# NLST data highlight probability of lung cancer overdiagnosis with low-dose CT screening

9 December 2013

Data from the National Lung Cancer Screening Trial (NLST)—conducted by the American College of Radiology Imaging Network and National Cancer Institute Lung Screening Study—provided researchers the opportunity to investigate the probability that a cancer detected with screening low-dose computed tomography (LDCT) would not have progressed to become life threatening. The results of this investigation published online today in *JAMA Internal Medicine* suggest that up to 18 percent of the cancers detected by LDCT may not have progressed enough to affect patient health if left undetected.

"This is another piece of important information that helps us to better understand the benefits and risks of lung cancer screening," says the study's lead author, Edward F. Patz, Jr., M.D., a professor of radiology, and pharmacology and cancer biology at Duke University School of Medicine.

"The NLST provided encouraging data demonstrating that lung cancer screening with CT reduces death from the disease. However, there are inherent risks with any mass screening program, and this paper investigates the probability of overdiagnosis—meaning, if some patients never would have been screened for lung cancer, they would never have known they had the disease because it would never have caused symptom."

The specific negative consequences of overdiagnosis described by the authors include unnecessary invasive diagnostic procedures, treatment, morbidity (and mortality in rare cases), follow-up, cost, patient anxiety, and labeling of patients with a disease that otherwise would never have been detected.

Using NLST data, the authors determined an "upper bound to true overdiagnosis rate" because the post-screening follow-up period in NLST may not have been long enough to totally differentiate overdiagnosis from the effects of lead time—the length of time a diagnosis was moved up due to early detection by screening. The probability that any lung cancer (all types and stages) detected by screening with LDCT is an overdiagnosis was reported as 18.5 percent. The probability that an LDCT-detected non-small cell lung cancer—by far the most frequently diagnosed lung cancer type—represents an overdiagnosis was found to be 22 percent. The overdiagnosis rate for bronchioloalveolar lung cancer was 78.9 percent.

Patz explains that the problem clinicians face is not knowing which patients are among the approximate 18 percent who have indolent disease. "Patients with these nonaggressive cancers are treated the same as any other patient with lung cancer, because it is generally not possible to distinguish indolent lesions from more aggressive tumors," says Patz. The authors emphasize the need for better biomarkers and imaging techniques to determine which lung cancers are more or less aggressive so as to optimize patient care and enhance the value of screening programs.

"Overdiagnosis is something we don't commonly think exists in lung cancer as compared with, for example, prostate cancer," says Patz. "Most often, when patients are diagnosed with lung cancer, it's viewed as a fatal disease. However, these data confirm that's not necessarily the case with screening programs, which is important information for clinicians to discuss with their patients."

"The relatively modest rate of overdiagnosis with low-dose CT compared with the overdiagnosis rate projected for other cancer screenings programs, further supports the implementation of lung cancer screening programs. Of course, it's important that

we work to further drive down overdiagnosis rates across all screening programs," says Mitchell D. Schnall, M.D., Ph.D., Co-Chair of the ECOG-ACRIN Cancer Research Group and the Radiology Department Chair at the University of Pennsylvania's Perelman School of Medicine.

**More information:** *JAMA Intern Med.* Published online December 9, 2013. DOI: 10.1001/jamainternmed.2013.12738