These factors accounted for an individual's 10-year risk for developing lung cancer which ranged from a low of less than 1% to a high of 16%. The study, along with an interactive lung cancer risk prediction tool, is published in the March 19 issue of *The Journal of the National Cancer Institute*.

"The risk assessment tool should help physicians and patients balance the possible risks and benefits of screening," explained Peter Bach, M.D. of the Department of Epidemiology and Biostatistics at Memorial Sloan Kettering and the study's first author. "For example, the subjects in our study who were at the low end of risk had less than a 1% chance of getting lung cancer in the next ten years. That needs to be contrasted with the 30 to 50 percent risk that a screening CT will show some lung scar or shadow that requires further evaluation or surgical biopsy, even though it will ultimately be deemed to be harmless.

"The researchers reviewed the information from a lung cancer prevention study called the Carotene and Retinol Efficacy Trial (CARET) conducted by investigators at the Fred Hutchinson Cancer Center. This randomized, multi-center trial looked at the effect of beta-carotene and Vitamin A supplements on lung cancer prevention in 18,314 people. The subjects included 14,254 men and women aged 50 to 69 who were considered heavy smokers - defined as having smoked at least one pack per day for 20 years and who were either current smokers or had stopped smoking within 6 years prior to enrolling in the study. The remaining 4060 participants were asbestos exposed men aged 45 to 69 who were either current smokers or former smokers who quit within 15 years of enrollment. The trial was terminated in 1996 after preliminary results indicated no benefit and possible harm from the supplements among individuals who continued to smoke cigarettes.

For the new study, the data from 18,172 subjects in the CARET trial who had a history of current or former smoking were used to create a mathematical model that predicts the likelihood that an individual will be diagnosed with lung cancer within the next ten years.For the risk prediction model, the duration of smoking, average number of cigarettes smoked per day, duration of abstinence, and age turned out to be the main factors that determined the probability of an individual being diagnosed with lung cancer. Looking at examples from people undergoing lung cancer screening, a 51-year-old woman who smoked one pack per day for 29 years but stopped smoking 9 years earlier had a 0.8% (less than 1 in a 100) risk of getting lung cancer in the next ten years while a 68-year-old man who smoked two packs a day for the past 50 years and continued to smoke had a 15% (1 out of 7) chance of developing the disease in the same time period.

"Our findings suggest that accurate risk prediction may also be useful for researchers designing clinical trials of early lung cancer diagnosis," said Colin Begg , Ph.D., chairman of the Department of Epidemiology and Biostatistics at Memorial Sloan Kettering and senior author of the study. "For example, focusing on the truly high-risk individuals may allow for more effective clinical trials of lung cancer screening and prevention."

Mark G. Kris , M.D., chief of Thoracic Oncology at Memorial Sloan Kettering and one of the study's co-authors, believes the new model will be a valuable tool in assessing risk. "Using the new model, we have a much better way to predict who is at high risk for developing lung cancer and, equally important, who is at a lower risk. With more than 90 million current and former smokers in the U.S., we need an accurate way to identify those individuals at exceptionally high risk who have the most to gain from screening."

The study's co-authors include Michael W. Kattan, Ph.D., Ramsey C. Tate and Lillian J. Hsieh of Memorial Sloan Kettering; Mark D. Thornquist, Ph.D. and Matt J. Barnett, M.S. of Fred Hutchinson Cancer Research Center. The study was funded by the "Steps for Breath Fund" from The Society of Memorial Sloan Kettering and by a Public Health Service grant from the National Cancer Institute of the National Institutes of Health.

Memorial Sloan Kettering Cancer Center is the world's oldest and largest institution devoted to prevention, patient care, research and education in cancer. Our scientists and clinicians generate innovative approaches to better understand, diagnose and treat cancer. Our specialists are leaders in biomedical research and in translating the latest research to advance the standard of cancer care worldwide.

The prediction tool can be found at: /cancer-care/adult/lung/screening-decision-tool
and only applies to individuals who are older than 50 and have smoked for at least 25 years.