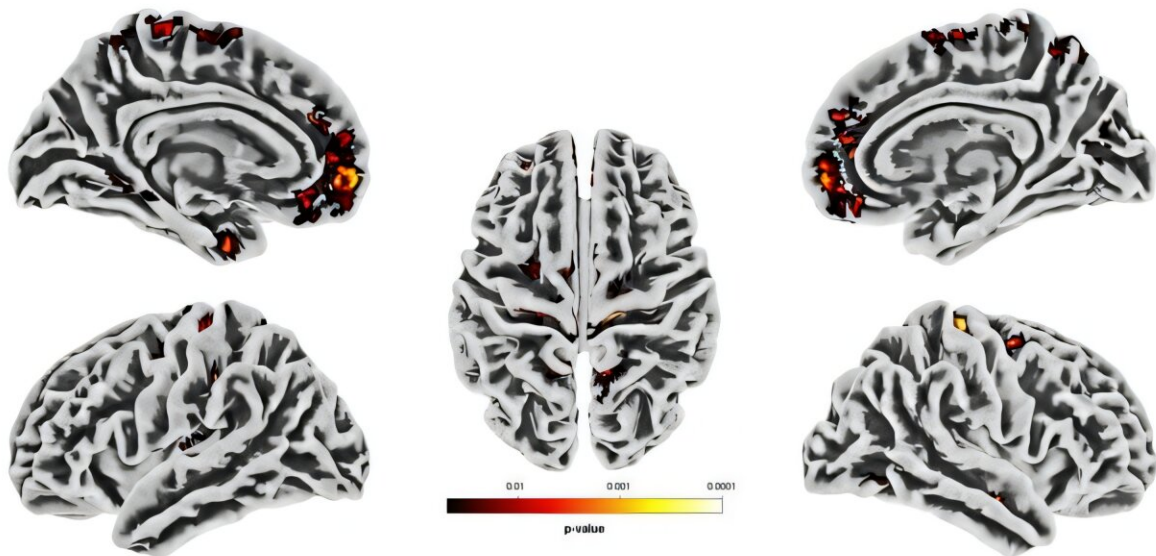


# Study provides evidence of amyloidosis in the brains of some World Trade Center responders

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These composite brain images from the study of WTC responders reveal evidence of amyloidosis. Areas shaded in red and yellow indicate regions of the brain with amyloid. Credit: Stony Brook University

Closing in on 25 years since the World Trade Center (WTC) attacks, WTC responders continue to suffer long-term effects from their exposures at Ground Zero. One issue of possible growing concern is signs of early dementia in responders. The results of a new brain imaging

study led by researchers at Stony Brook Medicine indicates a link between WTC exposure duration and the presence of amyloid in the brain.

Amyloid is a protein in the body that can form abnormal deposits in tissues and organs. These deposits can build up, cause a condition called amyloidosis, and are associated with numerous diseases, one of which is Alzheimer's disease. Many Alzheimer's patients have high levels of amyloid in areas of the brain.

This study, [published](#) in the *Journal of Alzheimer's Disease*, includes scans of the cerebrum of 35 WTC responders (26 men and nine women), with an average age of 56 years.

"The take home point with this study is that we saw from the imaging that duration of WTC exposures had a direct link to amyloid in the brain, specifically in the [olfactory cortex](#)," says Sean Clouston, Ph.D., lead author and Professor in the Department of Family, Population and Preventive Medicine in the Renaissance School of Medicine (RSOM), and in the Program of Public Health at Stony Brook University.

Clouston stressed the study showed that WTC responders who were exposed for a lengthy period of time and who did not wear masks at Ground Zero had notable evidence of amyloid in the olfactory regions of the brain.

"It is also important to emphasize that the presence of amyloid was associated with [cognitive impairment](#) in this cohort," adds Benjamin Luft, MD, co-author, the Edmund D. Pellegrino Professor of Medicine in the RSOM and Director of the Stony Brook WTC Health and Wellness Program. Nearly half of the subjects (17) showed cognitive impairment based on a standard battery of tests.

Both [positron emission tomography](#) (PET) and [magnetic resonance imaging](#) (MRI) scans were completed on the volunteer patients over three years. These patients are monitored for their health at the Stony Brook WTC Program.

WTC exposures included several inhaled exposures to [fine particulate matter](#) and air pollutants such as polycyclic aromatic hydrocarbons and dioxins.

The research team found that responders exposed to these elements via their worksites for months without a mask had a heightened burden of amyloidosis in the olfactory cortex. Additionally, when comparing non-masked to masked responders, the brain imaging also showed that high levels of amyloid in the olfactory cortex were associated with more [amyloid](#) throughout the brain.

The authors write that "amyloidosis is concerning because it implies the presence of aging-related amyloidosis at younger ages. Findings imply that exposure to air pollution may be a cause of a novel form of neuropathology in severely and chronically exposed individuals. If true, then efforts to remediate workplace exposures and protect workers might reduce the long-term burden of dementia in the population."

Clouston and colleagues point out that amyloidosis in this population may not cause Alzheimer's, though the association between cerebral amyloidosis and these conditions is strong. They hope to advance the research with larger patient cohorts and additional brain scans over time.

**More information:** Minos Kritikos et al, Exposure duration and cerebral amyloidosis in the olfactory cortex of World Trade Center responders: A positron emission tomography and magnetic resonance imaging study, *Journal of Alzheimer's Disease* (2024). [DOI: 10.1177/13872877241302350](https://doi.org/10.1177/13872877241302350)

Provided by Stony Brook University

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