Request for Information to the Update of the National Artificial Intelligence Research and Development Strategic Plan: Responses

University of California, Irvine School of Medicine and UC Irvine Health

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RFI Response: National Artificial Intelligence Research and Development Strategic Plan

To whom it may concern,                           March 4<sup>th</sup> 2022

Please see below for our response on behalf of the University of California, Irvine School of Medicine and UC Irvine Health. Thank you.

Very respectfully yours,

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RFI Response: National Artificial Intelligence Research and Development Strategic Plan

Healthcare expenditures are a large and growing part of the U.S. economy reaching $4.1 trillion and 19.7% of GDP\(^1\). The basis for the increased expenditures includes health care service price and intensity, inefficiency of care delivery as well as an aging population\(^2\). Waste may be a quarter or more of healthcare expenditures but Artificial Intelligence (AI) promises to improve accuracy and speed of diagnosis as well as to guide therapy potentially reducing waste and lowering costs in one estimate by 150 billion dollars per year\(^3\). We welcome the National Artificial Intelligence Research and Development Strategic Plan and offer the below suggestions for matters relevant to biomedical and healthcare AI.

a. Develop a standardization roadmap\(^4\). Standardization is essential for safe and reliable AI performance\(^4\). Standardization should be done cautiously and may evolve over time as technologies advance. Standardization may facilitate collaborative work by standardizing vocabulary, developing ontology and defining terms for the biomedical AI community including for genetic, radiology, pathology, and other clinical uses. Developing and encouraging the use of standard file formats for data elements such as images may facilitate research and implementation. Organizations with relevant expertise such as the American Medical Informatics Association and Association for Pathology Informatics among others should be engaged. A national committee for AI standardization should work closely with international partners such as the International Organization for Standardization (ISO)\(^5\) to enhance interoperability within and across borders.

b. Develop a STEM- and AI-competent work force. Training of STEM students should begin in elementary school and continue through high school, college and graduate school. Funding university and involving private sector information technology (IT) companies in this developmental process is critical to developing an IT/AI competent-work force. Programs for females, underrepresented minorities, and first-in-family college attendees should be a part of the pipeline from childhood on. Training programs for the existing healthcare workforce should be incentivized to facilitate AI technology adoption\(^6\).

c. Fund artificial intelligence research institutes and clinical trial networks at universities and health systems. Incentives and perhaps even requirements for private industry or other public health entities to work with these academic research institutes could be created. Veterans Administration hospitals, children’s hospitals and public health departments should be included in the networks. Most clinical trials are underrepresented in terms of low income and minority patients\(^7\). Academic Medical Centers or healthcare networks with substantial underrepresented populations (e.g. Safety Net) should be prioritized in AI research and care networks.

d. Fund or subsidize low-cost scalable, redundant storage and high bandwidth data networks nationally and make it available at middle and high schools, universities and medical
schools. Robust, environmentally-friendly power sources and networks should be developed in concert with the data networks.

e. Support digitization of stained patients' histopathology slides. Millions of diseased patient tissue samples are stored as stained or immunostained glass slides that are the current standard for diagnosis and guiding therapy. These histologic slides require digitization into whole slide images for image analysis using AI. These digital images can then be analyzed together with other patient disease parameters such as sequencing data, radiologic images etc. Developing and supporting whole slide digital imaging infrastructure will facilitate research and clinical adoption of AI for diagnosis and therapy decisions⁸.

f. Develop improved models for translating AI tools and technologies into the care setting to benefit patients, including those in Safety Net. Of particular importance is adequate staffing and funding of the Food and Drug Administration (FDA) for the evaluation and approval of AI-based medical devices and technologies commensurate to their rate of growth. Mechanisms to follow, re-evaluate, or re-validate AI-infused tools periodically for safety and benefit are essential. Experts including in ethics from research universities and academic medical centers should be integrated into this process. In addition, existing laboratory inspection and accreditation mechanisms such as those provided by the College of American Pathologists may be adapted to ensure robust workflows in the clinical care setting.

References


5. https://www.iso.org/committee/6794475.html


8. https://jcp.bmj.com/content/jclinpath/74/7/409.full.pdf