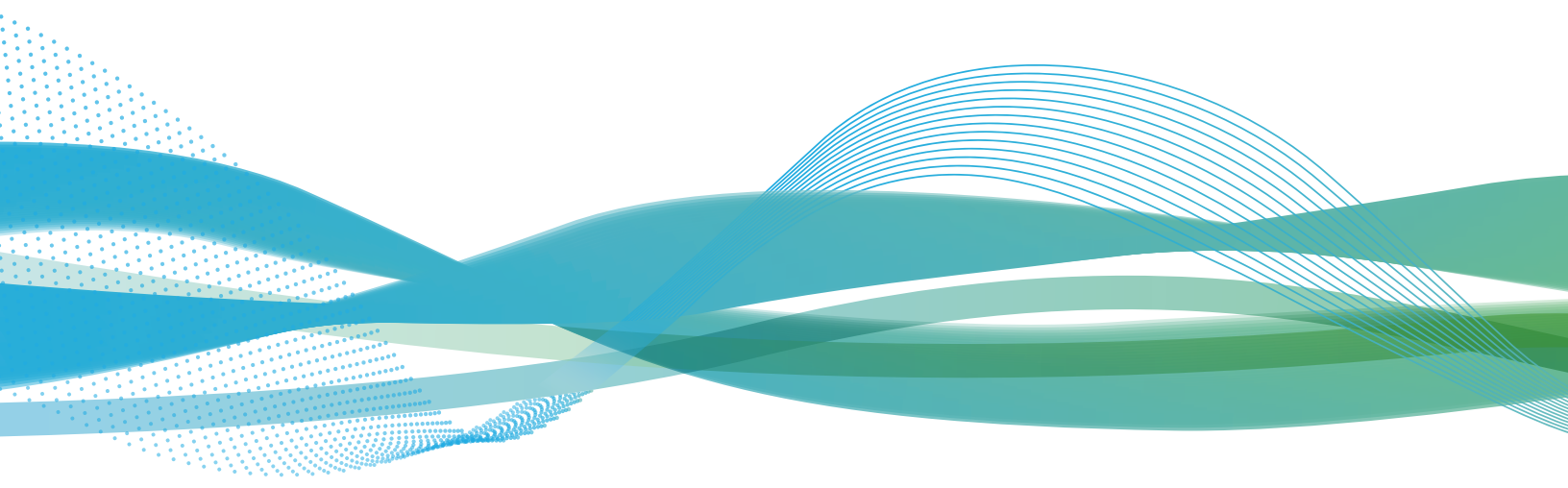


Thought Leadership Article

How artificial intelligence in diagnostics is transforming healthcare



Artificial intelligence (AI) has powerful potential within healthcare, offering the ability to analyze vast amounts of data quickly and in detail. In a field such as in vitro diagnostics (IVD), this could have transformative implications.

First, AI in diagnostics has the potential to make high quality healthcare more accessible and affordable by assisting healthcare providers to more quickly make the most appropriate treatment decisions for their patients. Second, AI could potentially transform the back office by performing otherwise tedious and time consuming administrative tasks, enabling staff to focus on those that add value, while decreasing inefficiencies and improving the use of resources.

Let's take a closer look at how AI is revolutionizing diagnostic and care pathways.

AI in diagnostics to enhance efficiency and accuracy of clinical decisions

As we move towards a digital world, the global datasphere is projected to grow:

33 zettabytes in 2018 to
175 zettabytes by 2025¹
(equal to 175 billion terabytes)

Compared to manufacturing, financial, media and entertainment industries, healthcare data is set to grow the most:

36%¹ compound annual growth rate



Given this vast amount of data being generated (including the advancement of medical knowledge), physicians today are faced with an overwhelming amount of information when working to diagnose even a single patient. AI, however, has the potential to provide healthcare professionals the ability to speed up and improve their diagnostic capabilities by helping to extract clinically-relevant insights from the wealth of information available.

The power of AI to help diagnose diseases at their early stage was recently highlighted in a study that evaluated its use to identify COVID-19 positive patients.² An AI algorithm that integrated chest computed tomography (CT) findings with clinical symptoms, exposure history and laboratory testing was shown to perform equally well in correctly identifying COVID-19 patients compared to a senior thoracic radiologist.² Additionally, the algorithm outperformed radiologists in identifying patients positive for COVID-19 via reverse transcription-polymerase chain reaction (RT-PCR) who presented with normal CT results in the early stage of disease.²

This study showed the potential of AI as a useful screening tool to aid in the quick diagnosis of infectious diseases such as COVID-19, especially when access to specialists is limited and time is of essence in order to start appropriate treatment.

AI in improving image recognition in the diagnostic work-up

AI technologies are making great strides in medical imaging. Studies have shown that the use of AI may be able to enable earlier disease detection, while also enhancing the workflows by accelerating reading time and automatically prioritizing urgent cases.^{2,3}

AI can look at vast numbers of medical images and then quickly and regularly identify patterns, including variations that humans cannot.³ This may not only help improve patient care, but also save money – earlier diagnosis and treatment of many cancers, for example, may cut treatment costs by more than 50%.⁴

There is applicability for AI systems to aid in making diagnoses based on medical imaging across many disease areas including oncology and cardiology, gastroenterology or hepatology, and neurology.⁵ This adds to the huge potential of AI to support clinical decisions in time critical situations or when there is a lack of expert knowledge available, such as in remote or poorly funded medical facilities.

Alleviating administrative and laboratory resource pressures with AI

From 1990 to 2012, the U.S. healthcare workforce grew by 75%, but 95% of that growth was in administrative roles, not physicians.⁶ There are now 10 administrators for every doctor.⁶ This rapid growth in administration is driven by increasingly complex regulations, technology and inefficiencies in the system.⁶

A slowdown in the use of technology or a relaxation of regulatory requirements are unlikely, so harnessing tools like AI-powered back office software to help offset this holds incredible value. A recent report by Accenture estimates that by 2026, AI applications that streamline the administrative workflow of healthcare organizations could lead to annual cost savings of US\$18 billion in the US alone.⁷

AI also has the potential to help address the shortage of laboratory staff/technicians that has plagued the field for years. The US Bureau of Labor Statistics estimates about 25,900 openings for clinical laboratory technologists and technicians each year, on average, between 2020 and 2030.⁸ However, less than 5000 students are graduating from accredited programs each year.⁹

While AI has incredible potential for analysis and diagnosis as discussed above, the majority of time and effort in a lab is spent on pre- and post-analytical processes.¹⁰ AI could help bring significant improvements to the workflow and operations, saving time, labor, and costs.¹⁰ Already today, our **navify** solutions leverage AI to help you drive efficiencies within your lab or point-of-care organization. Get in touch and explore how our **navify** solutions can unleash the power of the intelligent lab.

References

- ¹ Reinsel et al. (2018). Article available from <https://resources.moredirect.com/white-papers/idc-report-the-digitization-of-the-world-from-edge-to-core> [Accessed October 2021]
- ² Mei. (2020). Nature Medicine 26, 1224–1228
- ³ Pesapane. (2018). Eur Radiol Exp 2,35
- ⁴ Aboshiha et al. (2019). Article available from <https://www.bcg.com/en-ch/publications/2019/chasing-value-as-ai-transforms-health-care> [Accessed October 2021]
- ⁵ Liu et al. (2019). The Lancet Digital Health 1, E271-E297
- ⁶ Ross. (2019). HealthLine News. Article available from <https://www.healthline.com/health-news/policy-ten-administrators-for-every-one-us-doctor-092813> [Accessed October 2021]
- ⁷ Accenture Health. (2017). Report available from https://www.accenture.com/_acnmedia/PDF-49/Accenture-Health-Artificial-Intelligence.pdf [Accessed October 2021]
- ⁸ US Bureau of Labor Statistics (2021). Report available from <https://www.bls.gov/ooh/healthcare/clinical-laboratory-technologists-and-technicians.htm> [Accessed October 2021]
- ⁹ Data USA. (2021). Report available from <https://datausa.io/profile/cip/clinical-laboratory-technician> [Accessed October 2021]
- ¹⁰ Nath. (2019). Article available from <https://clpmag.com/diagnostic-technologies/anatomic-pathology/microscopy/ais-impact-on-in-vitro-diagnostics/> [Accessed October 2021]