiting the prediction of financial vulnerability. Nonprofit Manag Leadersh. 2003;13(1):17–31.

30 National Association of County and City Health Officials. 2019 National Profile of Local Health Departments [Internet]. Washington (DC): NACCHO; [cited 2024 May 8]. Available from: https://www.naccho.org/uploads/downloadable-resources/Programs/Public-Health-Infrastructure/NACCHO_2019_Profile_final.pdf

31 Etkind P, Gehring R, Ye J, Kitlas A, Pestronk R. Local health departments and billing for clinical services. J Public Health Manag Pract. 2014;20(4):456–8.

32 Nichols LM, Taylor LA. Social determinants as public goods: a new approach to financing key investments in healthy communities. Health Aff (Millwood). 2018;37(8):1223–30.