

The Use Of Artificial Intelligence And Smart Technology Tools In Health Care: A Public Deliberation



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WELCOME!

Thank you for participating in our public deliberation about artificial intelligence (AI) and smart technology in healthcare. We hope to hear from you:

- What are your hopes and concerns about the use of AI in healthcare?
- What are the key pieces of information that the public needs to know about the use of AI in healthcare?



What is a Public Deliberation?

Public deliberation is a community discussion that brings people into the process of making decisions or solving problems that affect them. In the deliberation, we work together to understand the challenging issues and consider different perspectives. For this project, we will discuss the use of AI in healthcare.

Deliberation Overview

During the deliberation, you will hear about the use of AI tools in healthcare from experts in this area. *You are not expected to be an expert*, but we would like you to bring your opinions, values, and ideas to the conversation. You will work with other participants to make recommendations that can shape policies and best practices for the use of AI in healthcare.

WHAT IS ARTIFICIAL INTELLIGENCE?

Artificial intelligence, or AI, uses large amounts of data to process information, to make predictions, automate processes, or help people make decisions. AI is used in many aspects of life - it is used in “smart” technologies or smart devices like Siri, Alexa, or GPS navigation in your car or on your phone. Stores use AI to see what you buy, and then send you coupons or advertisements.



HOW IS AI USED IN HEALTHCARE?

AI tools in healthcare have clinical uses, administrative uses, or personal uses.

In **clinical care**, AI tools may:

- Predict your chance of developing a disease
- Read images to detect cancer or other diseases
- Recommend treatments
- Help diagnose diseases
- Be used in monitoring devices like insulin pumps or heart pacemakers

AI can also have **administrative uses** in healthcare. AI tools may:

- Help scheduling patient appointments
- Transcribe doctor visit notes
- Automate medical billing
- Draft email communications to patient
- Manage inventory of medicines and medical supplies

There are also **personal uses** of AI tools for health. For example, apps on smart phones or smart watches can:

- Track medications
- Send health alerts
- Monitor your heart rate, exercise, or sleep pattern



Clinical use: monitoring insulin pump



Administrative use: managing medical supply inventory



Personal use: monitoring heart rate and exercise

HOW ARE AI TOOLS MADE?

AI tools are created by training computers to recognize patterns in large amounts of data, like images or text. The computer is given many examples, tested on how well it performs, and then given feedback so that it can improve. As the computer learns from more data, it gets better at tasks like understanding human language or recognizing objects in pictures.



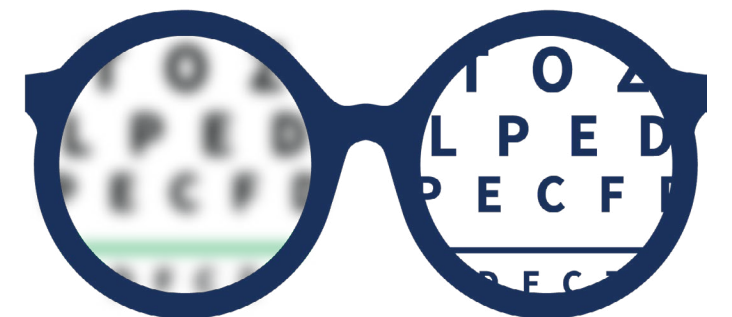
A programmer writing code on a computer

For instance, an AI tool can be used to diagnose diabetic retinopathy, a condition where high blood sugar damages blood vessels in the eye. The AI tool is developed and tested using datasets with thousands of pictures of eyes that have already been labeled as healthy (“negative” for the disease) or unhealthy (“positive” for the disease).



After the tool has been tested, a doctor can input a new picture of an eye from a patient who needs a diagnosis. The AI tool will provide an answer about whether diabetic retinopathy is present based on what it learned from the original dataset of images.

The AI tool will continue to use data from images, patient diagnoses, and outcomes to improve how accurate it is over time.



WHAT TYPES OF DATA DO AI TOOLS USE?

In general, having more data helps AI tools to make more accurate predictions. The specific types of data an AI tool may use depends on its particular purpose.

For instance, suppose your health system wants to develop an AI tool that better predicts patient risk of throat cancer in order to improve treatments for people with high risk of cancer. The tool may use information about:

Lifestyle / behavior	Medical History	Social Determinants of Health
<ul style="list-style-type: none"> • Recreational drug use • Alcohol • Smoking status • Diet and nutrition • Physical activity 	<ul style="list-style-type: none"> • History of sexually transmitted disease • Family history of cancer • Personal history of cancer • Genetic information • Immunization record • Lab tests • Prescription drugs • Weight • Height • Personal history of cancer • Other health problems 	<ul style="list-style-type: none"> • Zip code • Transportation insecurity • Food insecurity • Income insecurity • Employment insecurity • Personal safety • Environmental exposures • Work history
Demographics		
<ul style="list-style-type: none"> • Sex • Age • Race • Ethnicity • Disability status 		

USE CASE: OLIVIA TAN



Meet Olivia Tan

- 61-year-old Asian American woman
- Smokes cigarettes
- Family history of lung cancer on her father's side
- Generally healthy
- Gets a chest scan because she smokes and has a family history of lung cancer

AI tools

- AI is used to send Olivia reminders about her chest scan appointment
- Her chest scan is read by an AI tool that predicts whether lung spots are cancer or not
- An app on her smart phone detects poor air quality

Next steps

- Olivia Tan's doctor refers her to a pulmonologist (lung specialist)
- The specialist orders more scans and a biopsy (tissue sample)
- Olivia is advised to stop smoking and gets automated check-up reminders
- She turns on air quality alerts on her phone and wears a mask on poor air quality days

DO AI TOOLS WORK?

Yes — and no. AI tools are powerful and process a lot of data. Sometimes the predictions they make are very accurate but sometimes they don't work as well. One common reason AI tools don't work very well is that the data available to make the tool is incomplete. Let's look at an example:

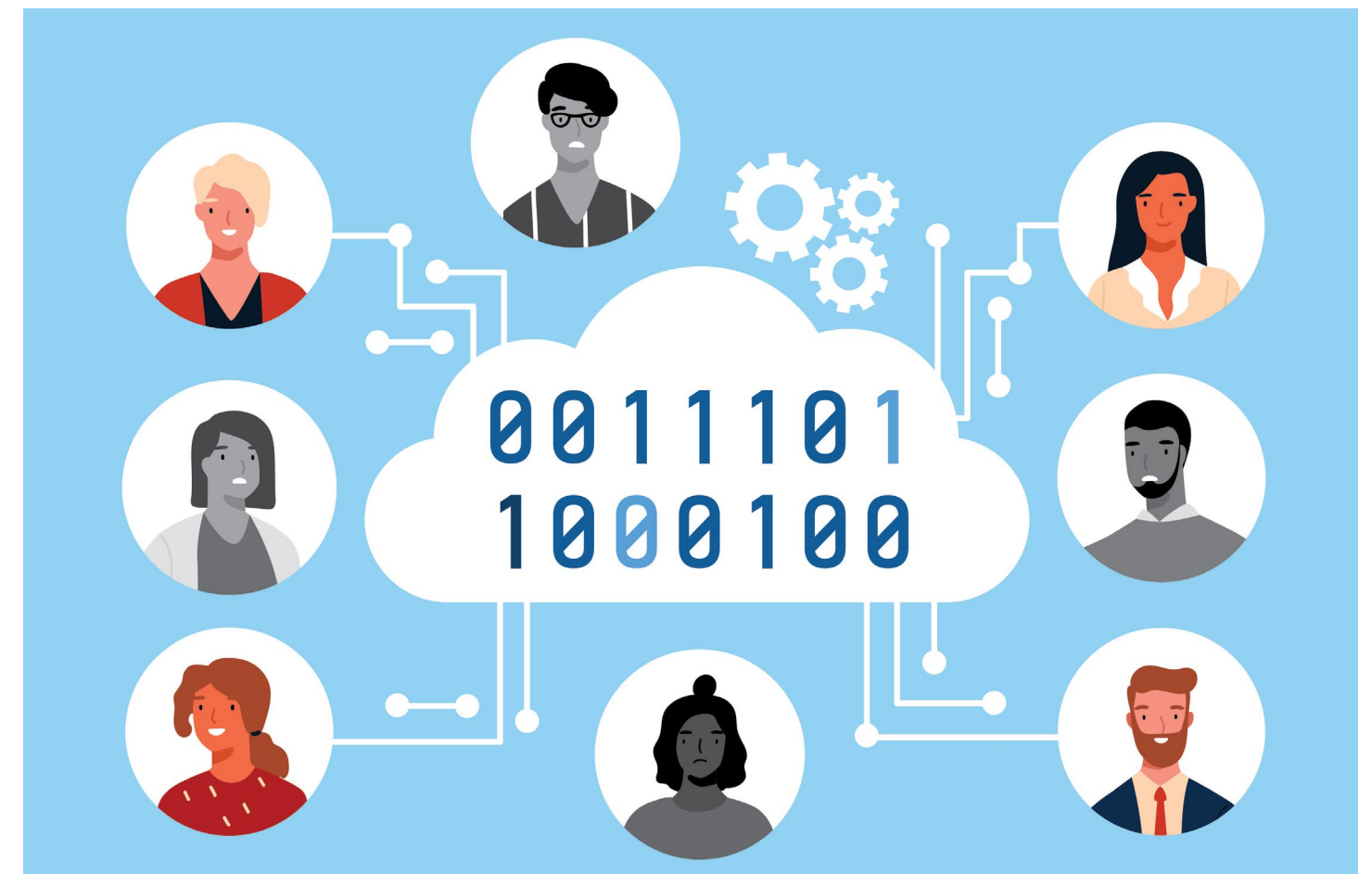


This is Chris, Alicia, and Frederick. They all arrive at their health system on the same day, aren't feeling very well, and have a spot on the back of their hand that wasn't there 6 weeks ago. Their doctors order biopsies and imaging tests as quickly as possible.



It turns out they all have a similar kind of skin cancer and the same AI tools are used to help diagnose them, but they have different experiences. For Chris, his cancer is detected right away using AI to interpret his imaging results. Alicia's results indicate her cancer might be treatable with a new, but expensive, treatment. But Frederick doesn't get a clear result.

The AI program that detected Chris and Alicia's cancer didn't work for Frederick because it had not been trained with data from enough black patients like Frederick. The AI program gave his provider inconclusive results, so Frederick was told to "just wait and see." His care was delayed, and he didn't get treatment as quickly as Chris and Alicia. Just like with human decision making, there is uncertainty and mistakes can happen when using AI tools.



AI improves faster and is more accurate when it includes information about all kinds of people. If some people are left out because they and others like them are not included in the healthcare system or the data used to train a program, AI tools will not work as well for them or the communities they belong to.

WHO USES AI TOOLS IN HEALTHCARE?

Who

How do they use AI?

Healthcare Providers

- Reading X-rays and other images
- Diagnosing diseases
- Recommending treatments
- Predicting health needs of individual patients
- Developing personalized treatment plans

Hospitals

- Automated appointment scheduling
- Generating discharge summaries
- Drafting emails to patients
- Billing and insurance claim processing
- Predicting future hospital admission

Medical Device Companies

- Insulin pumps
- Monitors (heart, oxygen)
- Robotic surgical assistants
- Medication dispensing

Researchers

- Identifying new treatments and interventions
- Understanding the causes of disease

Insurance companies

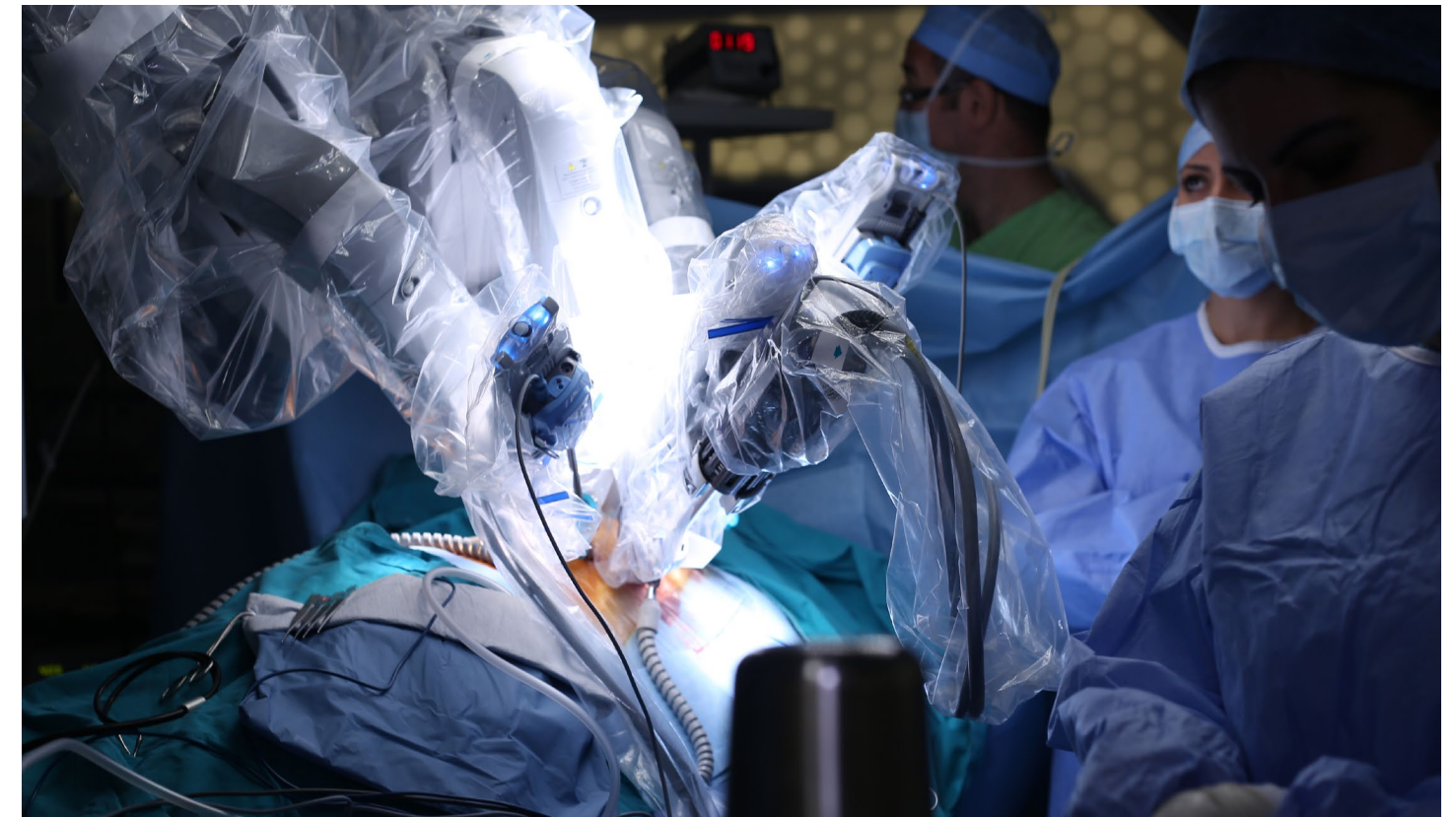
- Predicting healthcare needs
- Predicting future costs

Pharmaceutical Companies

- Drug discovery and development
- Clinical trial optimization



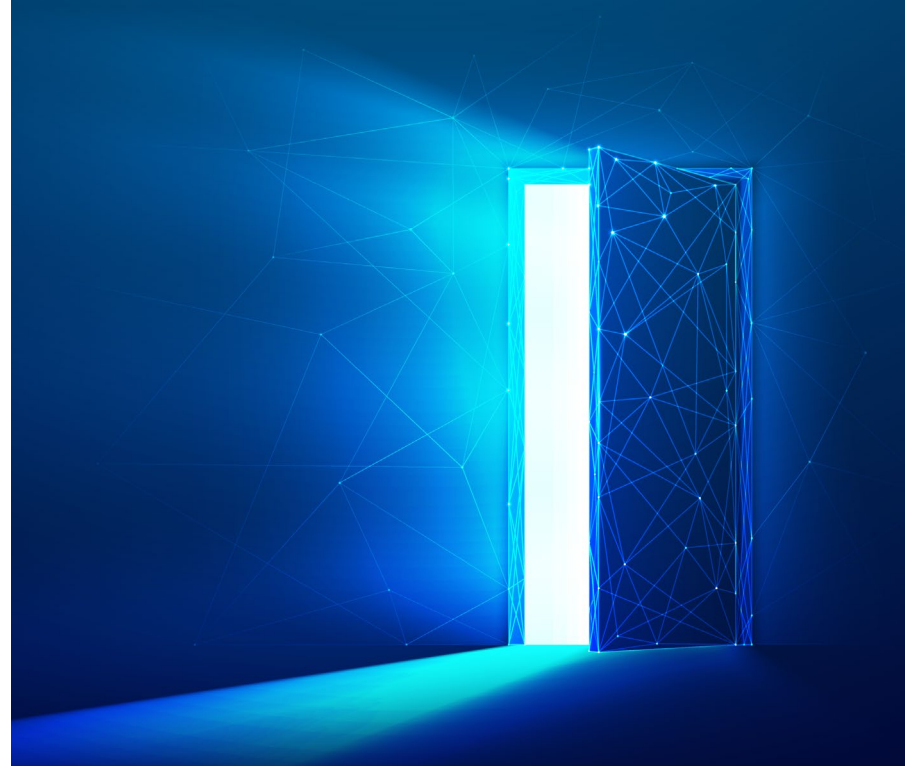
A healthcare provider using AI to assist in reading X-rays and other images.



A robotic surgical assistant uses AI to sew stitches.

CAUSE FOR HOPE OR CONCERN?

The use of AI tools in healthcare has both benefits and risks. For example, the large amounts of data used by AI makes AI tools more accurate, but it also raises concerns about privacy. Here we present some of the ethical issues related to the use of AI tools in healthcare.



FAIRNESS

AI tools may not work as well for less represented groups, leading to concerns about bias.



We should use AI tools, even if they don't work for everyone. The benefits far outweigh the risks.



My community is always the last to benefit from these kinds of technologies. Why would I expect AI to be any different?

TRUST AND TRANSPARENCY

Patients may not know that AI is being used in healthcare. Patients may want to know where to get assistance if an AI tool doesn't work.

WILL I STILL BE ABLE TO RELY ON MY DOCTOR?

AI may help doctors do their jobs more effectively. However, doctors and clinics using AI may become too dependent on the technology.



I'd just like to know if AI technology is being used in my healthcare.



AI is everywhere these days. Why is healthcare any different? I don't really feel I need to know the details.



Will my doctor still be making decisions about my care? Who do I call if there's a problem?



AI can do the work of many people. It will make things easier and a lot more efficient.

WHO BENEFITS?

Using AI technology in healthcare is expensive and not all people or healthcare organizations will have access to high quality tools.



AI is a cool technology, but it will never really benefit me or my community.



AI tools will be able to help everyone eventually. We need to start somewhere.

OVERSIGHT

As AI is used more in healthcare, there is a need for appropriate oversight to make sure that the technology is used safely, effectively, and ethically.



Who is responsible if something goes wrong? If the technology is wrong, is it like malpractice?



Technology is about innovation. Too many rules will just get in the way.

PRIVACY AND SECURITY

AI needs lots of data to work well. This data often comes from and goes to public agencies, private companies or other organizations outside of the healthcare system. While security measures are taken to safeguard the data, there remains a risk that data can be hacked or systems breakdown.



Our data is everywhere. I expect healthcare systems to be careful, but privacy risks are just part of life.



I am not comfortable with my personal information being used to develop AI tools.

WHERE IS THIS HEADED?



“AI is technology, like any other piece of technology that has benefited us – drugs, cars, planes – AI needs guardrails so we can be protected from the worst failures, while still benefiting from the progress AI offers.”

– March 8, 2023, U.S. Senate hearing

As AI continues to be used in healthcare, new laws and protections are being discussed. These include:

- Requiring companies and health systems to disclose how they use AI
- Holding AI developers to a code of conduct, like the Hippocratic oath (“do no harm”) for physicians
- Mandating testing for safety and effectiveness prior to use
- Embedding warnings or not allowing the use of AI tools trained on incomplete data
- Requiring audits to ensure that the AI tools are safe and effective when used in real-world settings (post-market surveillance)



WHAT DOES THE PUBLIC NEED TO KNOW?

In 2022, the White House Office of Science and Technology Policy issued “The Blueprint for an AI Bill of Rights.” This document provides guidance on how to protect people when AI is used in healthcare.

One way to tell patients about AI protections is by using labels. For example, nutrition labels on food have been around for decades. They provide information about ingredients, serving sizes, calories, and other nutritional content so people can choose what to buy. Drug labels on medications indicate dosage, expected side effects, refills, and expiration dates.

An AI label could communicate information about what the tool does, the quality of the tool, and how it impacts the patient’s care.



Nutrition label



Drug facts

AI that follows the recommendations in the AI Bill of Rights, might include a label that displays information that answers some of the following questions:



Does the AI tool meet industry standards for safety & effectiveness?



Can I opt out?



Does the AI tool improve health?



Who developed the AI tool?



Does the AI tool work for all patients regardless of gender, race, ethnicity, age, or disability status?



Who can I talk to if I have questions?



How is my privacy is protected?



Who is responsible for the quality of the AI tool?



How will I be notified?



How is the AI tool used in my care?

GLOSSARY OF TERMS

Administrative data

Data collected in the course of providing and/or paying for services (e.g. hospital admissions, physician payment information).

Algorithm

A rule, set of rules, or procedure used for solving a problem or performing a computation.

ChatBot

A chatbot is a computer program that simulates human conversation, either written or spoken, using AI and natural language processing to answer questions and automate routine tasks.

Clinical data

Detailed information about specific aspects of persons, conditions and/or care (e.g. blood pressure, weight, lab results).

Commercial companies

A company that is organized to make a profit.

Commercialization

The sharing of health information for the purpose of making money.

De-identified data

Data where the personal identifiers of the individuals have been removed.

Electronic health record (EHR) or electronic medical record (EMR)

Health histories collected from patient visits to clinics and hospitals that can be shared electronically.

Individual-level health data

Data that are collected from individuals and that can be associated with an individual such as medical records, blood test results, exercise habits, disease risk, and prescription medicines.

Health Data

Any type of information that contains information about the health conditions of a person or group of people. “Health data” might include biospecimens (e.g., blood/tissue samples).

Health provider

A person or company that takes care of patients.

Healthcare system

An organized group of people, institutions, and resources that deliver healthcare services to meet the health needs of populations.

Informed consent

A contract agreement that is meant to ensure that research subjects and patients have made a voluntary decision to participate in research after its purpose, risks and benefits have been fully explained.

Natural Language Processing

A field of artificial intelligence that focuses on the interaction between computers and human language, enabling machines to understand, interpret, and generate human language.

Notification

The alerting of patients to uses of their health data so that they’re aware of it.

Patient Portal

A digital file of individual health data on a technology device that can be used and shared. Patients can access their health data such as recent doctor visits, medications, and lab results through the patient portal.

Private company

Any privately owned business, corporation, or enterprise.

GLOSSARY OF TERMS CONT.

Public deliberation

A community discussion that can inform policy decisions on issues that affect members of the public.

Research

The systematic investigation into and study of materials and sources to establish facts and reach new, generalizable conclusions.

Survey data

Information collected directly from and about individuals or groups.

Tracking data

Data that exists about individuals in the context of everyday life (e.g. Fitbit, web activity, GPS tracking).

CREDITS

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