



The SUD-SEM Protocol: An Observational Exploration of Headaches, Comorbidities, and Substance Use Disorders in Older U.S. Adults

Suraj Malhan, D.O., M.S.¹, Anna Lin, M.D.¹, Bernadette Siaton, M.D., M.S.^{2,4},
John Sorkin, M.D., Ph.D.^{2,4}, Beth Hogans, M.D., Ph.D.^{2,3,4}



UNIVERSITY of MARYLAND
SCHOOL OF MEDICINE

¹Department of Neurology, University of Maryland School of Medicine ²Department of Neurology, Johns Hopkins University School of Medicine
³Geriatric Research, Education, and Clinical Center (GRECC), VA Maryland Health Care System ⁴Department of Medicine, University of Maryland School of Medicine

Background

Headache and substance use disorders (SUDs) are prevalent among older U.S. adults, significantly impacting their quality of life. Despite their frequency, the complex connection between these conditions in this population remains largely unexplored.

Objective

To examine the link between SUDs and headache in older U.S. adults, utilizing structural equation modeling.

Design/Method

2017 CMS Medicare Standard Analytical 5% Sample Files was analyzed, including carrier and outpatient claims. The study population included 1.1 million older adults aged 65-100, with 12-months Part B Medicare enrollment, alive throughout 2017, and having 6 to 180 claims; Medicare Part C participants and Medicare Part B enrollees without active claims were excluded. Condition definition files were created utilizing ICD-10 codes. Frequencies, rates, and adjusted rates (logistic regression) were analyzed.

Fig 1. Population flow diagram

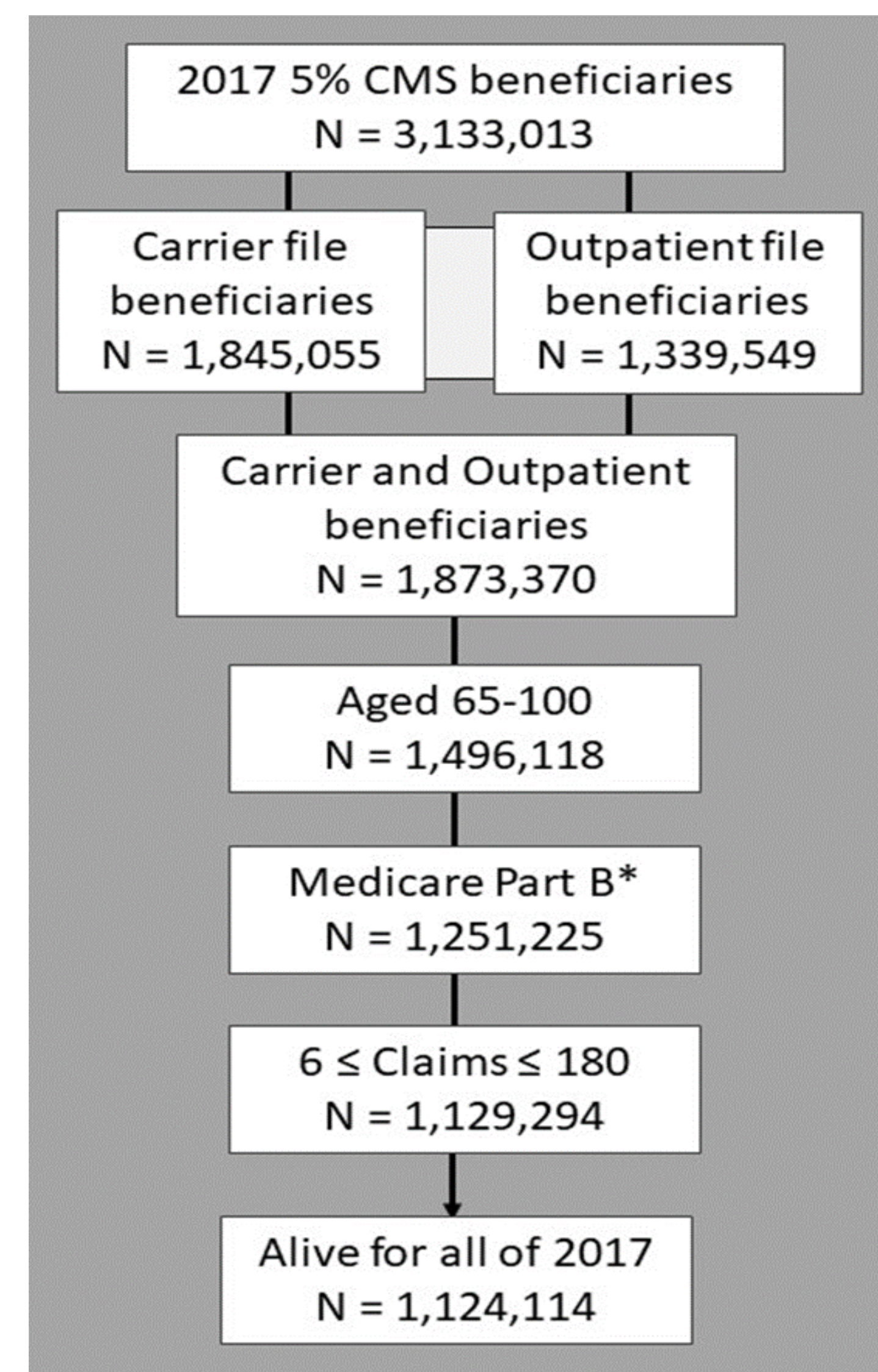
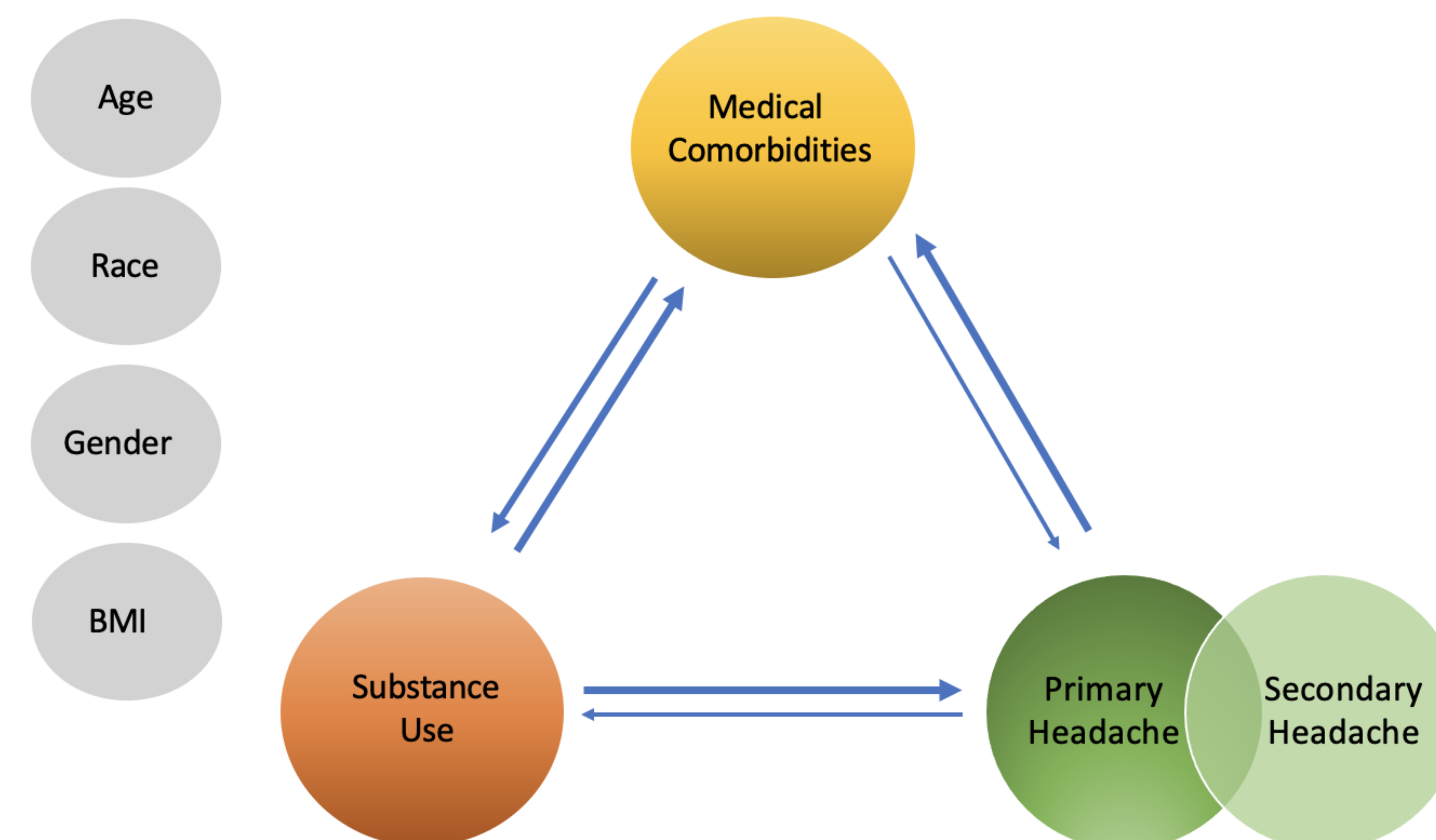


Fig 2. Headache (R51) Population

Race	Males	% Males	Females	% Females	Total
Unknown	452	0.81	432	1.78	884
White	43,900	78.73	19,398	79.93	63,298
Black	4,879	8.75	1,780	7.33	6,659
Other	422	0.76	197	0.81	619
Asian	1,920	3.44	801	3.3	2,721
Hispanic	3,866	6.93	1,517	6.25	5,383
American Indian	323	0.58	144	0.59	467
Total	55,762	100	24,269	100	80,031

Fig 3. Structural Equation Model



Results

This study explores potential relationships between demographic factors, headaches, SUDs, and comorbidities in older adults. Using SEM, we aim to assess how demographics influence headache disorders and their contribution to SUDs, while investigating the moderating role of comorbidities. By modeling these interactions, we aim to generate a comprehensive framework for understanding the multifaceted nature of headaches and SUDs, providing insights to guide future data collection and targeted interventions.

Conclusion

Structural equation models offer a statistical framework for characterizing associations, accounting for mediation and moderation through comprehensive visual and quantitative analyses. By employing SEM while considering demographic factors and comorbidities, this study provides insight into the relationships between SUDs and headache disorders, supporting hypothesis testing in observational data and enhancing research in clinical practice.