

In the NIC of Time: Six Domains of Primary Focus for the National Interoperability Collaborative



Stewards of Change Institute
Healthcare Information and Management Systems Society
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NIC is a new “Community of Networks” designed to increase collaboration among the sectors that impact health and well-being by improving information-sharing, interoperability, and use of technology. Our goal is to improve outcomes for everyone, particularly vulnerable and underserved members of society. NIC is led by the Stewards of Change Institute and AcademyHealth.

This document provides a summary of a more-detailed and comprehensive version that can be accessed at www.stewardsofchange.org/NIC. Most of the content in both versions was originally researched and written by Stewards of Change Institute for a white paper commissioned by the Healthcare Information Management and Systems Society (HIMSS).

We invite input on the content of this document to ensure its accuracy and ongoing usefulness. To ask a question or provide a comment, please send an email to NIC@stewardsofchange.org.

NIC members and other interested parties are encouraged to use this material as the basis for ongoing discussions and interactions on the new NIC website and its collaboration portal. We recognize the complexity of each of the six domains that are summarized here, and encourage active participation – especially on the NIC portal – to delve into topics relevant to your own work and interests. The aim is to identify common themes, needs and areas where collaboration within and among domains could be genuinely valuable.



Stewards of Change Institute is a national nonprofit organization that provides catalytic leadership to improve the future of children, families and communities by inspiring and initiating transformational change in health and human services at all levels. SOCI's vision is to serve as a driving force for bringing together progressive ideas, cutting-edge tools, and leading innovators from the public and private sectors; conducting, synthesizing and applying research; and providing education, support, training, and advocacy to advance information-sharing and interoperability.



AcademyHealth is a leading national organization serving the fields of health services and policy research and the professionals who produce and use this important work. Together with our members, we offer programs and services that support the development and use of rigorous, relevant and timely evidence to increase the quality, accessibility, and value of health care, to reduce disparities, and to improve health. We bring stakeholders together to address the needs of an evolving health system, inform health policy, and translate evidence into action.

Most of the content of this document was originally produced by SOCI and HIMSS for a separate white paper. The content has been expanded for its use by NIC.



The Healthcare Information and Management Systems Society is a global, cause-based, not-for-profit organization focused on better health through information technology (IT). HIMSS leads efforts to optimize health engagements and care outcomes using IT. HIMSS North America, a business unit within HIMSS, provides thought leadership, community building, professional development, public policy, and events. HIMSS North America represents 64,000 individual members, 640 corporate members, and over 450 non-profit organizations.

Introduction and Background

Public and private organizations, as well as thought leaders nationwide, have long recognized that interoperability and information-sharing are at the heart of enabling a genuinely effective approach to addressing almost any situation (relating to health, wellness, emergency response, and many other concerns) affecting multiple organizations, systems, jurisdictions, and/or government at all levels.

With this understanding as backdrop, numerous efforts have been made for decades – many of them successful – to improve coordination, communication, and collaboration within and among some of the six primary domains that operate across the spectrum of care. This document summarizes key elements of each of those six domains: human and social services, public health, public education, public safety, emergency medical services, and health information technology.

This document was prepared by Stewards of Change Institute and NIC, with significant input from subject matter experts to whom we are very grateful (see Acknowledgements).

Understanding the Six Domains . . . to Connect the Dots

Each of the six domains examined here is in itself a complex, sprawling and diverse field that encompasses numerous agencies, organizations, and/or other entities. Each also has its own norms, standards, bureaucracies, and internal information-sharing and interoperability challenges. Moreover, each has a full complement of daily and long-term mission responsibilities. It is therefore unrealistic to think they can find ways to quickly and broadly exchange data in all circumstances. We believe, however, that further guidance, knowledge, and training will lead to substantive progress, and NIC is being built to provide those elements. What is possible as an initial step, and what we believe is in these domains' own best interests, is to identify data sets, processes, and other elements of their current work - focused on specific problems (ex., the opioid crisis) - that could be shared. We believe that doing so would result in better collaboration, services, and outcomes in the short term, and increasingly over time.

Perhaps most pointedly, interoperability and information-sharing among stakeholders clearly need to be established sooner rather than later, since doing so is far more difficult (at best) once an immediate need must be addressed. A simple example of how this could be started in a given community: Activities already conducted in each domain with the aim of "preventing opioid addiction" could be identified and enumerated, with answers to questions such as, "What data does each domain hold that some or all others do not, and which of them could be of tangible benefit if they were shared?" Answering questions such as these would help us to "connect the dots," prioritize actions, and then focus on those that could have the greatest impact, and most quickly. As it develops organizationally and in its on-the-ground activities, NIC's goal is to expand understanding of the domains and, most importantly, enable them to become more effective - individually and collectively - through greater collaboration, information-sharing, and interoperability.

By providing this unique, explicit look at all six domains, our goal is to enable and support the identification and analysis of common and divergent factors among them – and thereby instigate and accelerate cross-sector information-sharing, interoperability, and collaboration.

One of NIC's near-term objectives is to compare the six domains in order to gain insights about them and stimulate communications among them. Their strengths, gaps, and challenges are examined more fully in the expanded version of this document at www.stewardsofchange.org/NIC.

Human and Social Services

Mission: Means-tested human services programs, also referred to as social services (or, sometimes, as welfare) comprise about 80 separate federal initiatives that provide a very broad spectrum of benefits and services including: cash and housing assistance, food stamps, medical care, child welfare, human trafficking prevention, energy support, refugee aid, job training, and targeted education assistance for poor and low-income Individuals and families. They receive these and other services/benefits from numerous providers, based on specific needs, means, and circumstances – all of which can differ greatly and are subject to varying requirements. Furthermore, many recipients use multiple services/providers, again depending on many factors.

Today, it is widely recognized that comprehensive, coordinated services are critical to enhancing operational and programmatic efficiencies, as well as outcomes. The array of factors that need to be included in creating a holistic, person-centered approach are called the Social Determinants of Health and Wellness. Indeed, those factors – such as housing, nutrition, education, transportation, and jobs, among many others – have the greatest impact. Specifically, research indicates they are responsible for 50 percent of health outcomes, compared to 20 percent each for environmental factors and human biology/genetics and just 10 percent for clinical healthcare.

Addressing complex challenges requires a higher level of planning, alignment and coordination than most systems can achieve within their current constraints. Preventing and addressing major public health problems, for instance, requires the ability to share and use information in a responsible and timely manner to make informed decisions, as well as to gain access to the appropriate types and quantities of services when and where they are needed. However, a cornerstone of preparedness is that communications, system linkages, and trusting relationships among all partners need to be established before a crisis occurs, because trying to accomplish this granular level of cooperation during an emergency is far more difficult if not impossible.

A recent example is the lack of actionable information and coordination after the hurricane in Puerto Rico. Pre-negotiated data-sharing agreements were not in place, so the emergency response there was slowed and is being hampered to this day.

Infrastructure: Human services assistance/programs are delivered and run by numerous federal, state, local governmental, private, and nonprofit providers across the country. Their systems are made up of a hodge-podge of modern and legacy technologies produced by a variety of vendors that generally operate independently, don't coordinate with each other, and are usually proprietary. They were designed and built in response to specific requirements to serve particular populations, as mandated by enabling (usually federal) legislation and categorical funding by appropriations that often flow from Washington to the state and local levels for implementation.

Sources of Funding: The FY 2016 federal budget allocation for human services programs was about \$350 billion, plus \$935 billion for federal Medicare and Medicaid expenditures. Roughly half of this assistance went to families with children, most headed by single parents. This document classifies Medicaid within the public health domain, but it is important to note it has a huge impact on the human services ecosystem because the federal government offers states a 90 percent match to pay for technology supporting interoperability between Medicaid and human services, if it benefits the administration of Medicaid programs. Medicaid therefore becomes a major funding driver for integration and interoperability between public health and human services programs.

health agencies are in the lead. By law, the governmental public health agency has the chief responsibility for the essential services described above, and can engage the private sector to carry out the services and programs. Because of the variability across the country and across jurisdictions in how public health is organized, national professional organizations play a major role in advising on policy development, sharing information on best practices, and professional development for the workforce. The leading public health organizations at the national level are the Association of State and Territorial Health Officials (ASTHO) and the National Association of County and City Health Officials (NACCHO).

Because public health is responsible for monitoring, forecasting, and analytics around community health, its information infrastructure comprises information and communication technologies (ICT) including hardware, software, services and devices; broadband infrastructure; and a workforce skilled in “public health informatics.” Private healthcare providers and laboratories are required to notify health departments when they see a case of a reportable disease (e.g., Zika, measles), but healthcare delivery systems rarely share clinical data not mandated by law. With the growing interest in tracking and incorporating the Social Determinants, some communities are beginning to exchange health information more readily.



Sources of Funding: The majority of public health funding is at the state level, with most coming from pass-through federal funds from the Department of Health and Human Services, Environmental Protection Agency, Department of Agriculture, and Department of Homeland Security. Private foundations such as the Robert Wood Johnson Foundation and the DeBeaumont Foundation also provide funding to state and local health agencies for demonstration projects.

Workforce: Approximately 300,000 people are estimated to be employed at federal, state, and local health agencies. There are numerous vacancies for skilled professionals such as epidemiologists and informatics experts.

Public Education

Mission: Public elementary and secondary education in the U.S. serves children in grades K-12, mainly through schools that are open to all children regardless of immigration status, income, ethnicity, disability status, religion, sexual orientation, or other factors. Broadly speaking, the mission of public education is to prepare students with the necessary skills to fully participate in society and the workforce. The accountability requirements established in the 2001 No Child Left Behind law spurred an unprecedented focus on accountability and standardized testing at the state level that precipitated a decades-long emphasis on data collection, reporting, and quality.

Traditionally, states have been responsible for setting standards and systems of accountability for public education. In 2007, however, with support from the federal government, state leaders began working together with national convening organizations to develop a shared set of standards for math and English language arts known as the Common Core State Standards, which were adopted by 42 states as of 2015. These in turn spurred development of new standardized tests and data-collection strategies. In 2010, 26 states began the process of jointly revising science standards, resulting in the Next Generation Science Standards, which were adopted by 20 states as of 2017.

In 2015, then-President Obama signed the Every Student Succeeds Act into law. Among other goals, it establishes annual statewide assessments to be provided to educators, families, students, and communities; it also maintains accountability to improve the lowest-performing schools, while at the same time devolving flexibility and accountability back to the state level.

Infrastructure: Public education is governed by laws and regulations at the federal, state, and local levels, with oversight from both appointed and elected leaders. The U.S. Department of Education oversees federal law and funding, and state education agencies oversee their own state approaches to standards, curriculum, accountability and funding. States differ on the extent of local control offered to counties, school districts and local school boards.

Each state has an agency that oversees elementary and secondary education and is led by an elected or appointed chief education officer, superintendent, or secretary; its roles include funding and funding oversight, data-collection systems and federal reporting, accountability systems, teacher credentials and assessments. Each state also has a Board of Education, composed of leaders appointed by the governor or legislature, or elected by constituents; their oversight is generally “big picture,” but they are also charged with activities including setting statewide curriculum standards; establishing high school graduation requirements; determining qualifications for professional education personnel; establishing accountability and assessment programs; and developing rules and regulations for the administration of state programs.

Sources of Funding: Most public education funding comes from state and local coffers; in 2012-13, 45 percent came from states, 45 percent from local sources (including property taxes), and 9 percent from the federal government. The latter are typically allocated for two types of students: those who are socioeconomically disadvantaged or who are in special education programs.

Workforce: A total of 7.7 million people were employed in public education at the federal, state, and local levels in 2012, with 99 percent of them employed locally.

Public Safety

Mission: The U.S. public safety system includes law enforcement, fire and rescue services, and the emergency medical service (EMS) network of public, private, and voluntary organizations that contribute to the safety of the public in a geographic jurisdiction. Public safety partners include agencies that respond to emergencies, whether man-made or natural, and others that may vary by community but have a role in protecting the public and dealing with health and safety crises. By law, governmental public safety agencies have the responsibility to monitor safety status, develop policies and plans to support personal and community safety, enforce laws and regulations, and conduct research to ensure and maintain community safety.

Infrastructure: Public safety is generally regarded as a community responsibility. While agencies exist at the state and federal levels that play supportive roles in some cases, the bulk of public safety exists at the local (city, county, tribal) level, with no element of state or federal direct control over operations. The federal government works to provide consensual standards and to conduct research in public safety methods and processes and provides funding for programs, services and educational efforts. Federal agencies with lead public safety responsibilities include the Departments of Homeland Security and Justice, and the Director of National Intelligence.

States usually provide a coordination and planning role for public safety, with associated funding varying widely across the nation. All states have some sort of state-level version of homeland security, with varying degrees of capability, generally reporting to their governors. States also generally have fire marshals, who coordinate the work of fire services and standards. Emergency management operations often exist at the state as well as the local level. States are the conduits for significant amounts of federal grant dollars, distributed to them via block grant programs.

Because of the autonomy of local public safety agencies, national professional organizations play a major role in advising on policy development, information-sharing on best practices, and professional workforce development. These include the International Association of Chiefs of Police, the International Association of Fire Chiefs, the National Emergency Management Association, and the Association of Public Safety Communications Officials. Public safety is constantly in motion and mostly mobile, so its information infrastructure encompasses information and communication technologies, including both fixed and mobile hardware, software, services and devices; broadband infrastructure; and a workforce skilled in public safety communications and technology.

Sources of Funding: Public safety funding comes primarily from tax revenues at the local level, augmented to a small extent with federal funds from the Departments of Homeland Security and Justice and additional, limited support from state general funds. Private foundations such as the Robert Wood Johnson Foundation and Arnold Foundation also provide funding to state and local safety agencies for research and demonstration projects.



Workforce: An estimated 850,000 people are employed in law enforcement activities at all levels. As of 2014, there also were 1,134,400 firefighters in the U.S. (not including those who work for the state or federal governments or in private fire departments). Of these, 31 percent were career and the rest were volunteer. As of 2014, there were also 241,000 emergency medical technicians (EMTs) nationwide. There are many vacancies nationwide, especially in law enforcement.

Emergency Medical Services

Mission: The Emergency Medical Services system is the best-known public-response system for individual medical crises in the U.S. EMS includes the public safety answering points, emergency medical dispatchers, emergency medical responders, emergency medical technicians, advanced EMTs, paramedics, and

designated medical directors. EMS is part of a tiered response system that dispatches law enforcement, fire services, and/or ambulances, as dictated by the nature of the emergency (also see the Public Safety section). These resources are deployed in specific geographic locations as part of a larger network of services organized by each state.

Medical services partners include agencies that respond to emergencies, and others that may vary by community but have a role in protecting the public. Emergency services contact, diagnose, triage, and transport patients under the direction of a locally authorized medical director. The service may be delivered in home, ambulance, local clinic, or hospital (if the patient is transported). It may be a general hospital or one of the following types of specialty facilities: trauma center, pediatric center, burn center, cardiovascular care, or stroke center.

Governmental emergency medical services are governed by state laws, regulations, policies, and procedures. These include a requirement to provide leadership to local jurisdictions. Each state must also have a system in place to evaluate and improve the quality of its EMS system. EMS operates at the intersection of Public Health, Public Safety, and healthcare.

Infrastructure: Under the Department of Transportation, the National Highway Traffic Safety Administration developed the framework for, and leads, EMS systems. Every state legislatively authorizes its own system, as well as the authorities who oversee service delivery and resource training. National standards are determined by DOT and modified by each state's Department of EMS (usually under its Department of Health); they are also altered by Regional Medical Advisory Committees (usually in rural areas), by other committees, or even by individual EMS providers.

States generally provide coordination and planning roles for EMS, with funding varying across the nation. Emergency management operations exist at the state as well as the local levels. States are the conduits for significant amounts of federal grant dollars, distributed to them via block grant programs. Federal partners with EMS include the Departments of Defense, Health and Human Services and Homeland Security, as well

as the Federal Communications Commission. The organizational model that has tested out so well to deliver this response, in coordination with public safety and medical agencies, also applies to community and regional health responses.

Sources of Funding: Public emergency services funds derive mainly from state and local tax revenues. The services may be provided by a local government or be the responsibility of the regional or state government. Municipality-operated services may be funded by service fees, supplemented by property taxes. Funding for programs, services, and educational resources is supported partly by the CDC and the ASPR as a part of other efforts. EMS systems are practical examples of the minute-by-minute emergency response mechanism for individuals in crisis.

Workforce: As of 2014, there were approximately 241,000 emergency medical technicians in the United States. There are numerous other support personnel, such as emergency medical responders and paramedics, throughout the country. In addition, there are private agencies that provide emergency medical services and that are not part of the public network.

Health Information Technology

Mission: While a strong business case and appropriate policy are necessary for interoperability to flourish, at the end of the day it's the available information technology (IT) that makes data flow. Because of the distributed nature of healthcare in the U.S., IT resources, decision-making, and infrastructure are equally decentralized. And a competitive marketplace on the one hand leads to great innovation, while on the other hand often limits effective cooperation. Rapid advancements in technology have also led to implementation stratification on the part of health organizations, so users can rarely keep pace equally in all technical areas. This leads to conflicting pressure to implement new technology as it becomes available, and to allowing existing technologies and approaches to become more widely implemented.

Infrastructure: Health information technology (HIT) encompasses many components. The most crucial relating to interoperability are: commoditization, with almost all types of computing equipment becoming essentially commodity purchases and most application development moving to the web; clinical systems, which support a wide range of activities, from direct patient care and population health management to more-specialized functions like radiology, laboratory information and pharmacy management; administrative systems, which drive the payment for healthcare services that, at the end of the day, drive most spending in healthcare organizations; and mobile computing, which over a short period of time has exploded to include a wide variety of devices – conventional and unconventional – now referred to as the Internet of Things. Fundamental to interoperability is the internet itself, fed by local networks within organizations that provide connectivity between computers and other devices.

The Office of National Coordinator's (ONC) work implementing the 21st Century Cures Act and its focus on trusted exchange is an important step toward advancing the creation of a national interoperable health system as early as 2019. In January 2018, ONC published a draft Trusted Exchange Framework and Common Agreement (TEFCA) for public comment. The single on-ramp described by ONC seeks to enable access by existing Health Information Networks to electronic health information regardless of what health IT developer they use, health information exchange or network they contract with, or where the patients' records are located. This approach also could stimulate innovation, improve services to participants, and support long-term sustainability.

Sources of Funding: Infrastructure certainly has its costs, but IT is moving into our society as a core capability



of our work, family, and social lives. Different industries spend varying amounts on IT in general. While the commoditization of hardware has reduced costs, increased demand for more and more capacity continues to drive spending, which competes with other organizational priorities for investment. The Centers for Medicare and Medicaid Services (CMS) Electronic Health Records Incentive Programs have spurred investment in EHRs, but payment reform continues to introduce uncertainty into the future availability of funds for investment in Health IT.

Workforce: Approximately 188,600 people are estimated to work as medical records and health information

technicians. Demand for health IT workers continues to grow steadily, as does the need for clinical staff trained and experienced in healthcare informatics. As the labor market for skilled IT in the U.S. tightens, and sometimes shifts overseas, organizations may find it increasingly difficult to advance their health IT projects successfully.

Conclusion

By providing this unique, explicit look at the six primary domains that operate across the spectrum of care, NIC's goal is to engage the broader interoperability community in identifying and analyzing the common and divergent factors among them in order to accelerate information-sharing and collaboration. One of our near-term goals is to compare these domains – through crowd-sourcing on the new NIC Collaboration Portal to gain deeper insights about them and to stimulate cross-sector communication/dialogue. Each of the domains are examined more fully in the expanded version of this document at www.stewardsofchange.org/NIC.

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