Shingles Vaccine and Dementia

Charlotte Aitken-Davies ’27

A health policy enacted in Wales on September 1, 2003 may have produced the strongest case to date of a vaccine reducing the risk of dementia. A growing body of evidence suggests that the Shingles vaccine, long used to prevent painful outbreaks of herpes zoster, could also play a critical role in protecting against cognitive decline. Dementia, including its most common forms such as Alzheimer’s disease and vascular dementia, affects millions of older adults worldwide. Despite billions of dollars in research each year, effective preventative measures for the condition remain very limited. Therefore, findings regarding the potential correlation between the shingles vaccine and a lower risk of developing dementia have very important implications, not only for personal health decisions but also for public health policy.

The landmark study conducted in Wales and published in *The BMJ* in 2024 used a natural experiment based on a phased vaccine rollout—where vaccines were distributed to specific targeted age groups over time—to assess whether shingles vaccination influenced dementia risk (BMJ, 2024). The rollout, which began in 2013, targeted individuals born on or after September 2, 1933. This allowed researchers to compare outcomes in vaccinated individuals with a similar unvaccinated group just outside the eligibility cutoff. The study analyzed linked electronic health records from over 2.4 million adults aged 65 and older (PHW, 2024). After adjusting for age, sex, socioeconomic status, frailty, and prior health conditions, the study found a statistically significant 19.9% lower incidence of dementia among vaccinated individuals over a follow-up period of up to seven years (Llewellyn et al., 2024). Importantly, the reduction was more pronounced for vascular dementia than for Alzheimer’s disease with a “28% lower risk of vascular dementia” but no significantly reduced risk of Alzheimer’s disease (BMJ, 2024).

Additionally, sensitivity analyses supported similar results, suggesting that the association was not driven by confounding variables or selection bias.

A parallel study led by Oxford University researchers followed more than 280,000 individuals who had received the recombinant shingles vaccine, which is made using a genetically engineered component of the virus rather than a live or weakened form (Shingrix). The study found a 17% reduction in dementia diagnoses over six years, and on average, vaccinated individuals experienced a delay in dementia onset of 164 days (Taquet et al., 2024). The study used rigorous statistical techniques to account for confounding factors such as comorbidities (overlapping conditions) and frequency of medical consultations. These controls strengthened the study's validity by minimizing potential sources of bias and increasing the reliability of the observed association between vaccination and dementia risk.

Biological plausibility for the observed effect comes from recent discoveries regarding the herpes zoster virus and its potential role in neuroinflammation. Repeated viral activation in older adults has been proven to lead to systemic inflammation (widespread immune response that damages healthy tissues), endothelial dysfunction (impaired functioning of the blood vessel lining that affects circulation), and microvascular damage in the brain (injury to the brain's smallest blood vessels that disrupts oxygen and nutrient delivery), all of which are pathways known to contribute to vascular dementia (Eyting et al., 2025). By preventing the reactivation of the herpes zoster virus, the shingles vaccine may reduce or eliminate these recurring inflammatory episodes. The immune response elicited by vaccination may "modulate inflammatory pathways associated with cognitive decline, especially in individuals genetically predisposed to Alzheimer's or other forms of dementia" (Eyting et al., 2025). These insights suggest a promising avenue by which immune-modulating interventions might mitigate

neurodegeneration before clinical symptoms arise, potentially altering the trajectory of aging-related cognitive disorders.

Additional support for this hypothesis comes from researchers at Stanford University, who conducted molecular analyses on blood samples from vaccinated and unvaccinated older adults. Their results indicated that individuals who had received the shingles vaccine showed reduced levels of inflammatory markers known to be linked with neurodegeneration and the analysis of the marker count revealed a statistically significant association between vaccination and a lower rate of cognitive decline in aging individuals (Bai, 2025). The Stanford study also found that among participants aged 70 and older, those who received the shingles vaccine exhibited slower rates of hippocampal atrophy—the shrinking of the hippocampus, a brain region critical for memory and learning—a well-established biomarker associated with the progression of Alzheimer's disease (Bai, 2025). Inflammatory gene expression profiles further supported a protective "immunological signature" in vaccinated individuals, offering molecular insight into how reduced systemic inflammation might lead to neurological benefits (Eyting et al., 2025). These findings add a mechanistic layer to earlier population-based observations, suggesting the biological effect of the vaccine extends beyond viral suppression by potentially influencing long-term brain health at a cellular level.

The public health implications of these findings are substantial. *The New York Times* reported on these studies in April 2025, highlighting that the emerging link between shingles vaccination and dementia prevention could even "shift vaccine policy" (Belluck, 2025). While the idea of a vaccine reducing the risk of dementia was once seen as unlikely, the consistency of findings across several large cohorts is starting to change this perception. Nevertheless, the studies to date have been observational, meaning they cannot definitively establish causation.

Researchers continue to emphasize the need for randomized controlled trials to confirm the protective effect of the shingles vaccine on dementia. Despite this limitation, the consistency of findings across diverse study populations and designs makes a compelling case for further research and potentially broader vaccine adoption. With global dementia rates expected to rise sharply in the coming decades due to lifestyle changes resulting in an increase in diagnoses and a much higher average aging of the population, preventative strategies are urgently needed. Even modest reductions in dementia incidence could lead to significant health and economic benefits. If confirmed by future studies, shingles vaccination could become a central component in dementia prevention strategies worldwide.

References

Bai, N. (2025). Shingles vaccination associated with lower dementia risk, Stanford study shows https://med.stanford.edu/news/all-news/2025/03/shingles-vaccination-dementia.html

Belluck, P. (2025). Can a shingles vaccine help prevent dementia? *The New York Times*. https://www.nytimes.com/2025/04/02/health/shingles-vaccine-dementia.html

BMJ. (2024). Shingles, Zostavax vaccination and risk of developing dementia: A nested case–control study–results from the UK Biobank cohort. *BMJ Open*. https://doi.org/10.1136/bmjopen-2020-04

Eyting, M. et al. (2025). Herpes zoster vaccination and dementia: a quasi-experimental study in a national cohort. *Nature*, https://www.nature.com/articles/s41586-025-08800-x

Llewellyn, D. et al. (2024). Association between herpes zoster vaccination and incident dementia in older adults: a population-based cohort study. *BMJ*, https://www.bmj.com/content/389/bmj.r722

Medical News Today. (2024). Shingles vaccine could prevent 1 in 5 dementia cases. https://www.medicalnewstoday.com/articles/shingles-vaccine-could-prevent-1-in-5-dementia-cases

Neuroscience News. (2024). Shingles vaccine linked to lower dementia risk. https://neurosciencenews.com/shingles-vaccine-dementia-28565

Public Health Wales (PHW). (2024). Evaluation of shingles vaccination rollout and dementia incidence. https://phw.nhs.wales/topics/immunisation-and-vaccines/vaccines-professionals/shingles-information-for-health-professionals/

Taquet, M., Dercon, Q., Todd, J. A., & Harrison, P. J. (2024). The recombinant shingles vaccine

is associated with lower risk of dementia. *Nature Medicine*,

https://doi.org/10.1038/s41591-024-032