MS Brain Health

OXFORD HEALTH POLICY FORUM

# Brain health - time matters

## An emerging spectrum of related diseases

**Understanding similarities and differences of Multiple Sclerosis (MS), Neuromyelitis Optica Spectrum Disorder (NMOSD), and Myelin Oligodendrocyte Glycoprotein Antibody-Associated Disease (MOGAD).**

## MS, NMOSD and MOGAD all affect the brain, optic nerves and/or spinal cord. Although they share overlapping symptoms, they differ in cause, frequency, prognosis, and treatment needs.

Misdiagnosis remains a risk, but increased awareness is changing how we understand and manage these conditions.

| Characteristic | MS<br>MS is a common, lifelong disease in which the body's immune system attacks the cells of the central nervous system, leading to accumulating physical and cognitive disability over time.[1,2] | NMOSD<br>NMOSD is a rare autoimmune disease that primarily targets the optic nerves and spinal cord.[3] Although distinct from MS, its overlapping symptoms can delay diagnosis without specialist input.[3] | MOGAD<br>MOGAD is a newly recognised inflammatory, demyelinating disease of the CNS that shares features with MS and NMOSD, but MOGAD may follow a slower disability development over time and lower accumulation of disability following relapses.[4,5] |
|---|---|---|---|
| **CNS regions affected** | Brain, optic nerves, spinal cord[1,2] | Optic nerve, spinal cord, CNS[5,11] | Optic nerve, spinal cord, CNS[5] |
| **Cause** | Immune-mediated attack on CNS myelin[1,2] | Immune attack via AQP4 antibodies[3,5] | Immune attack via MOG antibodies[17] |
| **Typical age of Onset** | ~ 32 years[6] | 32.6 - 45.7 years[11] | ~ 30 years[17] |
| **Prevalence** | ~2.8 million globally[6] | 0.5 -10 per 100,000;[12] higher in Black and East Asian populations[12] | 1.3 - 2.5 per 100k globally[17] |
| **Sex distribution** | 2-4x more common in women[7] | Up to 9x more common in women[13] | No known sex difference[17] |
| **Symptom overlap** | Fatigue, impaired vision, numbness, stiffness, mobility issues[6,8] | Vision problems, weakness, numbness, body aches, paralysis[3,14] | Fatigue, vision problems, weakness, numbness, body/head aches, mobility issues[18] |
| **Relapse profile** | Relapses + PIRA (progression independent of relapse activity)[9] | Relapses cause worsening in most cases; ~19-22% do not experience repeated relapses.[5,15] | Periodic relapses; ~33% do not experience repeated relapses[5] |
| **Progression without relapse** | Common: PIRA/smouldering MS[9] | Less common than MS (under investigation)[15] | No: usually relapsing[19] |
| **Neurodegeneration** | Significant; brain/spinal cord atrophy, irreversible damage[2,10] | Brain and spinal cord atrophy[16] | Slower neurodegeneration than NMOSD[5] |
| **Misdiagnosis risk** | High: non-specific symptoms, overlapping with other disorders e.g., migraine, radiologically isolated syndrome, neuropathy, NMOSD and MOGAD[2] | High: often mistaken for MS[3] | High: overlap with MS/NMOSD; risk of misdiagnosis[4,18] |

**Shared across all three conditions**

**Shared between two / partial similarity**

**Distinctive / clear difference**

**Unclear or not yet confirmed by evidence**

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## In MS, NMOSD and MOGAD, increasing disability occurs over time.

**a.** The brain, CNS or optic nerves may be progressively or suddenly damaged, leading to relapses with new or worsening symptoms for a period of time.

**b.** The disease course and disability accumulation are often driven by relapses, from which there may be incomplete recovery.

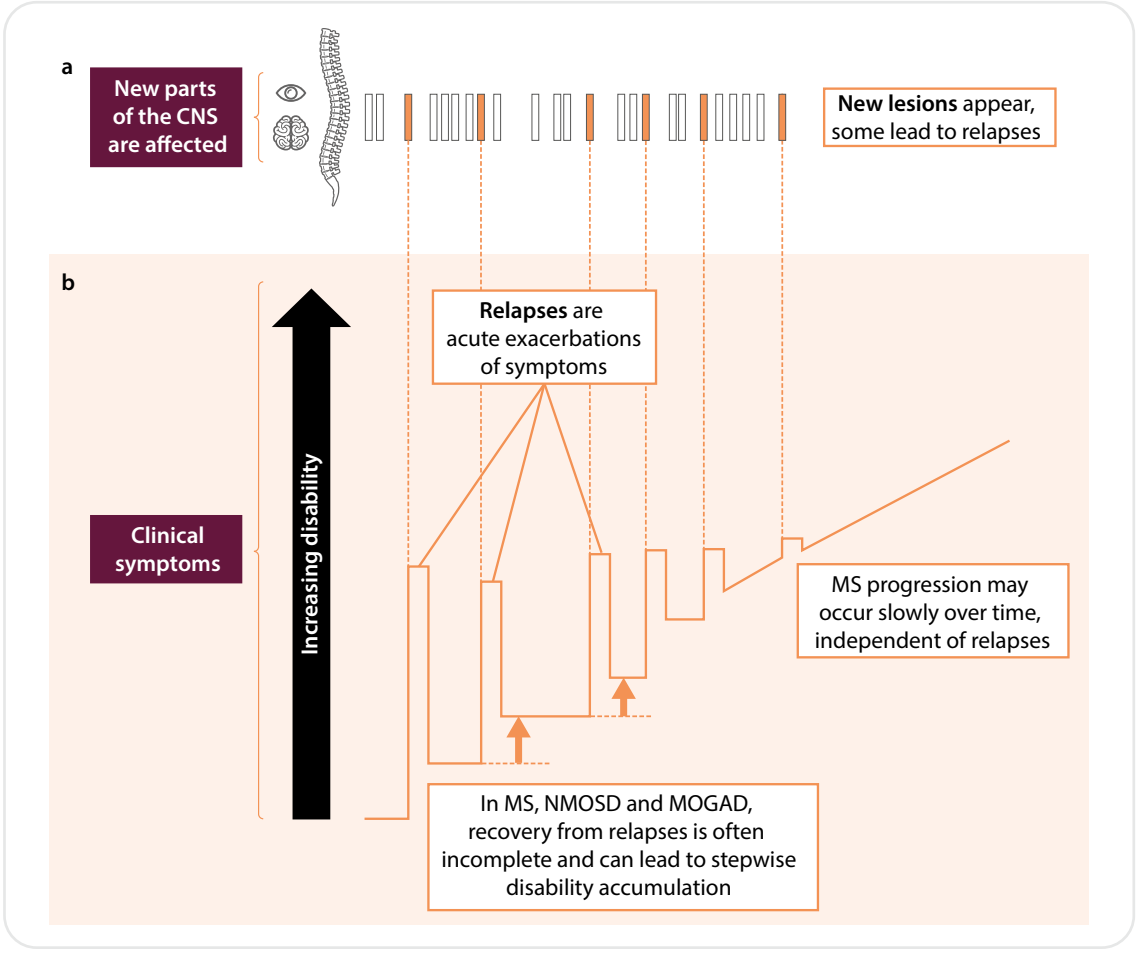


Image adapted from the original *Brain health: time matters in multiple sclerosis* report with the permission of Oxford PharmaGenesis, © 2015.[20]

**A need for early action!**

## What unites them?

**Earlier and accurate diagnosis**

**Targeted intervention**

**…leading to better outcomes; preserving function, minimising burden and cost to patients, their families and society.**


### References

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The dissemination of this material is supported by sponsorship funding from Novartis Pharma AG, Alexion, AstraZeneca Rare Disease, and a grant from Sanofi. No company had editorial control, influence over the content or involvement with any other elements of the activity.

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