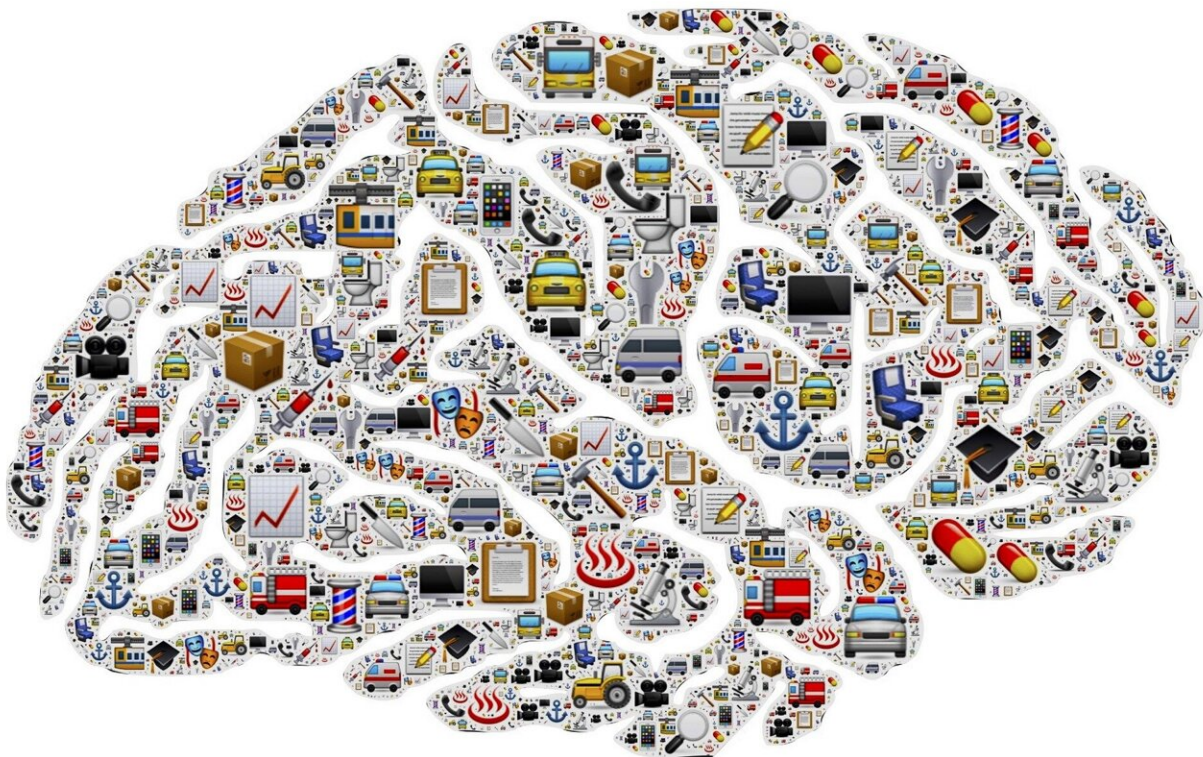


Study of 70,000 individuals links dementia to smoking and cardiovascular disease

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In the largest study of the associations between smoking and

cardiovascular disease on cognitive function, researchers at the Translational Genomics Research Institute (TGen), an affiliate of City of Hope, found both impair the ability to learn and memorize; and that the effects of smoking are more pronounced among females, while males are more impaired by cardiovascular disease.

The results appear today in the journal *Scientific Reports*.

Previous attempts to quantify cognitive function among smokers and assess [sex differences](#) produced mixed results. The TGen researchers attribute this to the limited size of previous data sets. By analyzing data representing more than 70,000 individuals worldwide—generated through TGen's online cognitive test called MindCrowd—the current study produced results that indicate definitive trends.

"These results suggest that smoking and [cardiovascular disease](#) impact verbal learning and memory throughout adulthood, starting as early as age 18," said Matt Huentelman, Ph.D., TGen Professor of Neurogenomics, a MindCrowd founder, and the study's senior author. "Smoking is associated with decreased learning and memory function in women, while cardiovascular is associated with decreased learning and memory function in men."

Besides Alzheimer's disease, the most significant cause of cognitive decline is known as "vascular contributions to cognitive impairment and dementia" or VCID, which arises from stroke and other vascular brain injuries that cause significant changes to memory, thinking and behavior: Smoking and cardiovascular disease exacerbate VCID.

"The reasons for these sex-modification effects are not entirely understood," said Candace Lewis, Ph.D., a Postdoctoral Fellow in Dr. Huentelman's Lab, and the study's lead author. "Our findings highlight the importance of considering biological sex in studying vascular

contributions to cognitive impairment and dementia."

This study's findings are important, Dr. Lewis said, since cigarette smoking is the nation's leading cause of preventable disease and death, accounting for nearly 1 in 5 deaths, and cardiovascular disease is the leading cause of disease and death worldwide, and is an important predictor of cognitive decline and VCID. Vascular diseases also are associated with increased risk of Alzheimer's, which is the nation's 6th leading cause of death.

Because the study included a wide range of adults of ages 18-85, it allowed researchers to assess the relationship between smoking, cardiovascular disease, and verbal memory in the broadest single study age range used to date.

The researchers noted that few studies have previously assessed the effects of cardiovascular disease in younger adults, and that understanding the relationship between cardiovascular [disease](#) and cognitive function in young adults may be necessary for understanding possible treatment and intervention opportunities.

"This study points out some unpredicted but important differences between the sexes relating to cognitive decline," said Brian Tiep, M.D., City of Hope director of pulmonary rehabilitation and smoking cessation. "The impact on mental acuity seems progressive over time—some more rapid than others. Living habits related to diet, exercise and smoking certainly are consequential and may differ between men and women. People undergoing cancer care may be cognitively effected by the cancer and its treatment."

"This study supports the importance of maintaining cardiovascular health and quitting [smoking](#) not only in support of their [cancer care](#) but to improve brain function," Dr. Tiep added.

More information: C. R. Lewis et al, Smoking is associated with impaired verbal learning and memory performance in women more than men, *Scientific Reports* (2021). [DOI: 10.1038/s41598-021-88923-z](https://doi.org/10.1038/s41598-021-88923-z)

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