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HARNESSING THE OPPORTUNITIES OF ARTIFICIAL INTELLIGENCE TO TRANSFORM THE HEALTH CARE SYSTEM

My name is Katherine Baicker, and I am Provost of the University of Chicago and a health economics researcher. I would like to thank Senator Wyden, Senator Crapo, and the Distinguished Members of the Committee for giving me the opportunity to speak today about Artificial Intelligence and Health Care. I serve on a number of boards and advisory panels but am presenting only my own views. This statement draws on several pieces I have written in this area, as well as research conducted by many others, including some on this panel.

AI holds enormous promise to improve not only the delivery of care, but the effectiveness and sustainability of the health care system.[1] In addition to improving the quality of care for individual patients, AI can also help us refine the way we pay for health care, focusing resources on patients who would benefit the most. Traditional economics would suggest that payments for health care are the key driver of utilization and value. But it is clear that more nuanced tools are needed. AI tools can improve both clinical decision-making and health care financing.

Of course, AI's promise will only be realized with sufficient large-scale investments and with safeguards to mitigate potential risks. For patient care, AI provides a set of tools to better determine the best course of treatment – but, like other tools, they require rigorous testing in relevant context to judge their utility. For the health care system, AI provides a potentially transformational avenue to support sustainable investment in long-term population health – but requires public policy guardrails to ensure that all patients can benefit.

AI Tools to Improve Decision-Making and Quality

Improving the quality of care that patients receive is not just about increasing access to new and existing therapies. There is ample evidence that our health care system has both overuse and underuse of care, leading to worse patient outcomes and unnecessary financial strain. AI tools can help clinicians do better—not just do more or do less. A recent study, for example, deployed a machine learning algorithm to examine how doctors test for acute coronary syndromes (ACS) in the emergency department (ED), and found both overtesting of patients with very low risk (who were extremely unlikely to benefit from the test) and undertesting of patients at high risk

[1] I focus here primarily on the use of predictive AI, though of course there are many opportunities and challenges with the emerging use of generative AI.

(for whom the test would have had high potential to avert severe harms to health).[2] Reallocating low-value tests to high-risk untested patients could save lives and be extremely cost-effective across a range of care.[3] A study of CT pulmonary angiography in national ED visits found similarly large-scale overuse and underuse.[4] Another study showed that variation in radiologists' diagnostic skill drove over- and underdiagnosis of pneumonia.[5]

AI offers the opportunity to draw in much more information than physicians alone can. In the study of ACS above, researchers found that physicians often focus on a small number of salient variables. Machine learning algorithms can use a much broader set of information to capture the richness of individual patients' histories and conditions. Much of the opportunity lies in bringing together multiple types of data and being able to merge data across silos. Public policy is important here, both because there are limited private incentives to collect and share data that might improve care and because there are real and serious risks to patient privacy and data security. The right information infrastructure with safeguards can not only enable the generation of algorithms to assist clinicians in delivering the right care to their patients but can accelerate discovery of new treatments and modes of care.

But algorithms must supplement, not replace, physicians in care decisions. Physicians can draw in information that algorithms alone can't, including the results of real-time patient exams.[6] It is crucial that algorithms be tested and validated in relevant contexts, just like any other medical intervention.[7] The way that information is presented to physicians and integrated into the clinical flow is crucial to improving patient care. And the value that the tools generate should be assessed in terms of real-world improvements in patient outcomes and the efficiency of the resources used. Similarly, algorithms can perpetuate biases present in the care patterns captured in the data used to train the algorithm.[8] Interrogating the context from which the new information is drawn and the setting in which it will be deployed is crucial to ensuring that incorporating the information benefits all patients.

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[3] Baicker, K and Obermeyer, Z. Overuse and Underuse of Health Care: New Insights from Economics and Machine Learning, JAMA Health Forum, 3(2), Feb 17, 2022
[4] Abaluck J, Agha L, Kabrhel C, Raja A, Venkatesh A. The Determinants of Productivity in Medical Testing: Intensity and Allocation of Care. American Economic Review. 2016;106(12):3730-3764.
[5] Chan DC, Gentzkow M, Yu C. Selection with Variation in Diagnostic Skill: Evidence from Radiologists. The Quarterly Journal of Economics. Vol 137 no 2, 2022.
[6] Agarwal, Moehring, Rajpurkar, and Salz. Combining Human Expertise with Artificial Intelligence: Experimental Evidence from Radiology. NBER Working Paper No. 31422, July 2023
[7] Shah, Halamka, et al. A Nationwide Network of Health AI Assurance Laboratories. JAMA. 2024;331(3):245-249.
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Improving Delivery and Access at Scale

In addition to improving the quality of care, AI can also help us refine the way we pay for health care, focusing resources on patients who would benefit the most. Economics suggests that payments for health care are the key driver of overuse and underuse – that we see overuse when we pay too much, and underuse when we pay too little. But the fact that we often see both overuse and underuse in the same payment system indicates that more nuanced tools are needed. Aligning payments with the health value that they produce for patients can foster higher-value use of care and minimize spending on care of questionable benefit.[9] AI can enhance our ability to design and implement value-based insurance and innovative payment systems.[10,11]

Of course, coverage of high-value treatments does not necessarily reduce spending. Some treatments, such as childhood immunization and counseling adults about low-dose aspirin to prevent coronary heart disease, may improve health and save money; but most high-value treatments that are highly cost-effective still increase spending.[12] AI can improve our ability to target treatments to the patients who are most likely to benefit from them, allowing coverage of more treatments while promoting affordability of premiums and sustainability of public programs.[13] Using predictive AI to help identify the patients with the greatest likely benefits can also be a tool to better target insurance coverage expansions.[14]

Improving individual patient care and affordability is in itself of enormous benefit, but AI also opens up new opportunities at broader scale, unlocking potential innovation in population health management.[15] In our system, payment for care through insurance coverage is a key driver of health care innovation. Insurance plans have latitude about what care they cover, subject to regulation. Enrollees exert some pressure to cover care that they value, but they may not be able to discern the generosity or quality of coverage until they are sick and need specialized care, and the health benefits of preventive care or disease management may not be evident for many years – which may make plans with less coverage and commensurately lower premiums more

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[12] Neumann PJ, Cohen JT. Cost savings and cost-effectiveness of clinical preventive care. Synth Proj Res Synth Rep. 2009;(18):48508.
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[14] Goto, Inoue, Osawa, Baicker, Fleming, Tsugawa. Machine Learning Detects Heterogeneous Effects of Medicaid Coverage on Depression, American Journal of Epidemiology, forthcoming.
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appealing, affecting health as well as costs.[16] Similarly, employers choosing which plans to offer employees are less likely to internalize the benefits of long-term health because of employee turnover, reducing the incentives to offer plans that invest in care that may only generate improved health (and potentially lower costs) many years later.

AI offers a new way to counteract this disconnect by using better predictions to incentivize coverage of care that improves patient outcomes in the long run. Machine learning applied to data spanning imaging, bloodwork, longitudinal health care use, diagnoses, and more can provide much better information about how future health risks and health care needs are likely to evolve at the individual and population levels. This information can be used to shape payments to insurers, paying more to those who improve future health prospects for their enrollees and less to those who don't. "Risk adjustment" is already a vital mechanism for mitigating insurers' incentives to enroll only the healthiest patients. Similarly, AI-informed risk adjustment applied to the outcomes that matter most for patients could mitigate insurers' incentives to limit coverage of treatments with short-term costs and long-term health benefits, as well as provide additional information about the quality of care.[17] This would improve access to beneficial care and also foster medical innovation. The absence of better real-time measures of health risk improvement has hindered the development of novel disease management, for example. The development of new health markers through machine learning could unlock new markets for disease management – and thus new modes of addressing serious chronic health conditions.

Predictive AI thus offers much promise at the individual and system level to drive medical innovation, increase the quality of care, and improve patient outcomes – and do so in a way that maintains access and affordability through a focus on high-value use. But that potential hinges on investment in shared data infrastructure and, crucially, on the development of systems of patient protections and algorithm testing and validation that engender trust and ensure broad and equitable patient benefits.

I thank you again for this opportunity and look forward to answering any questions you may have.

Sincerely,

Katherine Baicker

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[17] Obermeyer, Powers, Vogeli, and Mullainathan. Op cit.