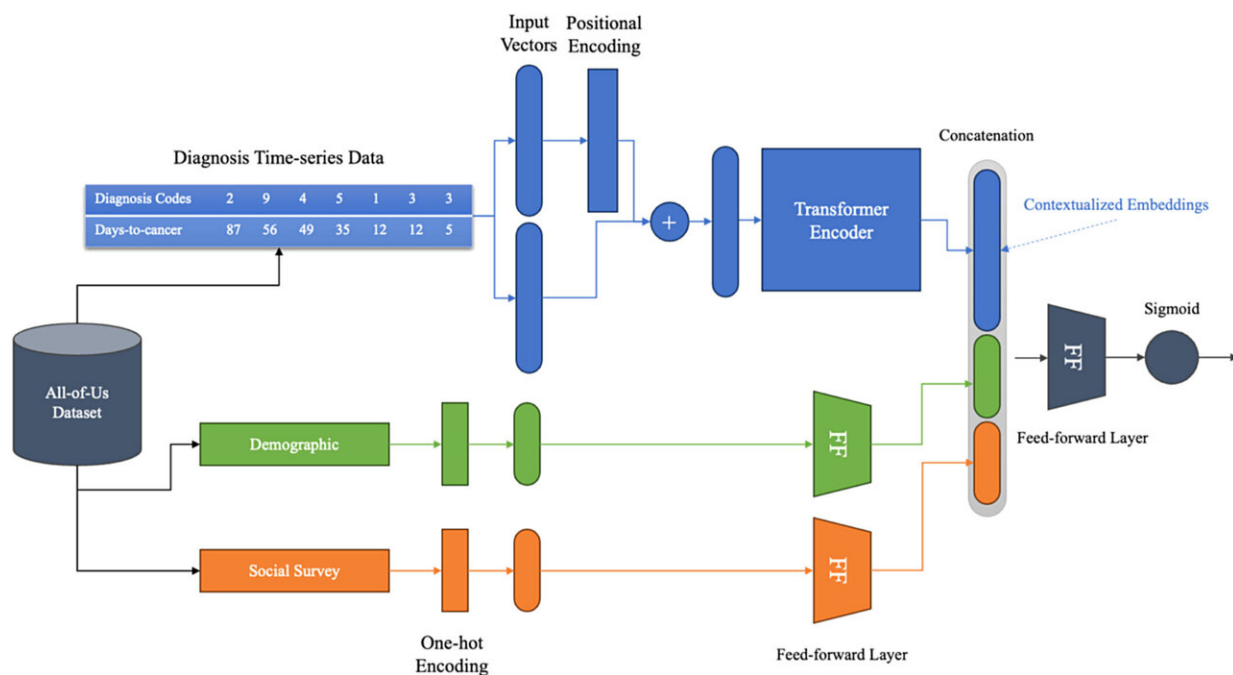# New AI tool predicts risk for chronic pain in cancer patients

July 31 2024, by Eric Hamilton

Overview of our transformer-based chronic pain prediction model: Three different data inputs are passed into dedicated encoders to generate a final vector that can be classified into a single value. Credit: *Journal of Nursing Scholarship* (2024). DOI: 10.1111/jnu.13009

A third of cancer patients face chronic pain—a debilitating condition that can dramatically reduce a person's quality of life, even if their cancer goes into remission.

Although doctors have some tools for addressing chronic pain, figuring out who is most at risk for developing it is no easy feat. But a new study, conducted by researchers at the University of Florida and other institutions, uses artificial intelligence to predict which breast cancer patients are most at risk for developing chronic pain. The predictive model could help doctors address underlying conditions that contribute to making pain chronic and ultimately lead to more effective treatments.

"We want to understand the factors that lead someone from having cancer to having chronic pain and how can we better manage these factors," said Lisiane Pruinelli, Ph.D., M.S., R.N., FAMIA, the senior author of the new study and a professor of family, community, and health systems science in the UF College of Nursing.

"Our goal is to link this information to some profile of patients so we can identify early on what patients are at risk for developing chronic pain."

The findings of the study were published on July 26 in the *Journal of Nursing Scholarship*. The authors included Pruinelli, Jung In Park, Ph.D., R.N., FAMIA, of the University of California, Irvine, and Steven Johnson, Ph.D., of the University of Minnesota.

The results showed that, when built with detailed data on more than 1,000 breast cancer patients, the AI model could correctly predict which patients would develop chronic pain more than 80% of the time. The leading factors that were associated with chronic pain included anxiety and depression, previous cancer diagnoses, and certain infections.

Implementing a model like this in doctors' offices would require integrating it into the electronic health care records systems that are now ubiquitous in clinics, which would take more research. The researchers said the rise of AI has the potential to help doctors tailor their treatments

to a patient's unique disease characteristics.

"Now with the amount of data we have, and with the use of artificial intelligence, we can actually personalize treatments based on patient needs and how they would respond to that treatment," Pruinelli said.

The study was based on the large amount of data made available by the All of Us Research Program, a nationwide research campaign from the National Institutes of Health that seeks to collect anonymized health care records from 1 million Americans.

"This wouldn't be possible if we didn't have people contributing their data," Pruinelli said.

More information: Jung In Park et al, Optimizing pain management in breast cancer care: Utilizing 'All of Us' data and deep learning to identify patients at elevated risk for chronic pain, *Journal of Nursing Scholarship* (2024). [DOI: 10.1111/jnu.13009](DOI: 10.1111/jnu.13009)

Provided by University of Florida