

Combination of more hospitalizations and brain pathologies linked to faster cognitive decline

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Older people who experienced more hospitalizations and also had more Alzheimer's pathology in their brain experienced the fastest rates of cognitive decline, according to study results published in the October 15 online issue of the *Annals of Neurology*.

"The association between the number of hospitalizations and the faster rate of [cognitive decline](#) was more pronounced in persons with more [tau tangles](#) in their [brain](#), one of the main signs of Alzheimer's disease. This was also true for people with signs of Lewy body disease in the neocortex," said Bryan James, Ph.D., an epidemiologist in the Rush Alzheimer's Disease Center and an associate professor in the Rush Department of Internal Medicine. "Being hospitalized is bad for your memory and thinking, and so is having Alzheimer's-related changes in your brain—but having both is extra bad."

Study compared cognition, hospitalization and brain pathology of 526 older adults

The study assessed a group of 526 [older adults](#) in the Rush Memory and Aging Project (MAP) in Chicago who were between the ages of 65.7 and 100.5 years of age and without a diagnosis of dementia at the start of the study. MAP study participants were recruited from retirement communities, social service agencies, subsidized housing facilities and churches.

They completed annual cognitive assessments and donated their brains for autopsy after death. Those autopsies determined the extent of Alzheimer's disease and a number of other dementia-related pathologies in the brains, including the tau protein tangles (deposits) and Lewy body proteins.

Information on hospitalizations was obtained from linking Medicare claims records for the years 1999-2010 to data from MAP.

A total of 1,383 hospitalizations among this group occurred over a mean of 5.1 years. The number of hospitalizations ranged from zero (for 23.1% of the people studied) to 17, and the average rate was 0.5, or one hospitalization every other year.

The innovative method of linking data sources allowed Rush researchers the opportunity to obtain hospitalization dates and other information that would not be accessible through regular survey methods. All MAP participants in this study provided consent to access their Medicare records.

People with more brain pathology and more hospitalizations had faster cognitive decline

"Notably, more pathology in the brain directly wasn't related to more hospitalizations," James said." So there was no evidence that hospitalizations were causing these pathologies or that having the pathologies led to more hospitalizations. However, we found that certain pathologies modify the relationship of hospitalization rate and cognitive decline."

The individuals with more tau protein tangles (deposits) and neocortical Lewy bodies in their brains had steeper rates of cognitive decline—as

measured by the annual cognitive assessments—as their hospitalization rates increased. "This is the first study that we are aware of to provide evidence that older adults with more Alzheimer's pathology and other dementia-related pathologies may experience worse cognitive outcomes after hospitalization," James said.

"It could mean that individuals with higher tau tangle density or Lewy bodies experience faster rates of cognitive decline compared to persons without these pathologies. Alternatively, it could mean that those with the same level of tau or Lewy body pathology who are hospitalized more will experience faster cognitive decline," James continued.

"Hospitalizations may lower an older person's resilience to negative cognitive consequences for a given level of underlying pathology. Also, the amount of [pathology](#) that exists in an older person's brain, unbeknownst to them, may determine whether that person experiences cognitive problems after being hospitalized."

More information: Bryan D. James et al, Hospitalization, Alzheimer's and Related Neuropathologies, and Cognitive Decline, *Annals of Neurology* (2019). [DOI: 10.1002/ana.25621](https://doi.org/10.1002/ana.25621)

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