What Is NMOSD?

Neuromyelitis optica spectrum disorder (NMOSD) is a rare and debilitating autoimmune disease of the central nervous system characterized by immune-mediated damage to the optic nerve, brain stem and spinal cord.¹,²

Role of B Cells in NMOSD

B cells play a fundamental role in NMOSD immunopathology with multiple proposed mechanisms contributing to disease pathogenesis.⁶

In NMOSD, damage is caused when CD19+-expressing B cell lymphocytes (plasmablasts and plasma cells) produce AQP4-IgG, triggering an escalating autoimmune reaction.⁵,⁷

Depletion of CD19+ B cells has an impact on the ability of the immune system to attack AQP4 channels on astrocytes and other neurons.⁵,⁷

Symptoms of Attacks and Ongoing Disability

Individuals with NMOSD often do not fully recover from attacks, and permanent disability results from accumulating damage from attacks.¹,⁸

- Visual Impairment
  - Blindness
- Pain
- Spasm
- Limb Weakness
- Sensory Disturbance
- Paralysis
- Motor Disability
- Narcolepsy
- Hiccups
- Nausea
- Vomiting
- Respiratory Issues
- Loss of Bladder/Bowel Control

Attacks have been associated with permanent motor disability in some patients.¹

At 5 years of disease onset, 41% of patients with NMOSD who are seropositive may become legally blind in at least 1 eye.³

The median age of disease onset is 40 but can range from ages 3 to 81.³

About 16,000 to 17,000 people in the United States have NMOSD.⁴

All people can be affected by NMOSD—but women may be 9 times more likely to be impacted than men.⁵

The prevalence is 2- to 3-fold higher in Black and Asian populations.³,⁵
Science Behind NMOSD

In about 75% to 80% of cases, antibodies to aquaporin-4 (AQP4) are present (“seropositive cases”). AQP4 is an important water channel protein in the central nervous system (CNS).\(^8\)

The cause in seronegative cases is less clear, but some patients have antibodies to myelin oligodendrocyte glycoprotein.\(^9\)

AQP4-IgG antibody tests can be critical for diagnosing NMOSD and the cell-based assay (CBA) is the most reliable way to detect these antibodies.\(^2,11\)

### Misdiagnosis

41% of NMOSD patients have reported an initial misdiagnosis of multiple sclerosis (MS).\(^12\) However, several factors differentiate the diseases.\(^13,14\)

<table>
<thead>
<tr>
<th>NMOSD</th>
<th>MS</th>
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<tbody>
<tr>
<td>Key symptom: severe vision impairment</td>
<td>Key symptoms: cognitive and psychological symptoms (eg, memory loss or depression)</td>
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<tr>
<td>Severe acute episodes can lead to permanent disability</td>
<td>Progressive disability caused by individual, typically mild, episodes</td>
</tr>
<tr>
<td>AQP4 antibody seropositive</td>
<td>AQP4 antibody seronegative</td>
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NMOSD and MS are treated in different ways, and early detection and treatment help ensure the best outcomes.\(^3\)

### Burden of NMOSD

Due to the cost of managing the underlying disease and the treatment of attacks, NMOSD imposes a significant financial burden on patients.\(^12\) Hospitalizations and emergency department visits also contribute significantly to the economic burden of the disease.\(^12\)

About 60% of patients report significant impact on work, activities and being able to accomplish things all or most of the time.\(^15\)

55% of people with NMOSD report fatigue, while 54%-57% have some level of cognitive impairment. Bladder and bowel problems, along with sexual dysfunction, are also common.\(^15\)

Despite the physical impairment and challenges of NMOSD, studies show that some patients demonstrate psychological resilience.\(^15\) This resilience, coupled with the changing NMOSD treatment landscape, may offer hope for the NMOSD community.