



Population Health Initiatives Among Hospitals: Associated Hospital Characteristics

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EXECUTIVE SUMMARY

This study explored how hospitals define population health and the factors associated with hospitals' population health initiatives. Data came from the 2015 American Hospital Association (AHA) Population Health Survey, the 2015 AHA Annual Survey, and the 2015 AHA Health Information Technology Supplement. Descriptive statistics described the sample of 1,386 nonfederal acute care hospitals and variables of interest. Multivariate logistic regression explored associations between population health commitment among hospitals and hospital characteristics. While hospitals defined population health in several ways, most (83%) responded that they were committed to population health activities. Multivariate regression results indicated that hospitals with lower levels of health information technology sophistication were less likely to commit to population health activities. For-profit hospitals were also less likely to commit to population health, compared to not-for-profit hospitals. System members were more likely to commit to population health initiatives, compared to independent hospitals. The variation in the definition of population health has implications for developing strategies to improve outcomes. These results present preliminary evidence on the relationship between hospital characteristics and hospital commitment to population health efforts.

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INTRODUCTION

Even though healthcare in the United States is expensive, many outcomes are not as robust as in other countries. Healthcare expenditures in the United States are expected to reach nearly \$5.7 trillion in 2026, and recent studies have shown that what was always believed to be the drivers of high costs and poor quality healthcare might not be to blame (Abutaleb, 2018). Papanicolas et al. (2018) found that the United States has lower inpatient and outpatient utilization rates and better outcomes for heart attacks or strokes than 10 other high-income nations. However, they found that the United States also has the highest percentage of adults who are overweight or obese, below average rates of avoidable hospitalizations for patients with diabetes and asthma, and the lowest life expectancy of the other nations in the study. These findings were similar to those from earlier studies, indicating that what happens outside of the clinician's office may be more important than the clinical care that patients receive (Marmot & Allen, 2014; Frieden, 2015).

As a result of increased pressure to improve the factors outside of the hospital's walls and healthcare's shift from volume-based to value-based reimbursement, hospitals are adopting population health strategies to improve the quality of care and control costs (Casalino et al., 2015). The importance of population health management in healthcare delivery is reinforced by an Institute of Medicine (2015) report indicating that health practitioners, as well as facilities, should invest in training for population health management approaches; this report also emphasized the significance of standardizing the meaning

of the term *population health*. A highly referenced definition developed by Kindig and Stoddart (2003) defines population health as "the health outcomes of a group of individuals including the distribution of such outcomes within the group" (p. 380). Although this provides guidance, population health nevertheless is a relatively new term in the healthcare sphere and lacks a precise definition (Skinner et al., 2018; Swarthout & Bishop, 2017).

Regardless of the lack of a consistent definition and understanding of the term, population health has become an area of interest for researchers, healthcare payers, and policymakers. The Institute for Healthcare Improvement's Triple Aim Framework to improve the care experience, improve the health of the population, and reduce healthcare costs has been incentivized as part of a national strategy for the population health efforts in the United States, and it is widely cited in the literature as a conceptual framework for population health (Whittington et al., 2015).

Many factors create a demand for population health management efforts. These factors include an aging population with specific needs, a generally longer life expectancy, more chronic conditions, a greater number of uninsured individuals, technological advances, and a need for evidence-based care (American Hospital Association [AHA], 2012). Also, patient populations in rural geographic areas may experience difficulties in receiving care because of numerous barriers to access that stem from social determinants of health such as transportation, health literacy, and fewer resources for disease management (RHIIhub, n.d.). The emergence of population health

management strategies alongside electronic record-keeping has led to a greater emphasis on identifying issues and predicting trends in healthcare, which has helped to inform evidence-based care by streamlining the operational functions within hospitals (Raghupathi & Raghupathi, 2014).

The population health movement has helped to reduce healthcare costs by focusing on the patient's health instead of revenue generated by multiple healthcare interactions (Darves, 2015). As the reimbursement structure transitions away from the creation of revenue through large volumes of services and procedures, healthcare providers must develop cost-saving methods to remain viable (Martin, 2017). The use of population health management can assist in this endeavor.

Population health management is regulated and incentivized in several ways. For example, hospitals claiming not-for-profit status must conduct community health needs assessments (CHNAs) to receive their annual tax benefits (Chen et al., 2016). Hospitals also use CHNAs to (1) incorporate population health into their planning, (2) improve local population health by tailoring programs and services, (3) improve relationships with community partners in addressing health needs, (4) collaborate with public health departments, (5) evaluate the effect of hospital resources and community preparedness in addressing local health issues, and (6) obtain baseline data to compare for future assessments (AHA, 2015).

Little research has been conducted on the characteristics of hospitals that have adopted population health efforts. A qualitative study by Chen et al. (2016) found that the characteristics of hospitals

engaged in population health were heterogeneous with many types of activities. Using American Hospital Association (AHA) Population Health Survey data, Begun and Potthoff (2017) took an important next step of quantitatively exploring the characteristics of hospitals engaged in population health activities. Their research provided a significant contribution to the field using bivariate statistical analyses to determine that hospitals with a focus on population health are more likely to be large, not-for-profit, metropolitan, teaching-affiliated organizations, and members of systems. Gabriel et al. (2018) also studied the relationship between hospital ownership and population health efforts and found that government and for-profit hospitals were less likely than not-for-profit hospitals to report a commitment to population health.

There also is little research on a current and widely used definition of population health. Skinner et al. (2018) found in their qualitative research of children's hospitals that even among organizations on the leading edge of population health, there was no consistent definition of population health and a tendency to discuss population health and population health management interchangeably.

Our research built upon the previous work on the characteristics of hospitals pursuing population health by exploring how hospitals define population health and exploring whether these are population health or population health management strategies. Additionally, we used multivariate regression to estimate the relationships between hospital, health information technology, and market factors and hospital commitment to population health.

METHODS

This study used data from the 2015 AHA Population Health Survey ($N = 1,418$), which includes questions about hospitals' population health management efforts. These data were merged with the 2015 AHA Annual Survey of Hospitals database and the 2015 AHA Information Technology (IT) Supplement database to produce the final data set used in this analysis. The AHA Annual Survey includes information from more than 6,000 hospitals—their characteristics, governance, and information regarding hospital utilization. The AHA IT Supplement collects information from more than 3,500 hospitals regarding their electronic capabilities and level of health IT sophistication. Hospitals not included in the IT supplement were removed from our data set, leaving a final sample size of 1,386.

Variables of Interest

First, we explored how hospitals defined population health. Survey respondents could select more than one definition of population health related to the following options: (1) individuals for whom you have a financial risk, (2) individuals who may use your hospital or healthcare system, (3) individuals experiencing a specific disease or condition, (4) individuals living in a specified geographic area or community, or (5) other. These responses helped us conceptualize what population health management means to individual hospitals.

The outcome variable of interest included a measure of the hospital's commitment to population health. This variable was defined using a Likert scale of commitment where 1 = *no commitment*, 3 = *reflected in the vision statement and*

overview plans, and 5 = *total commitment* where population health management is part of the long-term planning strategy, resources are sufficient, and specific people are accountable. This variable was combined into a dichotomous outcome variable of 1 and 2 (*no commitment to population health*) and 3, 4, and 5 (*commitment to population health*); and missings ($n = 36$) were coded as 0.

Hospital Characteristics

Hospital characteristics such as hospital size, area characteristics, ownership, system membership, teaching status, and electronic health record (EHR) system sophistication were explored. Hospital size was measured by the number of beds. Specifically, hospitals were classified as small (less than 100 beds), medium (100–399 beds), or large (400+ beds). Area characteristics included poverty levels, urbanicity, and region. The poverty level of the county where the hospital is located was included as a continuous variable. Urbanicity was broken into two categories, urban and rural. Geographic regions included Northeast, Midwest, West, and South. Ownership status included local and state government, federal government, not-for-profit, and for-profit hospitals. Also, we categorized hospitals as being part of an integrated health delivery system or a single hospital. We also included a self-reported dichotomous variable of teaching status.

We created indicator variables for a hospitals' EHR sophistication, including less than basic, basic without notes, basic with notes, and comprehensive. The basic category includes hospitals that have computerized functions in at least one clinical unit of a hospital (a definition widely used

to measure hospital EHR adoption; Joseph et al., 2014). The comprehensive category includes hospitals where the EHR system is used in all major clinical units and has all basic functions in addition to more advanced functions (Adler-Milstein et al., 2015). Advanced technology such as a comprehensive EHR system can track data to manage and measure population health initiatives.

Statistical Analysis

We used descriptive statistics to describe the sample and variables of interest (Table 1). We also graphed measures of hospital definitions of populations health (Figure 1), population health commitment (Figure 2), and financial resources available for population health (Figure 3). We estimated the relationship between environmental factors and hospital commitment to population health using multivariate logistic regression. Specifically, we estimated the relationship between hospital commitment to population health and hospital region, system membership, bed size, teaching status, EHR adoption, ownership, and area poverty. Results were recorded to be reported as odds ratios. Data management and statistical analyses were performed with SAS software, Version 9.4.

RESULTS

The 2015 AHA Population Health Survey consisted of a sample of 1,386 hospitals (Table 1). The majority (62%) of hospitals in the sample were not for profit, 24% non-federal government (i.e., state or local), 3% federal, and 11% for profit. A small majority of the hospitals that responded to the survey belonged to a hospital system (57%), while 43% of hospitals were classified as single

hospitals. The majority of hospitals were in urban areas and were not teaching hospitals. The sample was heterogenous with respect to region, EHR adoption level, and hospital size.

Hospitals were asked to define the population in their population health management activities. This categorization of the definition of the population was not mutually exclusive. More than half of responding hospitals stated that the population comprised “individuals who may utilize the hospital or health system” (59%), followed closely by “individuals living within a specific geographic area or community” (58%). Also, 50% of the hospitals defined the population as “individuals experiencing a certain disease or condition,” while 40% defined their population as “individuals for whom the hospital has a financial risk” (Figure 1). Less than a third (31%) of hospitals only chose one response option; 40% chose two or three definitions, while 30% stated that they defined population health all four ways.

Regarding commitment to population health management initiatives, 30% of the responses indicated total commitment, 30% indicated partial commitment, and 23% noted that the hospital’s commitment was established in its vision statement (Figure 2). Thus, a majority (83%) of hospitals responding to the survey had at least some commitment to population health management initiatives. However, when asked if sufficient financial resources were available to support population health management activities, only 62% of hospitals agreed (Figure 3).

When controlling for hospital characteristics, the multivariate logistic regression analysis (Table 2) associated

TABLE 1*Characteristics of Hospitals (N = 1,386)*

Variable	Hospitals That Responded to the AHA Population Health Supplement	
	%	N
Area characteristics		
Urban	64	887
Non-urban	36	499
Hospital region		
West	18	247
Midwest	34	473
South	33	454
Northeast	15	212
Health system membership		
Health system member	57	790
Single hospital system	43	596
Hospital size		
Small	48	662
Medium	39	547
Large	13	177
Teaching hospital		
Yes	34	469
No	66	917
EHR adoption level		
Less than basic	38	526
Basic without notes	3	42
Basic with notes	29	404
Comprehensive	30	414
Hospital ownership		
Nonfederal government	24	336
Federal government	3	42
Not for profit	62	853
For profit	11	155

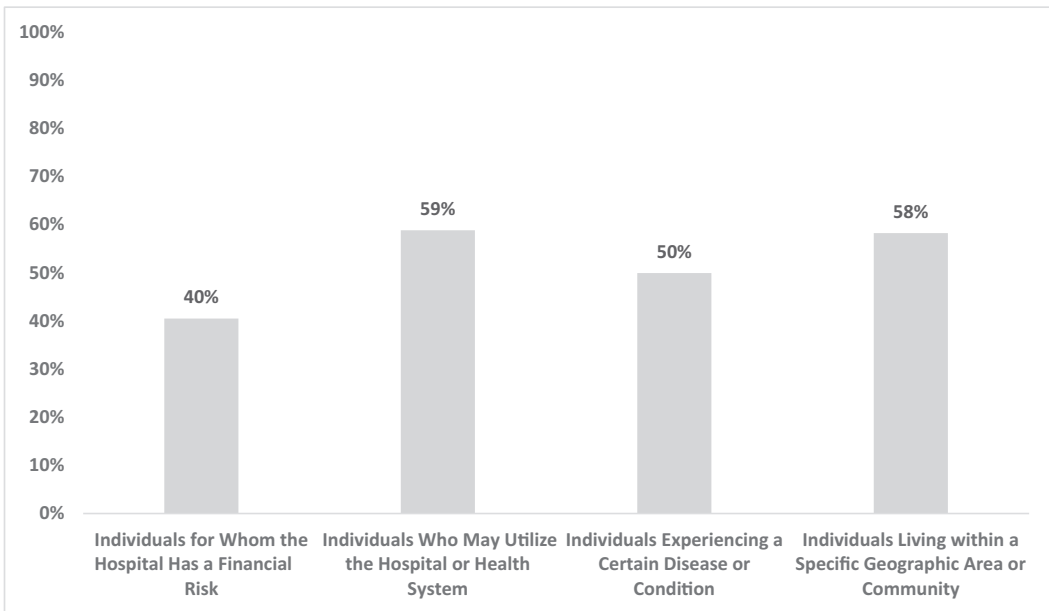
Note. AHA = American Hospital Association; EHR = electronic health record.

several characteristics with the commitment to population health management initiatives. Hospitals that were members of a system were 2.2 times more likely to commit to population health management initiatives compared to hospitals that were not associated with a hospital system (OR = 2.162, $p < .001$). Hospitals with small bed counts (OR = 0.347,

$p < .05$) were less likely to commit to population health management initiatives in comparison to hospitals with larger bed counts. Similarly, medium hospitals (OR = 0.384, $p < .05$) were less likely to commit to population health management initiatives than large hospitals. The level of EHR system sophistication was also

FIGURE 1

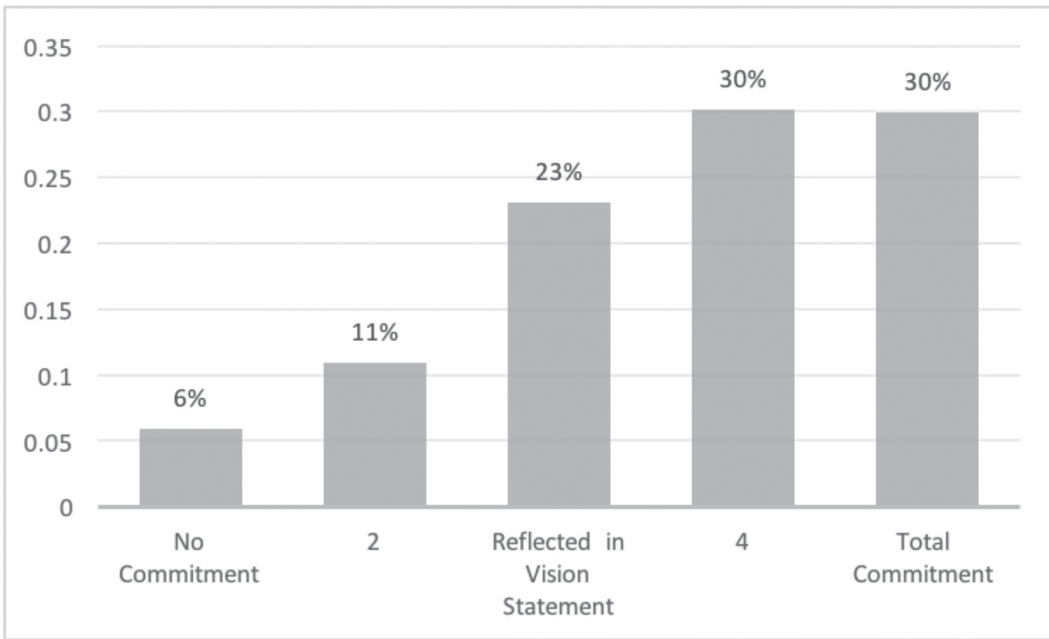
How Hospitals Define the Population in Population Health Activities



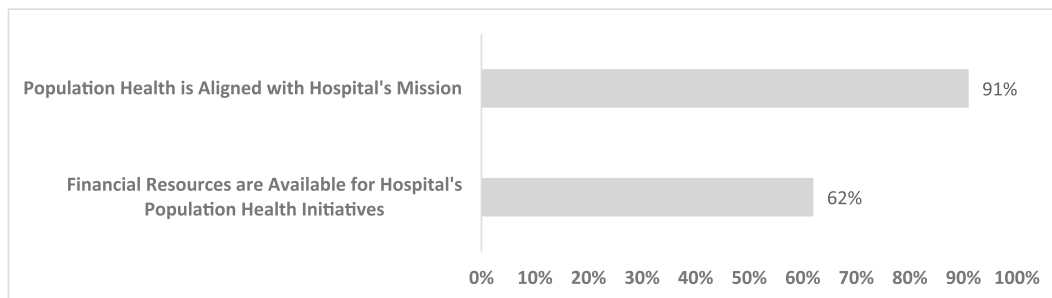
Note. Definitions of Populations in Population Health Activities (Not Mutually Exclusive Categories).

FIGURE 2

Hospitals' Commitment to Population Health Initiatives



Note. Degrees of Commitment to Population Health Initiatives (Likert Scale).

FIGURE 3*Hospital's Mission and Financial Resources Supporting Population Health Initiatives*

examined using linked data from the AHA Health IT Supplement. Results indicated that hospitals that had less-than-basic EHR system integration (OR = 0.501, $p < .01$) were less likely to commit to population health management initiatives compared to hospitals with comprehensive EHR system integration. For-profit hospitals (OR = 0.378, $p < .001$) were less likely to commit to population health compared to not-for-profit hospitals.

DISCUSSION

These results present preliminary evidence on the relationship between hospital characteristics and hospital commitment to population health efforts. Overall, we found that hospitals that are part of systems or are classified as large were more likely to reflect a commitment to population health, while for-profit hospitals and hospitals with less-than-basic EHR systems were less likely to reflect a commitment to population health.

In our descriptive analysis, we found that hospitals defined population health in many different ways. This variation has implications for identifying the relevant population, collecting data, and developing

strategies to improve outcomes. Additionally, we found that although the vast majority of hospitals (83%) responded that the hospital was committed to population health management activities, there was a gap between this commitment and whether the hospital dedicated financial resources to population health management activities.

Regarding the multivariate regression results, health systems may be more likely to reflect a commitment to population health for a variety of reasons. First, health systems, like larger hospitals, may benefit from economies of scale and have more resources available to dedicate to population health management activities. Second, health systems may be more likely to share data within the system via a joint EHR system. This capability may enable health systems to access data on population health more readily. Our findings are similar to those of Begun and Potthoff (2017) in that hospitals with a commitment to population health are more likely to be not-for-profit facilities and part of hospital systems. Controlling for other characteristics in a multivariate regression, we found that large hospitals, hospitals that are part

TABLE 2

*Factors Associated With Commitment to Population Health Initiatives Among Hospitals
(N = 1,386)*

Variable	Odds Ratio	Confidence Interval
Area characteristics		
Urban	1.086	0.758–1.555
Rural	<i>Reference</i>	
Hospital region		
West	1.383	0.806–2.371
Midwest	1.482	0.908–2.418
South	1.385	0.833–2.305
Northeast	<i>Reference</i>	
Health system membership		
Health system member	2.162***	1.559–3.000
Single hospital system	<i>Reference</i>	
Hospital size		
Small	0.347*	0.151–0.796
Medium	0.384*	0.175–0.840
Large	<i>Reference</i>	
Teaching hospital		
Yes	1.421	0.936–2.159
No	<i>Reference</i>	
Electronic health record adoption level		
Less than basic	0.501**	0.324–0.775
Basic without notes	0.917	0.330–2.548
Basic with notes	0.650	0.414–1.020
Comprehensive	<i>Reference</i>	
Hospital ownership		
Nonfederal government	0.783	0.542–1.131
Federal government	3.694	0.542–27.845
Not for profit	<i>Reference</i>	
For profit	0.378***	0.237–0.601
Percentage below poverty in county where hospital is located		
Percentage below poverty	0.987	0.960–1.015

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

of a system, and those with more advanced EHR systems were more likely to be committed to population health activities, but investor-owned, for-profit hospitals were less likely to report a commitment to population health activities.

For-profit hospitals may be less likely to reflect a commitment to population health when compared to not-for-profit hospitals because not-for-profit hospitals are required to perform a CHNA each year to maintain tax-exempt status.

Not-for-profit hospitals are tax-exempt and earnings must be used to help the community (i.e., providing charity healthcare). As required by the Affordable Care Act, not-for-profit hospitals must conduct CHNAs to understand the health needs of patients in their region (Pennel et al., 2016). Given the relationship of CHNAs to population health management activities, it is not surprising that for-profit hospitals are less likely to reflect a commitment to population health.

The progression of the Triple Aim has helped to support population health management initiatives yield a return on investment (Whittington et al., 2015). Indeed, hospitals have overwhelmingly stated that they have seen or expect to see a full return on their population health investments within 5 years (Bresnick, 2015). Specifically, the investments that promised the most significant return were data analytics tools, preventative care programs, and clinical decision support tools (Bresnick, 2015). Although there have been successes, population health management remains a challenge. Only a small percentage of providers believe that their population health management initiatives are comprehensive (Bresnick, 2015).

The United States is seeing high rates of chronic conditions, fueled in part by socioeconomic factors. Addressing social factors that drive healthcare needs through population health management efforts such as requiring CHNAs at not-for-profit hospitals will protect inroads made by the Triple Aim in bending the cost curve (Pennel et al., 2016). Hospitals can serve as a foundation of population health management services in their communities.

Value-based payment systems support population health efforts to contain costs

while improving outcomes (Burwell, 2015). For example, technology now enables hospital admission/discharge systems to track patient location and progress, thus preventing medication errors that can lead to adverse outcomes (IBM Watson Health, 2016). Robust health IT infrastructure and health information exchanges that allow for the transfer of clinical data across different healthcare organizations facilitate the improvement of coordination and management of health services delivered to patients and achieve cost savings (Lammers et al., 2014; Rahrurkar et al., 2015).

Our study did not find differences in population health management activities related to urban and rural populations. We assume, however, that larger urban hospitals may be more likely to practice population health management activities because they have more resources to support them. Overall, we learned that hospitals define population health differently and that hospital characteristics could play a role in the commitment to population health. Future research should further explore factors in how hospitals define their populations and identify types of hospitals with financial resources for population health management activities.

We found that large, sophisticated EHR systems were more likely to reflect a hospital's commitment to population health. Thus, policies like the 21st Century Cures Act (2016) that are aimed at increasing access to and practical use of EHR systems by hospitals might serve to increase a hospital's population health activities. Further, we found that for-profit hospitals were less likely to reflect a commitment to population health in their vision statements; further research should

explore the correlation of ownership status with population health activities. In addition, we found a marked difference in our study between hospitals that included population health as part of their mission and hospitals that had the proper funds for population health activities. Future research also should explore how hospitals define population and what types of hospitals commit sufficient funding for population health management activities. Finally, without a common definition of population health, it is very hard to measure outcomes of efforts. That challenge, in turn, makes it harder to incentivize hospitals and, perhaps most importantly, capture empirical-based best practices to advance the Triple Aim and improve the U.S. healthcare delivery system.

Study Limitations

This study has several limitations. First, there may be sample selection issues. Perhaps hospitals with greater commitments to population health were more likely to respond than hospitals with few population health activities. Given the popularity of population health initiatives and the potential desire to be on trend, social desirability bias is also a concern—respondents may be more likely to say their hospital is committed to population health because it seems like the correct response.

CONCLUSIONS AND IMPLICATIONS

Many policies emphasize the importance of population health. For example, the Medicare Access and CHIP Reauthorization Act (2015) incentivizes hospital participation in accountable care organizations and value-based care. Also, CHNA requirements for not-for-profit hospitals

encourage hospitals to engage and collaborate with other community stakeholders in population health activities. The Centers for Medicare & Medicaid Services created the State Innovation Models Initiative to financially support states' efforts to promote population health (Centers for Medicare & Medicaid Services, 2015). Finally, as of 2018, 12 states had adopted some sort of accountable health models (Clary et al., 2018). The National Academy for State Health Policy convened representatives of public health and other healthcare organizations from 10 states to discuss their local accountable health models (Clary et al., 2018; Chen et al., 2016). Their specific recommendations for policy and practice that are related to population health promotion follow:

- Use states' policy and contracting levers to address prevention and health-related social needs in payment and delivery reform.
- Align population health goals, agendas, and metrics across communities, payers, and stakeholders.
- Use data and measurement to raise the bar on performance, and consider financial incentives to address prevention and health-related social needs.
- Work across sectors and agencies to develop a range of financial strategies to support investment in prevention and community health and identify any gaps and duplication in funding streams.
- Learn from other states' value-based payment roadmaps and other lessons learned. (Clary et al., 2018, pp. 3–4)

In the context of the findings presented in this article, these recommendations may be particularly useful if targeted at smaller hospitals, hospitals that are not parts of systems, for-profit hospitals, and hospitals with low EHR system adoption. In addition, incentivizing and supporting EHR system adoption and sophistication in hospitals may increase population health activities by improving communication and allowing for hospitals to identify populations in need.

As the U.S. healthcare system continues to work toward the Triple Aim framework for better healthcare and reduced costs, population health efforts will grow. However, our research found that hospitals define population health in different ways. As hospitals press population health management into service, population health standards must be clear and measurable. Our research also found that system hospitals, not-for-profit hospitals, and hospitals with advanced EHR systems are more likely to engage in population health activities. Perhaps larger, more well-resourced hospitals are early adopters of population health management activities.

This study found that a commitment to population health was reflected in the majority of hospitals' vision statements, but many lacked the financial resources to support their efforts. This is likely to be a growing concern because of CHNA requirements, especially for tax-exempt hospitals. Advanced EHR systems will be necessary for hospitals to engage in population health activities because the data from these systems will be necessary to track and identify outcomes.

Understanding the characteristics of hospitals that can support population

health activities will be important to incentivize the continuation of those activities. Future research should further explore the characteristics that have been found to be associated with population health commitment—for example, in what contexts do these variables seem to matter? Exploring how other types of health IT are associated with population health commitments would also be a valuable addition to the literature. Finally, understanding the relationship between hospital characteristics and population health commitments with a standard definition of population health could have important implications for policy and practice.

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PRACTITIONER APPLICATION: Population Health Initiatives Among Hospitals: Associated Hospital Characteristics

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Readers of the article by Atkins et al. should be reminded that the American hospitals of today evolved from the almshouses of the past, where indigent people who were debilitated with chronic disease or dying with no family support received care. As science progressed and more could be done, hospitals developed into institutions that treated acute disease, performed restorative surgery, and provided a safe place for childbirth. Preventive care and the management of chronic disease were in the purview of physicians and their office practice. Most local jurisdictions eschewed health planning, so the U.S. healthcare “system” grew up without any real organizing function.

Because of this history, hospitals and other providers have acted according to their competencies and the financial incentives presented to them. They have given insufficient consideration as to whether they provided their communities with services they need in a way that satisfied them and did not waste their resources. This brings us to where we are today in healthcare and explains why the Institute for Healthcare Improvement started the Triple Aim initiative that the authors reference. The United States is spending upwards of 18% of its gross domestic product on healthcare and is not getting the outcomes that it needs.

Payers, most notably the Centers for Medicare & Medicaid Services, are challenging hospitals to step up and drive the movement to value—to deliver better healthcare and a better experience at a lower cost. Unfortunately, the movement faces a fundamental barrier. Hospitals have not been constructed to manage the health of a population. Their key competencies are in providing and supporting acute care, restorative surgery, and childbirth. Clearly, these are necessary components of a system that can manage the health of a population, but hospitals lack the accountability function for the oversight of an individual’s care as well as the ability to deliver preventive care and manage chronic disease.

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