

IS ALZHEIMER'S HEREDITARY?

# Decoding DNA Risk of Alzheimer's

**W**hen people ask whether Alzheimer's is hereditary, they are often combining two distinct categories of genetic influence without actually realizing such.

**The first category is deterministic genes.** These are rare genetic mutations that virtually guarantee the development of Alzheimer's, typically before the age of 65. This form of the disease, called early-onset familial Alzheimer's, accounts for less than one percent of all Alzheimer's cases. If you do not have a strong family pattern of early-onset disease across multiple generations, this category almost certainly does not apply to you.

**The second category is risk genes.** These are far more common and work very differently. They increase the statistical probability of developing Alzheimer's but do not make it inevitable. Many Alzheimer's cases fall into this category. Having a risk gene means your odds may be higher than average. It does not mean the outcome is decided.

## Understanding APOE4

The most well-studied Alzheimer's risk gene is APOE4, a variant of the APOE gene that affects how the brain manages cholesterol and clears amyloid proteins. Everyone inherits two copies of the APOE gene, one from each parent. APOE

comes in several variants, and APOE4 is the one associated with increased Alzheimer's risk.

Inheriting one copy of APOE4 raises the lifetime risk of Alzheimer's modestly. Inheriting two copies raises it more substantially. However, the critical point is this: many people who carry one or even two copies of APOE4 never develop Alzheimer's. And many people who develop Alzheimer's do not carry APOE4 at all. The gene shifts probabilities. It does not write outcomes. APOE4 is a risk factor, not a diagnosis, and it is not a reason to assume the worst about your future.

## Other Genes and the Bigger Picture

Research has identified other genes associated with Alzheimer's risk, including TREM2 and CLU, and scientists continue to map the complex genetic makeup of the disease. But what the research also consistently shows is that genetics is only one piece of a much larger picture.

Non-genetic factors play a significant and often underestimated role. Cardiovascular health, physical activity, sleep quality, diet, social connection, and cognitive

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engagement all interact with whatever genetic risk a person carries. Some of these factors can amplify risk, while others appear to buffer it. The evidence that lifestyle choices influence brain health outcomes even in the presence of genetic risk factors is growing stronger every year.

This matters because it means that many of the inputs shaping your brain health trajectory are within your control, regardless of what your genes say.



### What Family History Actually Tells You

Having a parent or sibling with Alzheimer's statistically increases the risk of developing AD, when compared to someone without a family history. It is worth knowing, and it is worth discussing with your doctor. But it is not a reason to assume you will develop the disease.

#### If you have a family history of Alzheimer's, some useful questions to bring to your next appointment include:

- At what age did my relative develop symptoms?
- Were multiple generations affected?
- Should I be paying particular attention to any modifiable risk factors?
- Is there anything I should be monitoring over time?

Family history alone is generally not a reason to pursue genetic testing. Most guidelines suggest that genetic testing for

Alzheimer's risk is most relevant in specific circumstances, such as a strong pattern of early-onset disease in close relatives, or as part of a clinical research study. Your doctor is the best person to help you determine whether testing is appropriate for your situation.

### Before You Decide to Get Tested

Genetic testing for Alzheimer's risk is available, but it is not right for everyone, and it is not a decision to make lightly.

A positive result for APOE4 or another risk gene cannot tell you definitively whether you will develop Alzheimer's, when symptoms might appear, or how severe the disease would be. What it can do is give you information that some people find useful for planning, and that others find distressing without a clear path to action.

The emotional weight of a genetic result is real. Learning that you carry a risk variant, even one that is far from a guarantee, can affect how you think about yourself, your relationships, and your future. If you have questions or concerns, speak with your Primary Care Physician (PCP). Need help finding one? Call the Health Advocate number on your BCBSIL member ID card or log in to **Blue Access for Members<sup>SM</sup> (BAM<sup>SM</sup>)** at [bcbsil.com](https://bcbsil.com) and use the Provider Finder tool to locate in-network care.

Cook County employees can also reach out to [ComPsych EAP](#) for confidential support in processing the anxiety or uncertainty that can come with thinking through genetic risk.

[BCBSIL Resources](#) can also help you find behavioral health providers and navigate care options. Log in to your BCBSIL member portal to explore what is available to you.

Your genes are part of your story, but they are not the whole story. Knowledge about your risk, approached thoughtfully and with the right support, is a tool for living well, not a verdict about what lies ahead.

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SOURCES: [National Institute on Aging](#), [Mayo Clinic](#), [Hunsberger et al](#), [Gratuzo et al](#), [Alzheimer's Association](#)