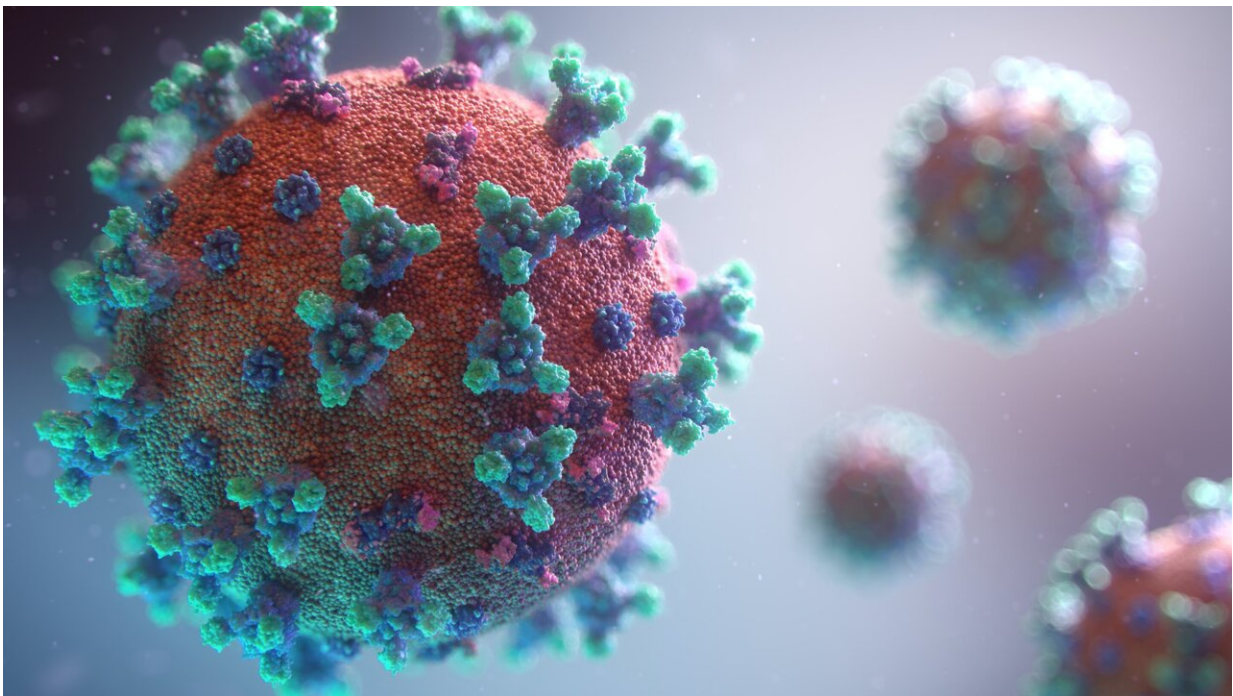


# Machine learning model finds COVID-19 risks for cancer patients

March 10 2022, by Jeremy Thomas

---



Credit: Unsplash/CC0 Public Domain

If a cancer patient tests positive for COVID-19, are they more likely to become hospitalized from the disease?

That depends on certain [risk factors](#), according to a new study by researchers at Lawrence Livermore National Laboratory (LLNL) and the University of California, San Francisco (UCSF), who looked to identify

cancer-related risks for poor outcomes from COVID-19. Analyzing one of the largest databases of patients with cancer and COVID-19, the team found previously unreported links between a rare type of cancer—as well as two cancer treatment-related drugs—and an increased risk of hospitalization from COVID-19. The findings appear in the journal *Cancer Medicine*.

"There is still a lot of fear of what the impacts are to the risk of patients with cancer and COVID-19," said LLNL principal investigator Priyadip Ray. "The key to this study was the strength of the dataset, which allowed us to look at this niche sector and was big enough to find some statistically significant cancer-related and medicine-related perspectives. These are potentially actionable items for physicians to let their patients be more aware, take more precautions or even look at alternate treatments."

Using a logistical regression approach, the team examined de-identified Electronic Health Record (EHR) data from the UC Health COVID Research Data Set (UC CORDS) on nearly a half-million patients who underwent COVID-19 testing at all 17 UC-affiliated hospitals. The dataset included nearly 50,000 patients with cancer—more than 17,000 of whom also had tested positive for COVID—and contained information on patient demographics, comorbidities, lab work, cancer types and various cancer therapies.

The researchers examined a range of factors and disease outcomes, including hospitalization, ventilation and death, and identified a higher risk from COVID-19 due to a specific group of rarer blood cancers and two medications used to treat cancer: venetoclax (used to treat leukemia) and methotrexate (an immune suppressant used in chemotherapy).

"We found that patients with cancers called myeloproliferative neoplasms or receiving specific anti-cancer treatments may be more

likely to be hospitalized after SARS-CoV-2 infection," said collaborator Daniel Kwon, an assistant clinical professor in the hematology/oncology division in UCSF's Department of Medicine. "To our knowledge, this is the first study to identify these potential risk factors. Further studies in these populations are needed."

LLNL computer scientist Jose Cadena worked with co-authors Sam Nguyen and former LLNL academic graduate appointee Ryan Chan (currently a Ph.D. student at Johns Hopkins University) on the software tools for extracting and analyzing the data stored in the UCSF system. He said having access to such a large database with detailed medical history for each patient was key to the study.

"It allows us to evaluate the potential risk of many different factors with some reasonable confidence that the findings are statistically significant and relevant to a population beyond the cohort understudy," Cadena said. "One of the reasons I joined LLNL was to conduct research that could have a national or global impact. It would be great if our findings help physicians improve care for cancer patients with COVID."

In addition to cancer-specific risks, the study examined if people with cancer have an increased risk of getting infected with COVID-19. In contrast with previous studies, the team found cancer patients among the UC cohort were less likely to contract COVID-19 than the general population, which they hypothesized could be related to patients with cancer being more likely to take precautions that decrease transmission (e.g., social distancing and mask-wearing), frequent testing practices and having lower thresholds for undergoing testing compared to patients with cancer in other regions.

Cadena said such counterintuitive findings highlight one of the challenges of using EHRs for modeling disease, where there are "numerous confounding factors that muddle the analysis and have to be

accounted for." Researchers said more investigation is needed to help explain and confirm the lower risk of COVID-19 test positivity in patients with cancer.

The team found additional risk factors for COVID-19 that have been previously reported, such as Asian and Hispanic/Latino ethnicities (which made up 36 percent of COVID-positive patients with cancer), and comorbidities like old age, coronary artery disease, chronic kidney disease, diabetes mellitus and chronic obstructive pulmonary disease, which were associated with increased risk of hospitalization and more severe disease.

The work is part of a [pilot study](#), and researchers are pursuing external funding for further examination. Ray said the team would like to add time-varying, genomic and imaging data and apply more sophisticated AI and other tools to find better ways to treat patients. Going forward, they hope to understand not only the mechanics of the disease, but how socio-economic factors such as income and insurance can play a role.

"All of us are very excited," Ray said. "When you are doing research, you don't always see things that are immediately translatable. The potential that you can immediately impact how you treat a disease, care for patients or give guidance to patients or clinicians in how they can manage their disease, is very satisfying."

**More information:** Daniel H. Kwon et al, COVID -19 outcomes in patients with cancer: Findings from the University of California health system database, *Cancer Medicine* (2022). [DOI: 10.1002/cam4.4604](https://doi.org/10.1002/cam4.4604)

Provided by Lawrence Livermore National Laboratory

Citation: Machine learning model finds COVID-19 risks for cancer patients (2022, March 10) retrieved 11 May 2024 from <https://medicalxpress.com/news/2022-03-machine-covid-cancer-patients.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.