



Artificial Intelligence, COVID-19, and the Future of Pandemics

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Artificial intelligence (AI) has proven of value in the COVID-19 pandemic and shows promise for mitigating future healthcare crises. During the pandemic's first wave in New York, for example, Mount Sinai Health System used an algorithm to help identify patients ready for discharge.

Pandemic applications have demonstrated AI's potential not only to lift administrative burdens, but also to give physicians back what Eric Topol, MD, founder and director of Scripps Research Translational Institute and author of *Deep Medicine*, calls "the gift of time."¹

Like any emerging technology, AI brings risk, but its promise of benefit should outweigh the probability of negative consequences—provided we remain aware of and mitigate the potential for AI-induced adverse events.

AI's Pandemic Success Limited Due to Fragmented Data

Innovation is the key to success in any crisis, and many healthcare providers have shown their ability to innovate with AI during the pandemic. For example, AI has been used to distinguish COVID-19-specific symptoms: It was a computer sifting medical records that took anosmia, loss of the sense of smell, from an anecdotal connection to an officially recognized early symptom of the virus.² This information now helps physicians distinguish COVID-19 from influenza.

However, holding back more innovation is the fragmentation of healthcare data in the U.S. Most AI applications for medicine rely on machine learning; that is, they train on historical patient data to recognize patterns. Therefore, "Everything that we're doing gets better with a lot more annotated datasets," Dr. Topol says. Unfortunately, due to our disparate systems, we don't have centralized data.³ And even if our data were centralized, researchers lack enough reliable COVID-19 data to perfect algorithms in the short term.

AI Introduces New Questions around Liability

While AI may eventually be assigned legal personhood, it is not, in fact, a person: It is a tool wielded by individual clinicians, by teams, by health systems, even multiple systems collaborating. Our current liability laws are not ready for the era of digital medicine.

AI algorithms are not perfect. Because we know that diagnostic error is already a major allegation in malpractice claims, we must ask: What happens when a patient alleges that diagnostic error occurred because a physician or physicians leaned too heavily on AI?

AI in Healthcare Can Help Mitigate Bias—or Worsen It

Machine learning is only as good as the information provided to train the machine. Models trained on partial datasets can skew toward demographics that turned up more often in the data. Already during the pandemic's first waves, multiple AI systems used to classify x-rays have been found to show racial, gender, and socioeconomic biases.

It's critical that system builders are able to explain and qualify their training data and that those who best understand AI-related system risks are the ones who influence healthcare systems or alter applications to mitigate AI-related harms.

AI Can Help Spot the Next Outbreak

More than a week before the World Health Organization (WHO) released its first warning about a novel coronavirus, the AI platform BlueDot, created in Toronto, Canada, spotted an unusual cluster of pneumonia cases in Wuhan, China. Meanwhile, at Boston Children's Hospital, the AI application Healthmap was scanning social media and news sites for signs of disease cluster, and it, too, flagged the first signs of what would become the COVID-19 outbreak—days before the WHO's first formal alert.

These innovative applications of AI in healthcare demonstrate real promise in detecting future outbreaks of new viruses early. This will allow healthcare providers and public health officials get information out sooner, reducing the load on health systems, and ultimately, saving lives.

¹ Topol E. *Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again*. New York, NY: Hachette Book Group; 2019:285.

² Cha, AE. Artificial intelligence and covid-19: Can the machines save us? *Washington Post*. Published November 1, 2020. Accessed November 9, 2020. https://www.washingtonpost.com/health/covid-19-artificial-intelligence/2020/10/30/7486db84-1485-11eb-bc10-40b25382f1be_story.html

³ Reuter E. Hundreds of AI solutions proposed for pandemic, but few are proven. *MedCity News*. Published May 28, 2020. Accessed October 19, 2020. <https://medcitynews.com/2020/05/hundreds-of-ai-solutions-proposed-for-pandemic-but-few-are-proven/>