

Implementing AI Solutions in Federal Public Health Agencies to advance Health Innovation

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Abstract

As Artificial Intelligence (AI) continues to evolve at an unprecedented pace, the healthcare administration field stands at a critical inflection point—where technological advancement intersects with the growing need for innovation in public health systems. With the U.S. population living longer and healthcare demands increasing, AI offers a transformative pathway to bridge the gap between legacy administrative processes and future-forward, data-driven solutions. When implemented at the federal public health agency level, AI has the potential to drive systemic innovation across the healthcare industry. However, successful integration requires careful consideration of workforce preparedness, governance frameworks, and legal implications. Without a comprehensive approach that addresses these foundational elements, AI's full potential cannot be realized. It is therefore imperative for healthcare leaders, policymakers, and technologists to collaboratively shape an infrastructure that supports responsible and effective AI adoption. AI is no longer a distant prospect—it is the present reality. The time to act is now.

Keywords: Artificial Intelligence, Healthcare Administration, Public Health Innovation, Workforce Readiness, Governance, Health Policy, Legal Considerations, Technological Adoption

Introduction

Policies and initiatives developed by federal public health agencies significantly influence state and local governments, as well as hospitals, clinics, and other healthcare facilities across the United States. Historically, however, the federal government has been slow to adopt technological advancements due to the prevalence of legacy systems and a workforce composed of long-serving career employees. These institutional characteristics often lead to resistance to change and innovation.

As Artificial Intelligence (AI) continues to disrupt industries across both public and private sectors, it presents a unique opportunity for federal public health agencies to lead in setting a precedent for innovation, governance, and cross-sector collaboration in healthcare administration. Failure to take decisive action in integrating AI technologies risks repeating a familiar pattern: private-sector organizations advancing rapidly while public institutions lag—not only in terms of implementation, but also in shaping relevant policy frameworks.

AI now offers the federal government—and federal public health agencies in particular—a chance to move from being reactive to becoming proactive leaders in transformative healthcare change. Olawade et al reported that AI has been applied to disease diagnostics, helped forecast the development of infectious diseases, and identified novel medication targets. AI has also been used to guide interpretation of medical imaging, drug discovery, and delivery.¹ These applications underscore AI's profound and expanding role in reshaping the healthcare landscape.

Given these possibilities, federal public health agencies such as the U.S. Food and Drug Administration (FDA) stand to benefit from integrating AI technologies into key operational processes. For example, within the FDA's Center for Biologics Evaluation and Research (CBER) and the Center for Devices and Radiological Health (CDRH), AI could enhance the review and approval processes for medical devices and drugs, increasing both efficiency and precision.

Discussion and Critical Analysis

The implementation of Artificial Intelligence in federal agencies and in particular federal public health agencies starts with AI literacy. Full-time government employees and leaders must understand, evaluate, and effectively use artificial intelligence in a way that is responsible. Hattab et al noted that “the opacity of AI techniques is a significant barrier to their integration into public health, fostering skepticism and unrealistic expectations among professionals. To overcome this challenge, it is critical to develop and implement clear guidelines that address ethical considerations, transparency, accountability, and interpretability. These measures will ensure that AI systems provide transparent rationales for their decisions, thereby fostering trust and facilitating effective collaboration between AI and public health professionals.”²

The skepticism and barriers as related to Artificial Intelligence and professionals within public health agencies are inevitable. The rate at which Artificial Intelligence is growing and expanding is not keeping up with the rate at which policies within public sector organizations can keep up with. This is why the development of clear guidelines and addressing ethical consideration is the

key to moving forward in implementing these innovative solutions. Without this taking place, the consequences can be detrimental.

One example of how Artificial Intelligence could be used in a way in which it is not responsible would be to include Personally Identifiable Information (PII). This can be irresponsible on many fronts. First, if there are any breaches of data within the cloud that holds the data, that individual's PII is likely to be compromised. As a result, from an individual or organizational standpoint, it may add to distrust or apprehension in implementing Artificial Intelligence solutions. Secondly, if leaders do not have a policy in place about AI usage, it is hard to coach and correct employees on responsibly using Artificial Intelligence without a full grasp of it overall themselves. This example highlights the importance of AI literacy prior to implementing AI solutions.

Working as a federal healthcare change management consultant, this opportunity to present an introduction to Artificial Intelligence to full-time government employees and leaders came about through client work with the National Institutes of Health. Once there was a clear understanding of the several aspects of Artificial Intelligence such as large language models and deep learning, naturally the audience's next question was how they could implement it in their daily workflows.

Findings

The curiosity as to how these government employees could implement this innovative technology into their daily workflows had profound findings. More than half of the audience stated that they saw the benefits of Artificial Intelligence in their daily workflows. Additionally, they sought to learn more about how Artificial Intelligence could drive efficiency in their day-to-day activities in an Office such as the Financial Management Branch.

The Financial Management Branch of the National Institute of Minority Health and Health Disparities is responsible for financial data and analysis. Through the incorporation of Artificial Intelligence in a branch such as this, automating and streamlining financial data and analysis would allow for NIMHD to carry out its mission of leading scientific research to improve minority health and reduce health disparities in the United States and its territories.

Tariq et al reported that information plays a significant role in the decision-making procedures on the operational, strategic, and tactical stages. However, the calculation and accumulation of data within enterprises are rising quickly. Big data analytics is the use of the latest statistics applied to electronic communication, including "messages, updates, images posted to social networks, readings from sensors, and GPS signals from cell phones."³ Large data analytics advances the way large quantities of data are processed. These capabilities highlight the tremendous transformation that AI can provide on an operational level, which in turn can drive health innovation in healthcare administration.

In the case of NIMHD Financial Management, the ability to process copious quantities of data from a financial standpoint can allow for attention and focus to be shifted to other aspects such as awarding contracts for groundbreaking scientific research. With this foreknowledge of the impact AI can have at an operational level within a federal public health agency such as the NIH, the impact it can have as it relates to advancing health innovation is ever growing.

One example of an AI solution being implemented that would drive health innovation and be of direct benefit to the American people would be personalization of care. Jungwirth and Haluza reported that personalization could remind individuals to get health screenings or immunizations, or provide personalized advice tailored to a user's medical history, lifestyle, and preferences.⁴ Such solutions enable users to access health information and make more informed health decisions, with multiple studies monitoring their traction in the public health sector.⁴

A second example of an AI solution would be through orthopedic surgery, particularly total hip arthroplasty (THA). More than 7 million hip and knee replacements have been performed in the United States, with the number increasing annually. Andriollo et al demonstrated that AI shows potential in advancing diagnosis and preoperative planning for orthopedic conditions, particularly hip osteoarthritis and THA.⁵ The application of AI to medical imaging, including radiographs, computed tomography, and magnetic resonance imaging, has automated and refined complex decision-making, improving diagnostic accuracy and surgical planning.⁵

A third example is AI in value-based care. With the United States spending one-fifth of its GDP on healthcare while maintaining some of the worst outcomes globally, cost, quality, and access remain central issues. Shah et al noted that AI applications can simultaneously enhance outcomes and reduce costs by improving patient agencies, simplifying health education materials, enabling personalized care through remote monitoring, and reducing unnecessary specialty referrals.⁶

Policy Implications

The policy implications of integrating artificial intelligence (AI) into federal public health agencies—alongside its rapid adoption within the private sector—are emerging within a complex regulatory and governance landscape. The current presidential administration's *Winning the Race: America's AI Action Plan* reflects a strategic emphasis on accelerating AI deployment by reducing regulatory barriers for data center construction and operation. Such deregulation aims to enhance infrastructure capacity, thereby enabling faster integration of AI technologies in both public and private domains. Furthermore, the policy prioritizes the establishment of AI Research Excellence Centers, intended to foster innovation by supporting AI entrepreneurs and advancing high-impact research initiatives.

While these measures signal strong federal support for AI-driven innovation, they also underscore the urgent need for comprehensive legislation to address the ethical, legal, and societal considerations of AI use in public health contexts. Key areas requiring policy attention include data privacy, algorithmic transparency, bias mitigation, and equitable access to AI-driven health interventions. The absence of such safeguard's risks exacerbating health disparities and undermining public trust in emerging technologies.

From a health innovation perspective, this policy direction has several important implications. First, increased federal investment in AI research and healthcare applications is likely to accelerate translational science, enhance disease surveillance, and improve precision public health strategies. Second, embedding AI into the operational workflows of federal public health agencies can strengthen data-driven decision-making, resource allocation, and rapid response

capabilities during public health emergencies. Finally, as AI becomes more deeply integrated into routine practice, public health leaders will need to balance innovation with governance—ensuring that technological advances align with ethical principles, community needs, and long-term equity goals.

Taken together, these developments reaffirm the assertion that the United States is at a pivotal inflection point. Strategic, well-regulated adoption of AI at the federal level has the potential to serve as a cornerstone for advancing health innovation, fostering scientific breakthroughs, and creating a more equitable healthcare system for future generations.

Implications for health innovation are multi-dimensional:

1. **Translational Acceleration:** Federal investment and regulatory facilitation can drive rapid incorporation of AI into disease surveillance, precision public health, and clinical research.
2. **Operational Modernization:** Embedding AI across federal public health workflows can enhance decision-making, resource allocation, and responsiveness to emergent threats.
3. **Governance and Ethics:** As AI becomes routine, leadership must ensure innovations align with ethical principles, community needs, and long-term equity—establishing systems that prevent bias and respect privacy.

Collectively, these developments reinforce that the United States is at a critical **inflection point**. Thoughtful, well-regulated AI adoption at the federal level has the capacity to catalyze scientific breakthroughs, transform public health systems, and chart a more equitable future—so long as policy design remains intentional and evidence-driven.

Conclusion

Artificial intelligence offers federal public health agencies a powerful means to modernize operations, enhance data-driven decision-making, and address complex health challenges with unprecedented precision. By embedding AI into public health strategy at the federal level, leaders can catalyze innovation, reduce disparities, and advance national health equity goals. Success will require thoughtful governance, robust stakeholder engagement, and an unwavering commitment to ethical standards—beginning with immediate action to integrate AI solutions that will shape the future of public health in the United States.

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