

Advancing the Learning Health System by Incorporating Social Determinants

Deepak Palakshappa, MD, MSHP; David P. Miller Jr, MD, MS; and Gary E. Rosenthal, MD

The learning health system (LHS) has emerged as a powerful framework for improving healthcare delivery.^{1,2} The Institute of Medicine (IOM) defined an LHS as “one in which science, informatics, incentives, and culture are aligned for continuous improvement and innovation, with best practices seamlessly embedded in the care process, patients and families active participants in all elements, and new knowledge captured as an integral by-product of the care experience.”^{2,3} An LHS can improve care at multiple points along a patient’s clinical trajectory by providing clinicians real-time access to the best available evidence, partnering with patients and their families, incentivizing high-value care, and creating a culture of continuous learning.² Ultimately, this could lead to a patient-centered LHS on a national scale that allows data sharing across health systems and informs decisions that improve population health and reduce health disparities.⁴

The LHS framework is beginning to take shape, and we believe that realizing its full potential is linked to a health system’s ability to effectively account for and mitigate the social and economic factors that affect health. Social determinants of health (SDH)—the conditions in which people are born, grow, live, and age—have a profound impact on morbidity and mortality. SDH can lead to social risk factors (eg, food insecurity, housing instability) that can negatively affect health.⁵⁻⁷ Historically, reducing social risk factors has been the focus of public policy and public health, not healthcare. Increasing attention has focused on health systems’ potential to reduce patients’ social risk factors.⁷⁻⁹ The National Academy of Medicine (NAM; formerly the IOM) has recommended a core set of social domains that health systems should document in the electronic health record (EHR).¹⁰ Increasing research has also shown that addressing patients’ unmet social needs in clinical settings can improve patients’ access to resources, which, in turn, may improve health outcomes and decrease costs.¹¹⁻¹³ With this research as a backdrop, CMS implemented the Accountable Health Communities model to test whether addressing unmet social needs reduces healthcare utilization.¹⁴

Eliminating the health disparities that emerge from SDH will require broad social, cultural, and policy changes.¹⁵ Nonetheless,

ABSTRACT

The learning health system (LHS) has gained traction as a powerful framework for improving the cost and quality of healthcare. The goal of an LHS is to systematically integrate internal data and experience with external evidence so patients receive higher-quality, safer, and more efficient care. However, if the goal of an LHS is to improve health, as well as healthcare, it must account for and mitigate the negative impact of social and economic factors on health, known as the social determinants of health. In this paper, we discuss the critical role the LHS can play in addressing patients’ social risk factors. We also discuss how integrating data on the social determinants and activities to reduce patients’ social risk factors could advance the mission of the LHS to enhance patient engagement, improve the delivery of personalized care, and more accurately evaluate the effectiveness of care. Without the collection and integration of data on the social determinants of health, the LHS may fail to reach its full potential to improve health and healthcare.

Am J Manag Care. 2020;26(1):e4-e6

health systems have an important role in improving health equity, and the LHS could fail to reach its mission of higher-quality, safer, and more efficient care if such systems do not integrate data on SDH or activities to reduce social risk factors.

In this paper, we discuss the role the LHS should play in addressing social risk factors. We further discuss 3 areas—patient engagement, personalized care, and effectiveness of care—in which the LHS is unlikely to reach its full potential without integrating SDH data.

Role of the LHS in Reducing the Impact of Social Risk Factors

If the goals of the LHS are to improve health and provide more efficient healthcare, it must mitigate the negative effects of social risk factors. Several lines of reasoning support this. First, a large body of evidence indicates that SDH have a greater impact on health than healthcare does. Even if health systems provide optimal healthcare for every patient, only a small improvement in population health would likely be seen.^{5,6} Second, although the United States spends more on healthcare, it ranks last among other developed nations for a number of important health outcomes, potentially due to lower levels of spending on social programs.¹⁶ Because the United States lacks broad bipartisan support for expansion of public health and social programs, health systems must build new partnerships with social services if they are to improve population health. Third, the drive to value-based purchasing, the emergence of accountable care organizations, and the creation of financial incentives for controlling expenditures have established a strong business case for the LHS to address the social factors that lead to increased utilization.

Although research on the effect of reducing social risk factors in clinical settings on healthcare utilization and health outcomes is limited, early results have shown promise.^{12,13,15} One example is Hennepin Health, which used care coordinators, social workers, and community health workers to connect patients to social services and found a 9% decrease in emergency department visits.¹² Another study found that identifying and addressing patients' unmet social needs using Health Leads, a community-based healthcare organization that connects patients with resources, led to small but significant improvements in blood pressure and cholesterol.¹³

How Incorporating Data on SDH Could Advance the Mission of the LHS

Enhance patient engagement. A major goal of the LHS is to improve patient engagement so that patients have a more active role in the shared decision-making process. Understanding the social circumstances in which patients live is central to this goal. For example, advising a patient to increase physical activity when the patient does not have a safe space in which to exercise is unlikely to be effective. In one study that screened patients for social needs,

TAKEAWAY POINTS

The learning health system has emerged as a framework for improving healthcare delivery, but it may fail to reach its full potential if it does not incorporate data on social determinants of health or activities to reduce social risk factors.

- ▶ If a central goal of the learning health system is to improve health, it must mitigate the negative effects of social determinants.
- ▶ Incorporating social determinants could enhance patient engagement, allow for tailoring of care, and more accurately evaluate the care experience.
- ▶ A learning health system that is able to rapidly evaluate and improve care could be an ideal setting to pilot interventions to reduce patients' social risk factors.

clinicians reported that this information changed care delivery for almost a quarter of patients with an identified need and changed their interactions with more than half.¹⁷ However, few clinicians screen patients for unmet social needs, and there are limited data on how practitioners can incorporate interventions in clinical settings to reduce social risks.^{18,19} The LHS offers an opportunity to address these gaps by partnering with patients and the community. For example, to improve educational materials about cancer screening for patients with low health literacy and facilitate physician-patient communication, this social risk-informed care could utilize an LHS community model in which community members are involved in the development process.^{20,21}

Delivery of personalized care. In 2015, the National Institutes of Health launched the Precision Medicine Initiative (PMI) to understand the drivers of health and develop personalized treatments. A central element of the PMI is the All of Us Research Program, which plans to enroll 1 million adults to investigate how differences in genomics, environment, and lifestyle can contribute to the development of precision medicine treatments.²² Although not in the original LHS framework, the NAM published a 2015 workshop summary describing the inclusion of genomic data in the LHS.²³ The LHS offers an opportunity to understand how integration of genomic data affects healthcare delivery.²⁴ As an example, Geisinger Health is integrating individual genomic data within the EHR to inform patient care about disease risk.²⁵ However, social risk factors often have a greater influence on disease occurrence than genetic risk factors. For the genomics-enabled LHS to provide precision medicine, it must account for these social factors that affect health and healthcare.²⁶ Further, an LHS that combines data on individuals' genomics and social risk factors can better elucidate causal pathways leading to health disparities and tailor the delivery of care.

Evaluate the effectiveness of care. A further goal of the LHS is to close the gap between evidence generation and clinical care, particularly the lack of generalizability of randomized controlled trials.²³ One method to accomplish this is through pragmatic trials that evaluate the effectiveness of treatments in real-world settings. The LHS, with its EHR and robust data collection systems, is an ideal setting for pragmatic trials.²⁷ However, without accounting for patients' social factors, evaluating the effectiveness of treatments in the LHS could be incomplete. For example, one study evaluated

the effect of neighborhood poverty on the impact of a primary care practice-based trial for depression. The authors found that the treatment effect weakened after the initial 4 months among participants living in high-poverty neighborhoods but not among participants in other neighborhoods.²⁸ Thus, the failure to account for social risk factors could lead to effective treatments and novel healthcare delivery strategies showing minimal benefit as a result of unmeasured SDH. Similarly, collecting SDH data could shed light on ways in which social factors mediate the effect of treatments on health.²⁹ Intermountain Healthcare is an LHS that is using an area-level deprivation index to evaluate heterogeneity in medication adherence among patients with hypertension.³⁰

Conclusions

The LHS is a powerful framework for improving the cost and quality of healthcare. However, realizing the full potential of the LHS will require moving beyond the traditional boundaries of healthcare and developing innovative approaches to reduce social risk factors. Although the evidence base for the effectiveness of such approaches on improving health is currently limited, early results suggest that addressing patients' unmet social needs can decrease costs and improve outcomes. We believe it is imperative that the LHS add to this evidence. An LHS that is able to rapidly evaluate and improve care could be an ideal setting in which to pilot interventions reducing social risk factors. This process should begin with the routine collection of SDH data. Making these data a part of the LHS should enhance patient engagement, allow for tailoring of care, and more accurately evaluate the care experience. ■

Author Affiliations: Department of Internal Medicine (DP, DPM, GER), Department of Pediatrics (DP), and Division of Public Health Sciences (DP, DPM), Wake Forest School of Medicine, Winston-Salem, NC.

Source of Funding: None.

Author Disclosures: The authors report no relationship or financial interest with any entity that would pose a conflict of interest with the subject matter of this article.

Authorship Information: Concept and design (DP, DPM, GER); drafting of the manuscript (DP, DPM, GER); and critical revision of the manuscript for important intellectual content (DP, DPM, GER).

Address Correspondence to: Deepak Palakshappa, MD, MSHP, Wake Forest School of Medicine, Medical Center Blvd, Winston-Salem, NC 27157. Email: dpalaksh@wakehealth.edu.

REFERENCES

1. Institute of Medicine; Yong PL, Saunders RS, Olsen L, eds. *The Healthcare Imperative: Lowering Costs and Improving Outcomes: Workshop Series Summary*. Washington, DC: The National Academies Press; 2010.
2. Institute of Medicine; Smith M, Saunders R, Stuckhardt L, McGinnis JM, eds. *Best Care at Lower Cost: The Path to Continuously Learning Health Care in America*. Washington, DC: The National Academies Press; 2013.

3. Accelerating progress toward continuous learning: a National Academy of Medicine meeting summary. Agency for Healthcare Research and Quality website. ahrq.gov/sites/default/files/wysiwyg/professionals/systems/learning-health-systems/Learning-Health-Systems-Meeting-Summary.pdf. Published 2017. Accessed September 11, 2019.
4. Friedman C, Rubin J, Brown J, et al. Toward a science of learning systems: a research agenda for the high-functioning learning health system. *J Am Med Inform Assoc*. 2015;22(1):43-50. doi: 10.1136/amiajnl-2014-002977.
5. Adler NE, Stewart J. Health disparities across the lifespan: meaning, methods, and mechanisms. *Ann NY Acad Sci*. 2010;1186:5-23. doi: 10.1111/j.1749-6632.2009.05337.x.
6. Schroeder SA. We can do better—improving the health of the American people. *N Engl J Med*. 2007;357(12):1221-1228. doi: 10.1056/NEJMs073350.
7. Alderwick H, Gottlieb LM. Meanings and misunderstandings: a social determinants of health lexicon for health care systems. *Milbank Q*. 2019;97(2):407-419. doi: 10.1111/1468-0009.
8. Daniel H, Bornstein SS, Kane GC; Health and Public Policy Committee of the American College of Physicians. Addressing social determinants to improve patient care and promote health equity: an American College of Physicians position paper. *Ann Intern Med*. 2018;168(8):577-578. doi: 10.7326/M17-2441.
9. Council on Community Pediatrics. Poverty and child health in the United States. *Pediatrics*. 2016;137(4):e20160339. doi: 10.1542/peds.2016-0339.
10. Institute of Medicine. *Capturing Social and Behavioral Domains and Measures in Electronic Health Records: Phase 2*. Washington, DC: The National Academies Press; 2014.
11. Alderwick HAJ, Gottlieb LM, Fichtenberg CM, Adler NE. Social prescribing in the U.S. and England: emerging interventions to address patients' social needs. *Am J Prev Med*. 2018;54(5):715-718. doi: 10.1016/j.amepre.2018.01.039.
12. Sandberg SF, Erikson C, Owen R, et al. Hennepin Health: a safety-net accountable care organization for the expanded Medicaid population. *Health Aff (Millwood)*. 2014;33(11):1975-1984. doi: 10.1377/hlthaff.2014.0648.
13. Berkowitz SA, Hulberg AC, Standish S, Reznor G, Atlas SJ. Addressing unmet basic resource needs as part of chronic cardiometabolic disease management. *JAMA Intern Med*. 2017;177(2):244-252. doi: 10.1001/jamainternmed.2016.7691.
14. Accountable Health Communities Model. CMS website. innovation.cms.gov/initiatives/ahcm. Updated November 13, 2019. Accessed December 5, 2019.
15. Castrucci B, Auerbach J. Meeting individual social needs falls short of addressing social determinants of health. *Health Affairs* website. healthaffairs.org/doi/10.1377/hblog20190115.234942/full. Published January 16, 2019. Accessed September 12, 2019.
16. Papanicolaos I, Woskie LR, Jha AK. Health care spending in the United States and other high-income countries [erratum in *JAMA*. 2018;319(17):1824. doi: 10.1001/jama.2018.4940]. *JAMA*. 2018;319(10):1024-1039. doi: 10.1001/jama.2018.1150.
17. Tong ST, Liaw WR, Kashiri PL, et al. Clinician experiences with screening for social needs in primary care. *J Am Board Fam Med*. 2018;31(3):351-363. doi: 10.3122/jabfm.2018.03.170419.
18. Palakshappa D, Vasani A, Khan S, Seifu L, Feudtner C, Fiks AG. Clinicians' perceptions of screening for food insecurity in suburban pediatric practice. *Pediatrics*. 2017;140(1):e20170319. doi: 10.1542/peds.2017-0319.
19. Schoenthaler A, Hassan I, Fiscella K. The time is now: fostering relationship-centered discussions about patients' social determinants of health. *Patient Educ Couns*. 2019;102(4):810-814. doi: 10.1016/j.pec.2018.10.025.
20. Gottlieb L, Fichtenberg C, Alderwick H, Adler N. Social determinants of health: what's a healthcare system to do? *J Healthc Manag*. 2019;64(4):243-257. doi: 10.1097/JHM-D-18-00160.
21. Myers RE, DiCarlo M, Romney M, et al. Using a health system learning community strategy to address cancer disparities. *Learn Health Syst*. 2018;2(4):e10067. doi: 10.1002/rh2.10067.
22. All of Us research program. National Institutes of Health website. allofus.nih.gov. Accessed September 13, 2019.
23. Institute of Medicine. *Genomics-Enabled Learning Health Care Systems: Gathering and Using Genomic Information to Improve Patient Care and Research: Workshop Summary*. Washington, DC: The National Academies Press; 2015.
24. Chambers DA, Feero WG, Khoury MJ. Convergence of implementation science, precision medicine, and the learning health care system: a new model for biomedical research. *JAMA*. 2016;315(18):1941-1942. doi: 10.1001/jama.2016.3867.
25. Williams MS, Buchanan AH, Davis FD, et al. Patient-centered precision health in a learning health care system: Geisinger's genomic medicine experience. *Health Aff (Millwood)*. 2018;37(5):757-764. doi: 10.1377/hlthaff.2017.1557.
26. West KM, Blacksher E, Burke W. Genomics, health disparities, and missed opportunities for the nation's research agenda. *JAMA*. 2017;317(18):1831-1832. doi: 10.1001/jama.2017.3096.
27. Rosenthal GE. The role of pragmatic clinical trials in the evolution of learning health systems. *Trans Am Clin Climatol Assoc*. 2014;125:204-216, discussion 217-218.
28. Gillman SE, Fitzmaurice GM, Bruce ML, et al. Economic inequalities in the effectiveness of a primary care intervention for depression and suicidal ideation. *Epidemiology*. 2013;24(1):14-22. doi: 10.1097/EDE.0b013e3182762403.
29. Knighton AJ, Stephenson B, Savitz LA. Measuring the effect of social determinants on patient outcomes: a systematic literature review. *J Health Care Poor Underserved*. 2018;29(1):81-106. doi: 10.1353/hpu.2018.0009.
30. Knighton AJ, Savitz L, Belnap T, Stephenson B, VanDerstice J. Introduction of an area deprivation index measuring patient socioeconomic status in an integrated health system: implications for population health. *EGEMS (Wash DC)*. 2016;4(3):1238. doi: 10.13063/2327-9214.

Visit ajmc.com/link/4437 to download PDF