AI May Improve Care for Cancer Survivors After End of Treatment

By identifying cancer survivors who may need support, healthcare providers can “align supportive resources earlier and more effectively.”

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Many cancer survivors continue to experience physical and emotional symptoms after they complete treatment. Referred to as the long-term and late effects of cancer, they affect patients differently. Furthermore, it’s difficult to anticipate who is more likely to experience these symptoms or unexpected medical needs, like urgent care or emergency department visits. But that may soon change. A new study from the Sylvester Comprehensive Cancer Center, part of the University of Miami Miller School of Medicine, published in JCO Clinical Cancer Informatics found that the use of artificial intelligence (AI) to analyze patient data may help healthcare providers predict which cancer survivors at increased risk for the long-term or late effects of cancer treatment as well as unplanned healthcare use.

“This is about shifting from reactive to proactive survivorship care,” said senior study author Frank Penedo, PhD, in a Miami University press release. “If we can identify patients who are more likely to struggle, we can begin to align supportive resources earlier and more effectively.”

Long-term, or chronic, effects of cancer treatment are those that start during treatment and continue long after, while late effects of treatment are experienced months or years after treatment subsides. Long-term and late effects may include problems concerning hearing, vision, bones, joints, muscles, heart, lungs, teeth, bowel, bladder or lymph nodes. Cancer survivors also report issues with memory, focus, sleep and mood.

For this study, researchers from the Sylvester Comprehensive Cancer Center used patient-reported outcomes (PROs) and electronic health record data to identify the optimal window for AI to identify adverse survivorship. According to the National Cancer Institute, PROs include a patient’s description of their symptoms, their satisfaction with care and how a disease or treatment affects their physical or emotional well-being. PRO data are often used to provide information about side effects of a new treatment during clinical trials. In this study, the researchers used PRO data as potential indicators of future patient needs.

The study followed 25,592 cancer survivors for 36 months, tracking baseline measures, treatments, PROs and healthcare utilization (emergency room visits and hospitalizations). AI models were used to detect patterns that could have been missed otherwise, factoring in a patient's clinical history, treatments, symptoms and emotional well-being. The models were also used to identify key predictors of higher symptom burden and healthcare use.

The AI models identified crucial windows for predicting continued health problems in cancer survivors. For emergency department visits and hospitalizations, clinical activity during the most recent months were the best predictors. For higher symptom burden, full history was important. Using PROs also improved AI analyses. When researchers flagged the top 10% of highest-risk patients, they identified 51.7% of hospitalizations or emergency room visits and 46.7% of symptom burden events.

"The expertise of our multidisciplinary team provides a unique opportunity to create a data ecosystem that facilitates the implementation of AI-powered analytics to guide proactive and precision care to reduce the burden of cancer on patients and health systems. This study is among several initiatives that are working toward this goal," said Penedo.

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