Researchers develop a web application to analyze hypertension statistics

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A research team from Wake Forest University School of Medicine has developed an open-source, web-based application that allows users to generate customized hypertension statistics using National Health and

Nutrition Examination Survey (NHANES) data.

A description of the application and an overview of hypertension statistics for U.S. adults were recently published online in *Hypertension*

NHANES is a national survey conducted by the Centers for Disease Control and Prevention to assess the health and nutritional status of adults and children.

"Data from NHANES is valuable because it is publicly available and can be used to estimate nationally representative statistics for the U.S. population. It has also been updated in two-year cycles since 1999, which means it can show health trends over time for people in the U.S.," said Byron Jaeger, Ph.D., assistant professor of biostatistics and data science at Wake Forest University School of Medicine.

"However, to get meaningful results from NHANES data, you need to understand survey designs and need to know all kinds of extra details about NHANES, like when and why certain data were not collected or when protocols for data collection changed," Jaeger said.

To make the data more accessible, Jaeger and team developed the application to provide hypertension statistics for U.S. adults using 10 cycles of NHANES data, 1999-2000 through 2017-2020.

"The technical stuff like survey weighting, data harmonization and checking results for reliability according to CDC standards is baked into the application, which has been through a multi-step validation procedure to ensure it works," Jaeger said. "This means our users get direct access to statistics about hypertension trends in the US without needing to get a statistics degree along the way."

Within the application, users can analyze trends from more than 20 years

of NHANES data, select from more than 50 different variables related to hypertension and focus their analysis on many different subsets of U.S. adults. In total, more than 300 million unique statistics can be calculated, and the application can present these results as figures, tables or raw data files that can be downloaded and saved locally.

To demonstrate the features and capabilities of the application, Jaeger and team used it to replicate results from three prior studies and conduct their own analysis examining trends in blood pressure and hypertension in the U.S. since 1999.

They found that although blood pressure levels and hypertension declined during the early 2000s, they have slowly risen since 2013. These results suggest that monitoring blood pressure levels remains an important consideration for improving public health, as high blood pressure is a major modifiable risk factor for cardiovascular disease.

According to Jaeger, the application is open source, which means its code is publicly available and can be modified.

"While we created the application for hypertension, we made it open-source so that anyone can take our code and adapt it to work with other outcomes, such as lipids or diabetes," Jaeger said. "Many providers, policymakers and other health care professionals use statistics from NHANES, so we hope our web application can help guide policy and clinical decision-making to improve outcomes."

More information: Byron C. Jaeger et al, Hypertension Statistics for US Adults: An Open-Source Web Application for Analysis and Visualization of National Health and Nutrition Examination Survey Data, *Hypertension* (2023). DOI: 10.1161/HYPERTENSIONAHA.123.20900