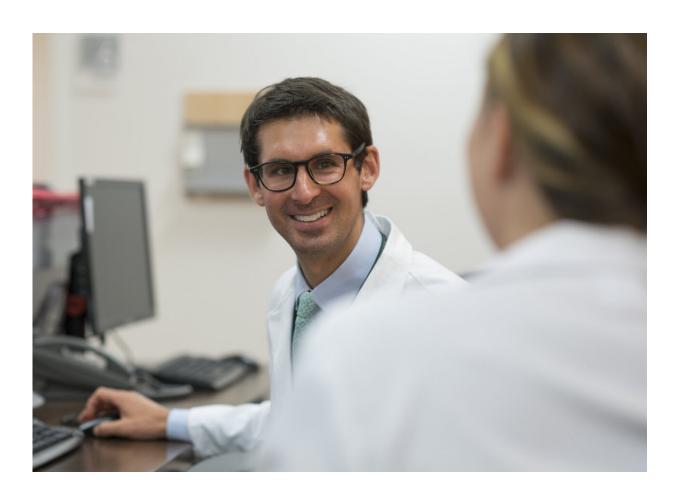# A new tool to predict delays in post-surgical radiotherapy for head and neck cancer

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Dr. Evan Graboyes and his team believe their nomogram tools will improve survival rates for head and neck cancer patients. Credit: MUSC Hollings Cancer Center

More than 65,000 Americans are diagnosed annually with head and neck cancer, which most often occurs inside the mouth and throat. For patients who undergo surgery to treat this cancer, guidelines recommend that prompt initiation of radiotherapy—within six weeks—is critical for best outcomes.

Unfortunately, delays in initiating post-operative radiotherapy (PORT) are far too common. Patients do not always understand the importance of prompt initiation of radiotherapy and may have to overcome other barriers, such as lack of social support and insurance. In addition, health care providers do not always communicate with one another or coordinate care. These avoidable delays have a negative impact on outcomes in a disease that claims almost 15,000 lives in the U.S. each year.

To ameliorate this crisis, a research team at the Medical University of South Carolina has developed and validated tools known as nomograms to help predict treatment delays in high-risk patients based on individualized risk factors. The team was led by Evan Graboyes, M.D., an assistant professor in the Department of Otolaryngology-Head & Neck Surgery at MUSC and a member of the Cancer Control Program at Hollings Cancer Center. The results of the nomogram study were reported in *JAMA Otolaryngology-Head & Neck Surgery*.

"A nomogram is a graphical representation of a mathematical model that we are using to predict how likely it is that a patient with head and neck cancer may have a treatment delay," explained Graboyes. "We hope that these nomograms can be used to identify patients at highest risk for treatment delays so that we can target interventions to them to decrease the risk of delay."

Standard-of-care treatment for patients with head and neck cancer combines surgery, radiation and chemotherapy. However, treatment

outcomes remain very poor, and only about 50% of head and neck cancer patients with advanced disease will survive after 5 years.

With the goal of improving the survival rate of patients with head and neck cancer, Graboyes and his team developed and validated two types of nomograms for predicting delays in PORT. The study examined pre- and post-surgical data from 60,766 adult patients with head and neck cancer, grouped into different cohorts.

The first nomogram is based on information available to both the clinician and patient during the surgical consultation. At this point, the patient will know whether he or she is likely going to have surgery followed by radiation therapy.

"This type of nomogram will provide a personalized estimate of the risk of delay commencing PORT and can be used to enhance counseling and guide interventions for patients with higher risks of delay," explained Graboyes.

The findings of Graboyes' study suggest that stage 4 cancer and oral cavity sites are two of the main variables associated with delayed PORT initiation. Knowing this type of information beforehand will enable patients to obtain pre-surgical dental oncologic treatment referrals and may greatly improve timely PORT introduction.

The second nomogram incorporates information from before and after surgery. According to Graboyes, this nomogram can be used by health care systems to compare their rates of PORT delay in a risk-adjusted fashion that acknowledges differences in the types of patients being treated.

In addition, the nomogram may guide quality improvement initiatives. For example, one of the key factors associated with delayed PORT was

prolonged length of stay after surgery. This information may help physicians to reduce the length of time patients stay in the hospital after surgery, eliminating one hurdle to prompt initiation of radiation treatment.

Although the two nomograms were developed in one cohort of patients and validated in a second cohort of patients with head and neck cancer from across the U.S., the study still had some key limitations. The nomogram didn't account for individual patient education, income, social support, dental disease, smoking or alcohol consumption. Therefore, more research will be needed to understand the degree to which these factors lead to delays in PORT initiation. A future study will help to address some of these limitations.

Graboyes believes that the current study will help head and neck cancer patients get the treatment they need and improve their chance of survival.

"I would love it if patients and clinicians would be able to use the nomogram website to get more precise, quantitative information about the risk of PORT delay and use it to educate patients, counsel them before treatment and communicate risk precisely," said Graboyes. "We know that getting patients timely head and neck cancer care that follows guidelines is a promising strategy to improve survival among these patients. I hope these nomograms will be a practical and useful tool as we work toward the goal of decreasing treatment delays."

Provided by Medical University of South Carolina

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