

Smokers with newly discovered genetic markers have higher lung cancer risk

August 25 2016, by Nana Ohkawa

University of Hawai'i Cancer Center researchers have discovered new genetic markers associated with a fast rate of nicotine metabolism, which potentially leads smokers to smoke more, thereby increasing their risk for lung cancer.

Dr. Loïc Le Marchand, a professor and leading epidemiologist in the UH Cancer Center's Epidemiology Program, and his colleagues identified differences in the CYP2A6 gene that are associated with a high rate of [nicotine](#) metabolism. Smokers who have these CYP2A6 markers may smoke more cigarettes and/or inhale a greater amount of nicotine per cigarette than smokers who metabolize nicotine less rapidly, in order to maintain stable levels of nicotine in the blood.

"Smokers adjust the way they smoke to satisfy their craving for nicotine. Nicotine is the highly addictive component in cigarettes that makes people want to smoke. Smokers with the [genetic markers](#) we discovered, smoke more extensively in order to keep their nicotine levels high and achieve the desired effects of nicotine in the brain," said Dr. Le Marchand.

"This new finding could identify smokers who are at greater risk for [lung cancer](#). The knowledge of these markers will help doctors and public health leaders improve strategies for cancer prevention, a major focus of research at the UH Cancer Center. In addition, application of this research may improve the survival and quality of life of [lung cancer patients](#), since continued use of tobacco products after diagnosis is

known to correlate with poor outcomes," said Dr. Randall F. Holcombe, incoming director of the UH Cancer Center.

Smoking exposes individuals to tobacco-derived carcinogens. The increased exposure that occurs in individuals with the specific genetic markers leads to an increased risk for lung cancer, according to the study.

The Multiethnic Cohort Study

Le Marchand's findings published in *Cancer Research* used data from the UH Cancer Center's Multiethnic Cohort Study (MEC) and an international consortium of lung cancer genetic studies. Smokers are about 25 times more likely to develop lung cancer in their lifetime compared to non-smokers (Hawaii Tumor Registry). Smokers identified as being at high risk for the disease could be offered regular screenings by low-dose CT scans.

Le Marchand collaborated with University of Minnesota and University of Southern California researchers to evaluate nicotine metabolism among 2,239 [smokers](#) participating in the MEC Study.

"We were able to translate differences in lung cancer risk that we first observed among Hawai'i's ethnic groups into information that has implications for the occurrence and prevention of a common and very deadly cancer."

Lung Cancer in Hawai'i

Lung cancer remains the leading cause of cancer-related deaths in Hawai'i, with 776 new cases and 526 deaths every year. The five-year survival rate for lung cancer remains very low at 18 percent (Hawaii

Tumor Registry).

More information: Y. M. Patel et al. Novel Association of Genetic Markers Affecting CYP2A6 activity and Lung Cancer Risk, *Cancer Research* (2016). [DOI: 10.1158/0008-5472.CAN-16-0446](https://doi.org/10.1158/0008-5472.CAN-16-0446)

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