



Measurements explained

How we define the ways in which multiple sclerosis can be measured

- ◆ **Annualised Relapse Rate (ARR):**
The average number of relapses a group of patients in a clinical study have in one year.¹
- ◆ **Brain Volume Loss:**
The overall decline in brain volume due to MS disease activity, which can be measured with MRI. Also referred to as “atrophy”, brain volume loss is associated with permanent disability.²
- ◆ **Composite Confirmed Disability Progression:**
Measures the risk of a patient’s disability getting worse based on any one of three disability endpoints – confirmed disability progression (CDP), walking ability (T25-FW) and hand function (9-HPT).
- ◆ **Confirmed Disability Progression (CDP):**
Measures the increase in a patient’s EDSS score that is sustained over a pre-determined time period, which means a patient’s physical disability has increased.³
- ◆ **Disability:**
The loss of abilities that results from damage to the central nervous system (CNS) and may be irreversible.⁴
- ◆ **Expanded Disability Status Scale (EDSS):**
Measures the degree of physical disability based on a neurological exam of seven functional systems throughout the body, plus a patient’s walking ability. The EDSS and its predecessor DSS have been used in nearly every MS clinical trial in the last 40 years.⁵
- ◆ **Hyperintense T2-weighted MRI:**
Shows all lesions, both active and chronic. These appear bright white and can be tracked over time to measure MS progression.⁶
- ◆ **Hypointense T1-weighted MRI:**
Shows sites of significant tissue injury and nerve cell death, referred to as “black holes” due to their appearance on an MRI scan.^{1,6}
- ◆ **Gadolinium-enhanced T1-weighted MRI:**
Shows active lesions that appear bright white on an MRI scan after administration of an intravenous imaging contrast agent (gadolinium).⁶
- ◆ **Multiple Sclerosis Functional Composite (MSFC):**
A combined measure of three separate disability assessments that was first introduced in the late 1990s. The MSFC is calculated based on leg, hand and cognitive function (T25-FW, 9-HPT, PASAT).⁷
- ◆ **No Evidence of Disease Activity (NEDA):**
A combined measure of disease activity based on relapses, disability progression and MRI results. If someone meets NEDA criteria, they are free from measurable disease activity over a defined period of time.⁸
- ◆ **No Evidence of Progression (NEP):**
A novel composite endpoint that measures the proportion of patients with no confirmed progression of disability status (EDSS), walking speed (T25-FW) and upper extremity function (9-HPT) and may represent a new outcome for people with PPMS.
- ◆ **No Evidence of Progression or Active Disease (NEPAD)**
A novel composite endpoint that measures the combined absence of disease activity (relapses and MRI activity) and progression (disability). NEPAD is similar to NEDA, but uses a composite endpoint (no confirmed disability progression by EDSS, 20% progression on timed 25 foot walk, and 20% progression on 9 hole peg test) to measure disability. This may represent a more comprehensive measurement of overall disease activity and progression for people with PPMS.
- ◆ **Nine-Hole Peg Test (9-HPT):**
Measures arm, wrist and hand function by timing the speed in which a patient can move nine pegs into nine holes and then remove them, using one hand at a time.⁹
- ◆ **Paced Auditory Serial Addition (PASAT):**
Measures cognitive function by testing thinking speed and calculation ability.



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- ◆ **Relapse:**
New or worsening signs and symptoms caused by inflammation in the central nervous system (CNS). These episodes develop quickly, last at least 24 hours and can continue for several days to weeks. Relapses can be followed by a full recovery or some continuing disability.¹⁰
- ◆ **Timed 25-Foot Walk (T25-FW):**
Determines walking speed by measuring how fast a patient can walk 25 feet.¹²

References

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