Cancer vaccine impact limited unless drug industry focuses on difficult-to-treat tumors

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Drug companies currently developing therapeutic cancer vaccines may be determining the cancers they target based on the number of annual cases, not the number of deaths they cause.

This approach may limit the patient benefits of such drugs, according to a new University of Michigan report.

Therapeutic vaccines, an alternative form of cancer treatment that may be more effective than traditional cancer therapies, are currently being tested in clinical trials around the world.

Early studies on these vaccines, which trigger patients' immune systems to attack cancer cells, have shown they may offer new hope for those suffering from difficult-to-treat cancers.

"In 2011, there were about 230 clinical trials for therapeutic vaccines targeting 13 different types of cancer," says Matthew Davis, M.D., M.A.P.P., associate professor of pediatrics, internal medicine, and public policy at the University of Michigan Health System and Gerald R. Ford School of Public Policy.

"If a cancer is more commonly diagnosed in the United States, it is significantly more likely to have therapeutic vaccines in clinical trials," Davis adds. "Focusing on annual incidence is a very common approach by drug companies in developing new therapies."

Therapeutic vaccine development should focus on cancers with higher mortality rates, creating more potential to improve patient outcomes, Davis suggests.

"The lack of a connection between therapeutic cancer vaccine development and cancer deaths means that vaccine development in this arena today may not best serve the needs of cancer patients tomorrow," Davis says. "As a primary care doctor, I would like to see innovations with therapeutic vaccines that target cancers where our current therapies are less effective than average."

Davis and co-author Elias Dayoub, a second-year medical student, emphasize that lung cancer and pancreatic cancer are two tumor types where the five-year survival is lower than average and the number of patients newly diagnosed each year is higher than average.

"Fortunately for patients, there are already some late-stage clinical trials in progress for patients with cancers of the lung and pancreas," Davis says. "Based on the typical time course for trials and licensure, if these vaccines are safe and effective, we may able to use them to help patients as early as 2020 and perhaps earlier."

The cancers with the highest number of active clinical trials worldwide in 2011 are melanoma (40), breast (34), lung (30), prostate (22), and brain (20).

The five cancers with the highest five-year mortality (estimated by the authors, based on current U.S. data) are lung (186,000), pancreas (40,000), colon (35,000), breast (21,000) and liver and bile duct (21,000), for a total of 303,000 deaths. There are currently 90 therapeutic vaccines in development against these 5 types of cancer.

In contrast, the five cancers with the most active development (146

vaccines in aggregate) target cancers with a lower five-year mortality of approximately 226,000. "This mismatch is unfortunate for patients," says Davis. "Cancers with higher mortality currently have fewer vaccines in development. For therapeutic vaccines to make the biggest difference in cancer care, development must focus more on high-mortality tumors."

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