Development and validation of absolute risk prediction models for lung cancer screening in Taiwan: synthesizing multiple data sources

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Abstract

Screening for lung cancer using low-dose computed tomography (LDCT) is a viable tool for early detection of lung cancer, which reduces mortality due to lung cancer. Because of radiation harm and cost concern, screening by LDCT should be only recommended to people with high risk. Among the methods and criteria proposed to identify high risk individuals for LDCT screening for lung cancer, absolute risk models with 6-year risk higher than 0.013, 0.0151, and 0.02 have been considered first in North America, exemplifying precision medicine practice. With these understanding, we proposed online risk calculators for smokers and never-smoking women in Taiwan based on absolute risk prediction models developed and validated without prospective cohorts. Our methods rely on datasets from a case-control design, age-specific lung cancer incidence rates in a 6-year period by sex and smoking status, a synthesized population resembling the 2010 population of Taiwan in terms of certain risk factors for lung cancer. They were derived from the Genetic Epidemiology study of Lung AdenocarCinoma (GELAC), Taiwan Cancer Registry, Cause of Death Database, Taiwan Biobank, National Health Research Insurance Research Database, Adult Smoking Behavior Survey, and population size from Ministry of Interior. In this talk, we will discuss the data synthesizing procedures, model performance, and directions for model improvement. (Part of this talk is based on Chien et al. (2020) and Chien et al. (2022))