

DIGITAL AND DATA ARCHITECTURE

COMMISSION ON INVESTMENT IMPERATIVES FOR A HEALTHY NATION

A Discussion Paper from the National Academy of Medicine

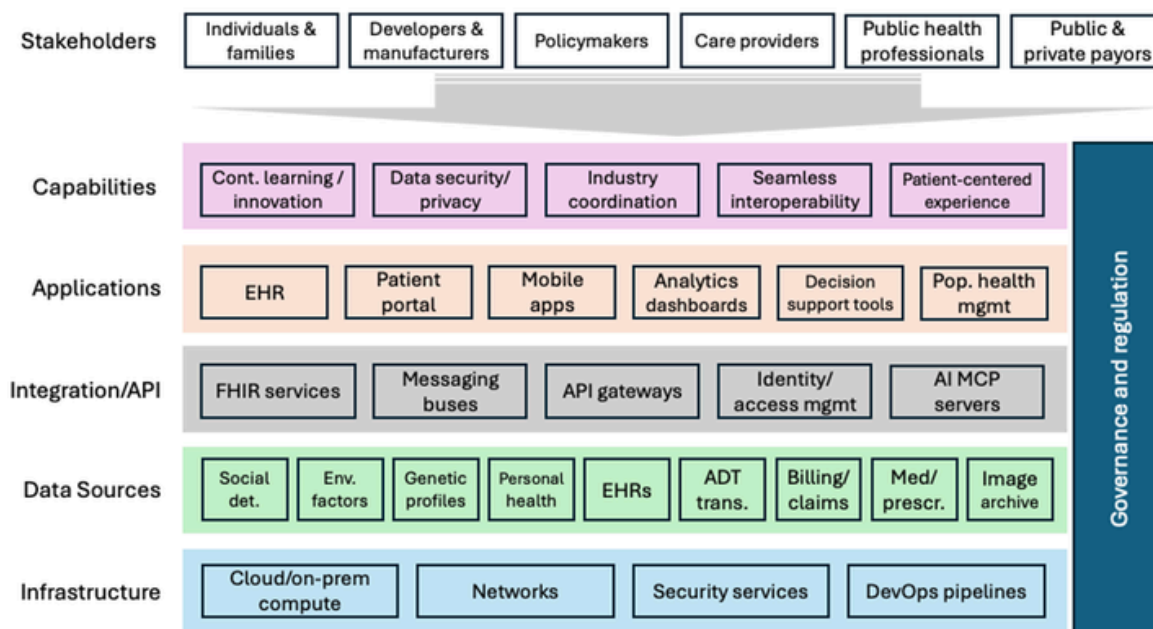
The U.S. health system substantially underperforms relative to its potential. Despite unparalleled biomedical innovation and excellence for some, U.S. health and public-health outcomes lag those of nations with comparable or even fewer resources. Data provide the primary fuel for continuous learning and high reliability in health. Clinical care, public health, and community well-being can improve rapidly when data flow securely and effectively—enabling timely insights, prevention, accountability, and innovation. However, the current data environment is fragmented, underutilized, and costly. Public, private, and personal health-related data are abundant, but interoperability gaps, misaligned incentives, and mistrust limit their real-world availability and impact for patients, clinicians, payers, innovators, and communities.

This discussion paper outlines how a cohesive digital and data architecture would maximize the benefits of interoperability, quicken the pace of innovation, enhance patient-centered care, and improve fragmentation of the industry around digital health infrastructure. The paper also identifies actions to mobilize efforts across involved parties and define long-term strategies to implement a unified digital architecture.

Why Digital Architecture?

Technology is advancing faster than coordination, policy, and trust frameworks. Artificial intelligence, real-time analytics, and decentralized data capture create unprecedented opportunity, but without coherent strategy, standards, and social license, the benefits will remain inconsistent, uneven, and substantially delayed. However, a comprehensive data architecture could unify and aid in organizing the continual technological evolution of the disparate systems and standards used across various settings. An overarching, flexible data architecture would establish a common language and set of protocols that all systems adhere to, enabling seamless data exchange and integration. It would also enable the use of multimodal clinical and biological data alongside information about the social and behavioral drivers of health.

Health Data Architecture Conceptual Framework



Proposed Actions to Mobilize Efforts

The following levers outline practical actions and highlight legal, regulatory, industry, and other levers to mobilize efforts and achieve a robust data architecture.

Policy and Regulation Alignment

1. Prioritize a small set of foundational interoperability requirements.
2. Align federal agencies to create a coherent regulatory environment.
3. Empower patients to acquire, use, and share their digital data.
4. Promote complementary interoperability standards.
5. Incentivize and measure interoperability performance.

Public Accountability and Patient Demand

1. Coordinate public awareness and messaging frameworks.
2. Leverage consumer demand for data access.
3. Strengthen accountability mechanisms.
4. Develop flexible regulatory framework for AI systems.

Infrastructure Development and Support

1. Strategic federal, state and non-governmental investments.
2. Build national infrastructure for a robust data architecture.
3. Empower providers and patients through digital literacy education.
4. Federal workforce-development programs.

Phased Integration of Emerging Technologies

1. Integration of AI-powered decision support tools.
2. Federated systems for collaborative AI development.
3. AI validation and monitoring.

Path Forward

The nation urgently needs a scalable, secure, and trusted data architecture with strong governance. Improvements in health system performance require seamless, protected data access and reuse that is guided by clear governance, privacy protections, sustainable financing, and transparent accountability. Trust and fairness must be at the core, and communities, patients, and caregivers deserve confidence that data sharing will improve their health and that of others.

Achieving the vision of a seamless digital and data architecture will require the coordinated application of multiple policy and market levers, alongside deliberate efforts to address longstanding barriers to progress. No single existing organization, public or private, is likely to achieve the scale of transformation required alone. A multi-sector, public-private strategy—a national stakeholder roadmap—is needed to align vision, define roles and responsibilities, and share investments toward mutual benefit.

Download the discussion paper at nam.edu/perspectives.



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