# AI can enhance patient care by creating tailored profiles for long-COVID patients



A recent study led by researchers at the Perelman School of Medicine at the University of Pennsylvania has suggested that artificial intelligence (AI) can significantly enhance patient care by analysing data from multiple hospitals to create more tailored patient profiles. This research, published in the journal Cell Patterns, highlights the importance of understanding and addressing the specific needs of varied patient populations across different healthcare facilities in the United States.

The study focused on long-COVID patients, drawing on electronic health records from eight paediatric hospitals. By employing a machine learning technique known as "latent transfer learning," the research team managed to identify four distinct sub-populations among long-COVID patients. These groups included individuals with:

1. Mental health conditions, such as anxiety, depression, neurodevelopmental disorders, and attention deficit hyperactivity disorder.
2. Atopic and allergic chronic conditions, including asthma or allergies.
3. Non-complex chronic conditions, like vision problems or insomnia.
4. Complex chronic conditions, encompassing heart or neuromuscular disorders.

Yong Chen, PhD, who is a professor of Biostatistics and the senior author of the study, indicated the limitations of previous studies. He remarked, "Existing studies pool data from multiple hospitals but fail to consider differences in patient populations, and that limits the ability to apply findings to local decision-making." The research thus aims to provide a model that offers broad insights while allowing for precise applications within individual hospitals.

By pinpointing the distinct needs of these sub-populations, the study’s authors posited that healthcare providers could avoid a blanket treatment approach that may overlook the complexities of patients with higher risks. Qiong Wu, PhD, the study’s lead author, explained, "Without identifying these distinct subpopulations, clinicians and hospitals would likely provide a one-size-fits-all approach to follow-up care and treatment." The study highlights that patients with complex chronic conditions were found to have the most pronounced increase in hospital admissions and emergency visits.

The researchers assert that had the latent transfer learning system been deployed at the onset of the COVID-19 pandemic, it might have facilitated better resource allocation, potentially aiding hospitals in predicting the need for ICU beds, ventilators, or specialised staff. Wu noted, "This would have allowed each hospital to better anticipate needs for ICU beds, ventilators, or specialized staff-helping to balance resources between COVID-19 care and other essential services."

Looking beyond the acute crises of the pandemic, Wu also pointed out that the AI system could be beneficial in managing more common chronic conditions, such as diabetes, heart disease, and asthma, which often have varying prevalence and treatment requirements depending on regional health factors and the resources of the hospitals involved.

The team is optimistic about the practical application of their findings, suggesting that this system could be introduced at numerous hospitals with a reasonably straightforward data-sharing infrastructure. Wu stated, "By utilizing the shared findings from networked hospitals, it would allow them to gain valuable insights."

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Source: [Noah Wire Services](https://www.noahwire.com)

## Bibliography

1. <https://www.med.upenn.edu/kbjohnsonlab/ai-in-medicine/> - This source discusses the use of AI in analyzing complex datasets, including those from patient-provider interactions, which aligns with the concept of creating tailored patient profiles through data analysis.
2. <https://hms.harvard.edu/news/new-artificial-intelligence-tool-cancer> - This article highlights the versatility of AI models in healthcare, such as predicting patient outcomes and validating them across multiple patient groups, which is similar to the tailored approach mentioned in the study.
3. <https://www.eurekalert.org/news-releases/938562> - This source details the use of AI to improve care for older adults and individuals with chronic conditions, which is relevant to the study's focus on chronic conditions among long-COVID patients.
4. <https://www.cancer.gov/research/infrastructure/artificial-intelligence> - This article discusses AI applications in healthcare, including predicting patient outcomes and integrating multiple data types, which supports the study's methodology of using latent transfer learning to identify patient sub-populations.
5. <https://www.med.upenn.edu/kbjohnsonlab/ai-in-medicine/> - This source emphasizes the importance of a comprehensive repository of healthcare interactions, which is analogous to the data-sharing infrastructure mentioned for the study's AI system.
6. <https://hms.harvard.edu/news/new-artificial-intelligence-tool-cancer> - This article mentions the flexibility of AI models in performing a broad range of diagnostic tasks, similar to the study's aim to provide broad insights while allowing for precise applications within individual hospitals.
7. <https://www.eurekalert.org/news-releases/938562> - This source highlights the integration of AI with clinical data from electronic health records, which is similar to the study's use of electronic health records from multiple hospitals.
8. <https://www.cancer.gov/research/infrastructure/artificial-intelligence> - This article discusses the use of AI in predicting patient responses to treatment and managing chronic conditions, aligning with the study's focus on long-COVID patients and chronic conditions.
9. <https://www.med.upenn.edu/kbjohnsonlab/ai-in-medicine/> - This source mentions the potential of AI in optimizing clinical workflows and detecting early signs of conditions, which is relevant to the study's goal of better resource allocation and predicting hospital needs.
10. <https://hms.harvard.edu/news/new-artificial-intelligence-tool-cancer> - This article highlights the importance of validating AI models across multiple patient groups, which supports the study's approach to identifying distinct sub-populations among long-COVID patients.
11. <https://www.eurekalert.org/news-releases/938562> - This source discusses the development of AI methods to support older adults and those with chronic conditions, which aligns with the study's focus on managing chronic conditions beyond the pandemic.
12. <https://news.google.com/rss/articles/CBMixAFBVV95cUxQdXNjZUlWdU82NHJQamJmUDZGcVUwTDBORTRNM2xPLWJIbXpxbTlmbVQ2b0J5V3REWkluakJCWmlJamI4cnllLWdiWTFqNzlrOWxiS0ZUdG9rNHY5Q21aeGxkZWpzRVZwSjlhUUh4c09iSmRuaTFtbmxYdk9WQWxnbmhnUlVkeW5QeVNTUkVYMXlTT1dmdmZnR1BMRVdkbE0zWm9xdDdmdTRzTUh5alIzUGhlMEs2VlpHRjRwMFdUYVNXcDVt?oc=5&hl=en-US&gl=US&ceid=US:en> - Please view link - unable to able to access data