Omega factor: Novel method measures mortality risk when multiple diseases threaten

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Researchers at the University of California, San Diego School of Medicine have developed a novel method for assessing mortality risk in elderly patients with cancer who also suffer from other serious diseases or conditions. The prognostic model, they say, is more precise and provides a more useful tool for determining the best treatments when more than one disease is involved.

The findings are published in the April 10, 2016 print edition of the *Journal of Clinical Oncology*.

With aging, increasing numbers of variables and complications affect health—and any existing treatments. An elderly person undergoing therapy for cancer, for example, might also have heart or lung disease, altering decisions about how to proceed with perhaps conflicting treatments. Doctors must weigh the risks of these so-called "competing events" to best personalize therapy.

A common approach has been to estimate patients' prognosis using survival or recurrence rates as a measure. But this approach is problematic because it is not possible to distinguish risk factors for cancer versus competing health conditions.

In other words, the authors write, current prognostic models "do not efficiently distinguish patients at risk for dying of cancer versus non-

cancer causes," possibly leading doctors to pursue ineffective or counterproductive treatments.

In the new study, researchers identified 84,319 elderly patients with non-metastatic prostate, head and neck and breast cancers from a Medicare database, then compared the standard risk-stratification strategy against a novel model that accounts for competing events to determine whether the latter provided more accurate risk assessments for different causes of mortality.

"The approach is quite different from just considering one's cancer stage, or tumor genetics, and supersedes these methods by using the same information in a different and better way, using a method called supervised machine learning," said senior author Loren K. Mell, MD, a radiation oncologist at Moores Cancer Center at UC San Diego Health and associate professor in the Department of Radiation Medicine and Applied Sciences in UC San Diego School of Medicine.

"Specifically, in this study, we tested a novel statistical approach to separate patients with high vs. low 'omega' with optimum efficiency. We found that the method we developed improves upon the standard method that has been in use since the 1950's - and the most widely used approach today - by overcoming a fundamental mathematical limitation."

The "omega factor," said Mell, is a quantitatively and qualitatively new way to assess health risks. It refers to the ratio of a patient's hazard for cancer mortality (or any cancer event) to their overall hazard for mortality. To calculate it, researchers compute values from large data sets of similar patients.

For a typical cancer patient, it puts risk in the context of his or her overall health status and predicts how likely they are to benefit from

more aggressive cancer treatment. "Every patient should know their own 'omega factor' since it might influence their and their doctor's decision-making, especially if faced with the choice of more versus less therapy."

Mell said the new method is not limited to cancer, but could be used to assess competing health risks in patients with other diseases or conditions.

More information: R. Carmona et al. Improved Method to Stratify Elderly Patients With Cancer at Risk for Competing Events, *Journal of Clinical Oncology* (2016). DOI: 10.1200/JCO.2015.65.0739

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