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ANALYSIS & COMMENTARY

Applying A 3.0 Transformation Framework To Guide Large-Scale Health System Reform

ABSTRACT Implementation of the Affordable Care Act is unleashing historic new efforts aimed at reforming the US health system. Many important incremental improvements are under way, yet there is a growing recognition that more transformative changes are necessary if the health care system is to do a better job of optimizing population health. While the concept of the Triple Aim—dedicated to improving the experience of care, the health of populations, and lowering per capita costs of care—has been used to help health care providers and health care systems focus their efforts on costs, quality, and outcomes, it does not provide a roadmap for a new system. In this article we describe the 3.0 Transformation Framework we developed to stimulate thinking and support the planning and development of the new roadmap for the next generation of the US health care system. With a focus on optimizing population health over the life span, the framework suggests how a system designed to better manage chronic disease care could evolve into a system designed to enhance population health. We describe how the 3.0 Transformation Framework has been used and applied in national, state, and local settings, and we suggest potential next steps for its wider application and use.

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The US health system is both expensive and inefficient, producing less value at a higher cost than the health systems of most other developed countries while yielding strikingly large health disparities across population subgroups.[1–6] These shortcomings ripple across society, affecting not only the health of the population but also the productivity of the workforce; the competitiveness of products in the global marketplace; and the ability to invest in education, economic infrastructure, and the future vitality of the nation.

The Affordable Care Act (ACA) provides an unprecedented opportunity to transform the current *health care system* into a multisector *health system* focused on producing population health. Population health is the health outcomes of a group of individuals, including the distribution of such outcomes within the group.[7] It is understood that population health outcomes are the product of multiple determinants of health, including medical care, public health, genetics, behaviors, social factors, and environmental factors.[8] Already many disruptive innovations are emerging in the form of novel payment strategies, new delivery mechanisms such as accountable care organizations (ACOs), and the rapid expansion of health information technology that have a transformative influence on the health care system.[9] This new environment is transforming the current volume-driven payment model to one that rewards value, improves the experience of care, and promotes population

health. Making the big shift from a health care system focused on producing medical care toward a health system focused on producing health is unlikely to succeed without a strategy that is capable of aligning multiple players—across health, social, and other key sectors—in common purpose and working toward well-defined goals. The strategy must be aspirational so that people can think outside the constraints of the current system but also scientifically grounded so that there is a foundation for taking the next steps. Without a shared framework for a desired future design—something to aim for—the health care system's complexity, geographic and organizational diversity, and shifting alliances are likely to stymie much-needed progress.

To stimulate thinking, planning, and deployment of the next generation of the US health system, we developed the 3.0 Transformation Framework. We use this operating-system metaphor to indicate the level of transformative change that is necessary and as a framework to describe the operating principles for a health system capable of optimizing health and well-being. In this article we highlight the potential utility of the 3.0 Transformation Framework using examples at the national, state, health system, and community levels. We conclude with a discussion of promising opportunities for further development and use of the 3.0 Transformation Framework to help drive transformative change at the state and local levels.

The 3.0 Transformation Framework builds on Lester Breslow's notion that health care systems evolve and mature in response to external and internal pressures.[10,11] Exhibit 1 provides an overview of how the US health system has matured over three eras and how its capability is evolving with progressive operating logics, each with its own design features and goals. The first era (1.0) emerged with modern medicine in the mid-1800s and extended through the 1950s to address infectious diseases and other immediate health threats, emphasizing acute, emergency, and rescue care to save lives. As life expectancy for men increased from forty-eight years in 1900 to sixty-six years by 1950 (fifty-one years in 1900 and seventy-two years by 1950 for women)[12] and noncommunicable chronic diseases began to dominate the epidemiologic landscape, a second era (2.0) developed in response to newly attainable goals of prolonging life and decreasing disability. The emphasis was chronic disease treatment and management, together with new strategies focused on secondary prevention.

With life expectancy now approaching eighty years,[12] the health system is already evolving toward a third era (3.0), with an operating logic informed by breakthroughs in life-course health science. Life-course health science explains developmental origins of health and disease patterns by elucidating how environmental exposures and social experiences, often occurring during sensitive periods of development early in life, are embedded into the function of biological and behavioral systems. The third era is par-

EXHIBIT 1

Three Eras Of Health And Health Care—Three Operating Systems

	First era—1.0: medical care and public health services (1850s to 1960s)	Second era—2.0: health care system (1950s to present day)	Third era—3.0: health system (2000 going forward)
Definition of *health*	Absence of acute disease	Reduction of chronic disease	Creating capacities to achieve goals, satisfy needs, fortify reserves
Goal of health system	Improve life expectancy	Reduce disability	Optimize health
Model of health and disease causation	Biomedical	Biopsychosocial	Life-course health development
Primary focus of services	Diagnose and treat acute conditions	Prevent and manage chronic disease	Promote and optimize health of individuals and populations
Organizational operational model	Clinics and offices linked to hospitals	Accountable care organizations and medical homes	Community-accountable health development systems
Dominant payment mechanisms	Indemnity insurance; fee-for-service	Prepaid health benefits, capitation	Health trusts and management of balanced portfolio of financing vehicles
Role of health and health care provider/organization	To protect from harm, cure the sick, and heal the ill	To prevent and control risk, manage chronic disease, and improve quality of care	To optimize health and well-being
Role of individual and community	Inexperienced patient	Activated partner in care	Co-designers of health

SOURCE Authors' analysis.

ticularly focused on these life-course influences and on optimizing population health development. The online Appendix provides a more detailed description of the evolution and characteristics of the three eras and the 3.0 Transformation Framework.[13]

Exhibit 2 adapts a diagram developed by the Centers for Medicare and Medicaid Services (CMS) Center for Medicare and Medicaid Innovation (CMMI) team to illustrate how the 3.0 Transformation Framework can be used to distinguish era-specific system design elements and to guide transformation to 3.0 systems. The transformation from a 1.0 sick care system to a 2.0 system to prevent and manage chronic disease is being driven by innovations such as the patient-centered medical home and ACOs that promote value-based care. Exhibit 2 also shows how further transformation could produce a health system more consistent with 3.0 principles: emphasizing community-accountable health systems, focusing on population health goals, and adopting new financing mechanisms.

Making 3.0 Assumptions Explicit

The 3.0 Transformation Framework portrays a sequential evolution of a complex health system, but it does not assume that change has been or will be inevitable or linear. The continuing metamorphosis of this complex system is in response to rapidly changing epidemiology, to policy jolts such as the implementation of Medicare and Medicaid and the passage of the ACA, and to scientific breakthroughs and disruptive innovations that are altering medical practice.

As described in Exhibit 1, the 3.0 Transformation Framework assumes that the definition of success in the health system will evolve beyond

EXHIBIT 2

US Health System Transformation

Health system characteristic	Era 1.0: sick care system	Era 2.0: coordinated health care system	Era 3.0: community-integrated health system
Objective	Acute care and infectious disease focused	Patient-centered care; coordinating episodes of care across levels of care and managing chronic conditions	Population and community health outcomes; optimizing the health of populations over the life span and across generations
Organization of services	Independent health care providers; hospital, clinics, primary care providers, and specialists operate separately	Systems of health care, such as accountable care organizations and medical homes; teams of health care providers accept collective responsibility for quality outcomes and overall cost of care	Community-integrated health system; integrated health care networks partner with public health and community organizations to both reduce community health risk factors and provide coordinated illness care
Care process	Little coordination between inpatient and outpatient medical care; dominated by an acute care treatment model	Coordinated care to better manage medical risk at each level (primary, secondary, and tertiary) of the health care delivery system	Integrated health, psychosocial services, and wellness care designed to optimize and maintain health and well-being across the life course
Payment methodology	Fee-for-service; rewards volume of services	Value-based payments; health care providers rewarded for better patient outcomes, better patient experience of care, and lower total cost of care	Recognize value with long-term time horizons and capture multisector financial impacts outside of health care cost; sustainable financing alternatives such as population-based global budgets; single budget for a broad scope of health care services, combined with incentives
Health information technology	Separate paper medical records exist but are not connected	Electronic health care information exchanges connect various provider networks	Health and medical information follows the person; there is connectivity between the health and human service systems; and actors have access to real-time data on quality, costs, and outcomes for individuals and populations
Quality of care	Large variations in quality and low transparency	Consistent quality; using standard quality outcomes and improvement processes through collaborative learning	High and continuously improving quality through a learning health system
Population health improvement	Not addressed	Focused on health of patients/clients only	Focused on health outcomes for geographically defined population, including upstream socioeconomic and developmental correlates of health

SOURCES Authors' analysis, and adapted from a Center for Medicare and Medicaid Innovation figure (online Appendix Exhibit 2; see Note 13 in text).

just improving life expectancy and minimizing disability to optimizing population health. The new 3.0 operating logic builds upon the biomedical and biopsychosocial models of disease causation, using recent breakthroughs in social epidemiology to focus more attention on the upstream social, behavioral, and developmental (that is, earlier in the life course) determinants of health.[14,15]

By emphasizing primary prevention, health promotion, and the multisector production of optimal lifelong health outcomes and by capitalizing on inputs from the education and housing sectors, the 3.0 Transformation Framework also suggests how the development of health, human capital, and community economics can be linked in a common purpose.[16] For example, a 3.0 system would help individuals and community populations understand the long-term impact of their current choices (and personal and community environments) related to food intake and physical activity. Such a system would engage communities in supporting conditions such as neighborhood safety and norms such as walking and exercise. The system would also align preventive medical care with community-based health supports in the Y (formerly called the YMCA), schools, and child care centers to improve calorie intake and physical activity across the continuum of risk and need. Finally, a 3.0 system would employ innovative financing mechanisms that encourage and provide incentives for all of these actions.

Creating local systems that are capable of comprehensive approaches to health will require new ways of pooling and allocating resources, as well as innovative financing models that incorporate the long time period necessary between investment in health and accrual of long-term health, social, and economic benefits.[17] The Robert Wood Johnson Foundation Commission to Build a Healthier America highlighted the importance of focusing health system reform strategies in this manner in two of its three recommendations in its 2014 update: Create communities that foster health-promoting behaviors, and broaden health care to promote health outside of the medical system.[18]

The specific design elements and the leadership required for significant reengineering into a 3.0 health system are still emerging. A successful 3.0 health system will likely involve shared leadership across multiple sectors to steward society's shared interest in optimizing population health and well-being: aligning different sectors, promoting shared accountability, and synergizing the efforts of various cross-sector stakeholders and organizations in common purpose.

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The 3.0 Transformation Framework recognizes that the health care system is evolving from simple relationships among hospitals, doctors, patients, and health insurers to complex, interdependent organizational and financing models that use complicated pricing formulas, risk-adjustment equations, and patient attribution schemes to pay for services. The next generation of the health system will require financing strategies that distribute accountability for addressing the social and developmental conditions across multiple health and human service sectors. This will likely require payment reforms such as multisector risk-based contracting or health trusts, organized to pool funds from different sectors and designed to incentivize the collaborative production of health and well-being.

If the 3.0 Transformation Framework health system is going to emerge and thrive, it will also require supportive policies that incorporate longer time horizons, in ways that are similar to other sectors such as national defense, energy, and transportation. Today, the policy framework for the health care sector prioritizes short-term rewards for existing agents and organizations. This is exemplified when the volume of services provided is rewarded irrespective of the value of the care received, when responsibility for care ends with a patient leaving a hospital, and when patient and family voices are excluded from policy development and decision making.

How The 3.0 Transformation Framework Is Being Deployed

In this section we provide early examples of how the 3.0 Transformation Framework is being used at the national, state, and local levels to advance efforts aimed at long-term transformative change. Each example represents a work in progress that will continue to evolve over time.

CENTER FOR MEDICARE AND MEDICAID INNOVATION The CMMI was launched in 2010 with the understanding that sustainable increases in health care coverage would require transformative change in the performance of the health care system. While Triple Aim goals were adopted as the primary measure of system success, the CMMI needed to communicate the rationale for broad change to a diverse set of audiences, including providers, payers, policy makers, and the public, so the center's population health team adapted the 3.0 Transformation Framework to provide a context for the type of innovations it hoped to catalyze (see Exhibit 2 and the Appendix).[13] Recognizing that most current health care delivery reforms are moving the system from 1.0 to 2.0 by reengineering medical care models (for example, ACOs and medical homes) and promoting value-based purchasing and payment arrangements, the CMMI population health team saw the need to also advance 3.0 health system change strategies and facilitate early experiments to learn what works.[19,20]

Starting in early 2012 the 3.0 Transformation Framework was used by the CMMI staff to frame the center's population health strategy, as well as to describe innovative new delivery models. Using the 3.0 Transformation Framework, the CMMI staff communicated how investments in the medical home and ACO were facilitating the transition from 1.0 to 2.0; the opportunity to incorporate population health goals more explicitly into those models; and the need for community-accountable, multisector collaborations to drive the transition from the 2.0 health care system toward the 3.0 health system focused on producing population health.

Recognizing the crucial role that states will play in ACA implementation, the CMMI created the State Innovation Model program to encourage states to accelerate transformative change that would generate Triple Aim outcomes. The 3.0 Transformation Framework was used to draft the State Innovation Model Funding Opportunity Announcement,[21] although an explicit reference to the framework was not included in the final announcement. Several states, including Maryland, Minnesota, Michigan, California, and Washington, have responded by explicitly including the development of Accountable Health Communities or equivalent local entities as part of their transformation plans.[22–26] Activities in Michigan are discussed further below.

The versatility and value of the 3.0 Transformation Framework was demonstrated in the way it guided the formulation of strategy, shaped the design of models, and informed the implementation of interventions. One of the 3.0 Transformation Framework's key attributes is how it is readily understood by a wide range of professional and lay audiences, creating a compelling vision of a desired future. Creating such common vision is essential to building and sustaining the momentum of reform.

MICHIGAN STATE INNOVATION MODEL In Michigan, which began its State Innovation Model planning efforts in March 2013, the expansion of Medicaid under the ACA instilled a sense of urgency about the need for health system transformation and payment reform. Over the past three years Michigan's ACOs and provider groups have increased the number and distribution of patient-centered medical homes and developed the infrastructure and care management models for patients with chronic diseases. The Michigan State Innovation Model proposal was seen as an opportunity to leverage the state's medical home expansion initiative, creating more accountable and integrated systems and care networks. Through its Michigan State Healthcare Innovation Plan, Michigan's State Innovation Model aspires to achieve 3.0 transformations by combining four health system elements: patient-centered medical homes, community-integrated Accountable Systems of Care, Community Health Innovation Regions, and a statewide health information exchange and performance-reporting infrastructure.

Patient-centered medical homes will manage and coordinate patient care and will be accountable for patients' disease prevention and wellness. Accountable Systems of Care will serve as organized, vertically integrated networks that employ and contract with patient-centered medical homes. They will be responsible for facilitating cross-sector care management and health information exchange, as well as for integrating health care services over the continuum of care required by the patients and populations they serve. Accountable Systems of Care will also link the provider network to community service systems and social and economic resources, including public health and behavioral health services. Michigan's Accountable Systems of Care model builds on the 2.0 ACO model, moving it toward 3.0 functions by addressing the social and economic determinants of health and upstream community risk factors.

The Community Health Innovation Regions are Michigan's community organizing and engagement platforms, serving as the vehicle to connect Accountable Systems of Care with health-promoting community assets. They bring community stakeholders together to set community health improvement priorities, address community health risk factors and raise the "healthy living" capacity of the community, and act as innovation incubators.

The final component of this emerging 3.0 delivery system design is the e-health infrastructure and health information exchange backbone, allowing electronic health information to be aggregated and securely exchanged from the patient care level to the community health level.

Payment reform in Michigan aligns risk and financial rewards to incentivize the accelerated evolution toward 3.0 design elements. By moving from a fee-for-service to shared-risk and reward-based payment that incentivizes long-term health improvement, Michigan intends to provide the financial wherewithal to support sustainable transformation. While the Michigan State Innovation Model is still a plan and time will tell how well it will be implemented, the 3.0 Transformation Framework proved essential in generating a clear vision and design ideas for changing how health care is organized and paid for in the state.[24]

CHILDREN IN DELAWARE AND FLORIDA: NEMOURS Nemours, a children's health system operating in the Delaware Valley and Florida, expanded its focus in 2003 to encompass optimal health through a vision consistent with the 3.0 Transformation Framework model. To execute this strategy, Nemours Health and Prevention Services was established to work with all systems that care for children in promoting and optimizing their health.

A community health assessment led Nemours to focus on reducing childhood obesity. Assuming the role of "integrator,"[27] Nemours worked with partners across multiple sectors—schools, child care, primary care practices, and community-based organizations—at a population level to positively influence behavior and instill healthy eating and physical activity habits early in children's lives. Nemours established partnerships with the early-learning community to implement new health-promoting tools at early care and education sites to engage children and families in obesity-preventing behaviors. The partnerships also promoted policy changes in state licensing regulations, improving the nutrition and physical activity standards in licensed and family child care affecting 54,000 children in Delaware.[28] Through a strong partnership with the Delaware state Child and Adult Care Food Program, Nemours and partners in early care and education created learning sessions for providers implementing these standards.

In addition to changes in clinical data systems that enable improvement in the management of obese children, Nemours galvanized cross-sector partnerships with a public information campaign. The comprehensive multisector approach included working with the Delaware Parks and Recreation Department to offer healthier food options in park vending machines; helping communities institute community walk days; and spreading policy and practice system changes to schools, child care centers, youth-serving and community-based organizations, and various levels of government throughout the state. This community partnership strategy is leading to the emergence of community-accountable systems aligned intentionally to improve population health outcomes.

Despite these programmatic successes, Nemours, as a health care system, is experiencing challenges in sustaining the changes. It has come to recognize that new payment models, such as those envisioned in the 3.0 Transformation Framework, are needed to incentivize payers and providers to focus on wellness and preventive strategies instead of continuing to pay based on the volume of clinical services used to treat illnesses.

THE MAGNOLIA COMMUNITY INITIATIVE The Magnolia Community Initiative near downtown Los Angeles is a prototype of a transformed system of health and human services in partnership with an engaged community.[29] It strives to optimize population health outcomes by improving the conditions and long-term health trajectories for 35,000 children and their families within a 500-square-block area.

The initiative is a voluntary network of seventy organizations from multiple, diverse service sectors that include county agencies, the public school district, patient-centered medical homes, Head Start, and other social and economic support programs, working in partnership with families and other local residents. It views population health as a shared responsibility of a complex community system. Network partners strive to align their resources into a continuum of wellness supports. They use their shared understanding of health determinants (and root causes of disparities) to work as a single system to create the conditions and behaviors that influence well-being across the life course.

The Magnolia Community Initiative introduced design concepts and service delivery functions consistent with the 3.0 Transformation Framework. Instead of establishing a single, formal structure across the many sectors and organizations to direct the transformation, the partners cooperate to align the health and related services and supports that they provide. They focus on transformations that can scale, spread, and be sustained over time. For example, cross-sector partners from health, mental health, and social services use collaborative learning cycles to improve protocols for client linkage and referral across the many organizations. Another example is pooling expertise in emerging life-

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course science and practice (such as early brain development and response to toxic stress and trauma) across sectors. This enables diverse partners in health, social services, child care, and other services to incorporate new knowledge into their training and care protocols so that families experience the transformation across all types of services.

The initiative purposefully works at multiple levels (individual, neighborhood, and health system), providing care across a network of organizations to mitigate family stressors and barriers; activating people to manage their health needs; and engaging neighborhoods in change. Partner organizations and neighborhood resident champions act as a "point of entry" into a network designed to help families take advantage of local resources. A Community Dashboard, displaying population health outcomes, health behaviors, and family and social conditions, is shared regularly with leaders and staff of partner organizations to encourage systems thinking, show real-time monthly progress, promote shared accountability for results, and engage partners in a common change process.[30] Families and residents also use run charts (graphs that display changes over time) to track their progress.

The Magnolia Community Initiative learning system equips partners in health care, education, social services, and economic and financial services to continually innovate and improve. In this way, this complex community system acts rather than plans its way toward a system that is capable of improving population-level health.[30]

Advancing 3.0 Principles And Design Strategies

The previous examples show how the 3.0 Transformation Framework can create an expectation for transformative systems change and spark needed innovations. The 3.0 Transformation Framework design concepts and change strategies will continue to evolve as new approaches are developed and tested in practice.

The framework can also facilitate transformation by providing a common language and a directional scheme to support change. The examples show how the 3.0 Transformation Framework concepts can be applied by states, regions, and localities to adopt shared goals for optimizing health at the population level; integrate a range of health and health-related services, horizontally across sectors and longitudinally over time; use system integrators and navigators; embed services within broader systems; develop prototype design ideas for innovative 3.0 organizing structures; and engineer financing schemes that reward health improvement. By providing a vision of what a transformed health system might look like, the 3.0 Transformation Framework can also create demand for disruptive changes and new approaches to ensure that the innovations of early adopters can take hold and be sustained.

Advancing the US health care system to version 3.0 at scale will require additional work focused on four key design elements.

COMMUNITY EMPOWERMENT AND ENGAGEMENT The 3.0 health system emphasizes not only activated patients but engaged communities and motivated populations focused on creating local conditions that support health over the life course. For individuals, this means moving beyond a 2.0 role as activated and informed patients to become designers and co-producers of their lifelong health development. This shift in how people interact with the health system is crucial for designing a more responsive system that meets population needs while personalizing care.[31] Engagement with community partners and institutions (such as cities and community health councils) as co-developers of new health system functions is critical because 3.0 health care will increasingly focus on upstream determinants of health and will rely on this local infrastructure to engage and inform residents in ways that address these determinants.

COMMUNITY INTEGRATION FUNCTIONS While 2.0 health systems focus mostly on the vertical integration of health care services, by intensity and cost, 3.0 systems are attempting to achieve collective and cross-sector improvements in population health through the horizontal alignment and integration of clinical, public health, and population health services and supports. To achieve collective impact, these alignment and integrating functions can be organized by a single entity (a "quarterback" organization that

serves in a connecting, integrating, and guiding role), they can be shared across different organizations, or they can be structured into what has been termed an Accountable Health Community.[27,32,33]

The diversity of local systems demands flexibility in how these integration functions are organized, structured, and deployed. Experimentation across a range of organizational forms and structures is needed to identify efficient ways of providing these functions, which may include stewarding an organized, cross-sector change process that spans an entire community system, the way that many community coalitions have banded together to address the obesity epidemic; facilitating agreement among multisector stakeholders on shared definitions, goals, and metrics, the way education, health, and early childhood sectors are coming together to define, promote, and measure healthy development and kindergarten readiness; building relationships across sectors to align or integrate services and collaboratively introduce new and improved interventions, the way some communities are approaching the needs of high-cost, high-need, frequent users of emergency services; and continually assessing and managing local resources to extend prevention and health optimization to the entire population, the way some communities are implementing health-in-all-policies strategies.

FINANCING APPROACHES While the 2.0 system focuses on achieving value, defined as the efficient production of high-quality health care services, the 3.0 system expands the concept of *value* to include the production of population health as a social investment. Realizing this new value proposition requires a shift in financing goals from paying for health care to paying for health. This means that a 3.0 health system requires payment methods that prioritize preventive services; health promotion efforts; and service coordination across health, social service, education, and other sectors, as well as allowing for longer time horizons. Meeting the health needs of a given community will require a broad portfolio of fiscal tools that reward investments in the development of health capital for individuals and populations across the life span. Financing tools for population health interventions are starting to be developed, including Triple Aim payment models, such as ACOs and shared-risk contracting, and new sources of capital, such as social impact bonds, as well as new ways of financing desired outcomes, such as community health and wellness trusts.[17,34,35]

INFORMATION AND MEASUREMENT Current measures and data systems are inadequate for the population health assessment, improvement, and innovation requirements of a 3.0 system. To optimize population health, the 3.0 system will need to measure population health trajectories and demonstrate the return on health investments by linking investments to health, social, community, and economic outcomes. A 3.0 health information system will need to link outcomes over time to measure the impact of longitudinal integration on health trajectories; to measure how multisector interventions affect health determinants and improve health assets; and to link individual, population, and systems measures to gauge overall system progress and performance.

Conclusion

Fully capitalizing on this historic opportunity to create the next version of the US health system—one that is more effective, efficient, and equitable—requires a roadmap to an alternative future. The 3.0 Transformation Framework is a useful tool for communicating how the next generation of the health system can emerge; for planning, designing, and developing the kinds of innovation and improvement strategies that might be deployed; and for organizing a learning system that can guide diverse actors, agencies, and sectors toward common health optimizing goals. Although the work will continue to be challenging, the path to a better US health system is within reach. ■

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