Stanford | MEDICINE

Stanford Multiple Sclerosis Center

It often begins suddenly: with paralysis, weakness, sensory disturbances, lack of coordination, or visual impairment. The attack can last from a few days to weeks, followed by a quiet period that may last from a few months to years. Another chronic, progressive state may follow, with severe disability in speaking, writing, and walking. But not always.

Multiple sclerosis, or MS, is an unpredictable inflammatory condition of the central nervous system, usually rearing its ugly head in early adulthood. Surprisingly, it occurs in people who are extraordinarily healthy, who have a strong immune system—the healthiest person you might know.

Today, there is growing recognition that there are more people affected with MS than previously thought. MS is, in fact, a much more common condition than people realize. And most people likely do not know that it is highly prevalent in the San Francisco Bay Area.

The epidemiologic distribution of MS tells a revealing, logistical story: MS is more common as you move further north and south on the planet—the farther away you live from the Equator, toward the poles.

A diagnosis of MS is terrifying and life-altering. Yet, Stanford researchers are making discoveries that are flipping the existing paradigm on its head—because of their efforts, our understanding of multiple sclerosis is changing remarkably. And there is new hope.

Because the disease expresses itself so differently from one individual to the next, Stanford researchers believe that MS may not be one disease, but several, with a number of different subtypes. Likewise, the trigger likely varies. And that may be at the heart of why patients manifest MS in their own unique way.

The key to maximizing treatment success lies in discovering each person's distinct, personalized "immuno-fingerprint."

CONDITIONS TREATED AT STANFORD:

- **Multiple sclerosis**
- **Neuromyelitis optica**
- **Optic neuritis**
- **Transverse myelitis**
- **Myasthenia gravis**
- **Guillain-Barre syndrome**
- **Paraneoplastic disease**
- **NMDA receptor encephalitis**
- **CNS systemic disease**

MS BY THE NUMBERS

- **2.5 million men and women worldwide**
- **400,000 in the United States**
- **70 percent female**
- **Most common in Caucasians of Northern European ancestry**
- **Most people are diagnosed between the ages of 20 and 50**
- **15 new treatments have recently emerged**

What causes multiple sclerosis?

For reasons yet to be defined—some theorize MS is caused by a virus, others speculate genetics or environmental factors are to blame—an overzealous immune system attacks the myelin sheath, the layer of protein that surrounds and protects the connections between nerve cells. Normally, the myelin sheath provides insulation for the electrical signals used for communication within the nervous system. When this insulation is damaged, communication becomes disrupted and ultimately, parts of the nervous system are destroyed.

There is a strong association between MS and Vitamin D deficiency. Even if you live in a relatively sunny area, only a small spectrum of light—called mid-wave frequency ultraviolet light, or ultraviolet type B light—stimulates Vitamin D synthesis in our skin. Where this spectrum of light only comes about in brief pulses, a high percentage of people are Vitamin D deficient. This deficiency coincides with a more active, upregulated immune system, increasing the risk of MS.

Beyond Vitamin D deficiency, Stanford researchers believe that the inflammatory trigger for MS is highly likely to be personalized—in some proportion of patients, the driver could be a virus; in others, it could be some other environmental culprit.

How is MS diagnosed?

Because there is currently no single test for MS, Stanford doctors rely on clinical criteria. This is usually a combination of history, physical examination, MRI, spinal tap, and bloodwork. A diagnosis of MS is given when doctors determine that the immune system has attacked the central nervous system in two different places or more, and at two different times or more.

Providing the very best of care, the Stanford Multiple Sclerosis Center has been designed to be a multidisciplinary care center, with a spectrum of specialty-level services.

In 2014 the National Multiple Sclerosis Society designated Stanford as a Partner in Comprehensive Care, its highest level of distinction, making it one of only two such centers in Northern California at that time. In 2017, Stanford received a renewal of this distinction, and was also awarded ongoing certification by the Consortium of Multiple Sclerosis Centers.

How is MS treated?

The new Stanford Neuroscience Health Center was built so that patients can have every one of their care needs met in one place. Patients can consult with doctors, receive appropriate testing and laboratory work, and enjoy access to a full rehabilitation team, including physical therapists, occupational therapists, speech pathologists, and an MD-level physiatrist.

The beautifully designed MS Infusion Treatment Center was designed as a place of healing, with a feeling of openness and connectedness. Enveloped by glass and bright sunlight, and overlooking evergreen trees, patients recognize at once that they've never been to a place like it. And they feel uplifted.

Many of the recent successful medications, several of which have been developed and approved with the help of Stanford researchers, are now administered intravenously. Our infusion center—arguably the best in the nation—is at the vanguard. Here, all of the infusion nurses and pharmacists are experts in MS-specific medications.

Stanford clinicians have favored the "induction" model of treatment, over the "escalation" model of treatment, as a more pro-active approach with a better chance of long-term neuro-protection. Once it is known that a patient has MS, better results are achieved by more aggressive early treatment, so the brain cannot be attacked or even slightly inflamed. It's been discovered that even a small amount of inflammation can trigger a vicious cycle of symptoms and loss.

Aiming to a higher standard, we offer comprehensive, multidisciplinary care to our thousands of patients. We treat them to their optimal level of wellness, not just the absence of disease. We come to know our patients well.

Along with prescription medication and Vitamin D supplementation, other treatment options include digital and signal processing techniques, and clinical electrophysiology of the peripheral and central nervous systems.

Our patients learn that nutrition, psychological support, physical fitness, hydration, and sleep are just as important for their overall health. With a specialist in integrative medicine, we also offer consultation in alternative and complementary therapies, as well as a lecture series on current innovations in MS treatment.

With MS affecting all aspects of one's life, the Stanford MS Center and Neuroimmunology Clinic takes a 360-degree, interdisciplinary, integrated approach to care and healing.

MS is personal

MS has traditionally been thought to be one disease. But Stanford clinician-scientists propose that not all types of MS are alike. Rather, MS may be a syndrome—a family of closely related sister diseases where the immune system causes inflammation and potential scarring of the brain and spinal cord. But the pathways that ignite that inflammation could be unique and different to every individual. And so it follows that there is not one therapy that will help every patient equally.

In a multidisciplinary effort, researchers at our Multiple Sclerosis Center are collaborating with other world-renowned Stanford scientists and investigators in immunology to develop biomarkers that could identify a tendency toward autoimmunity and shed light on disease status, treatment response, and therapeutic targets. And every day they are getting closer.

"We have profoundly changed the lives of men and women living with MS. When we treat them right from the beginning, and we stay with it, we can have long-term benefit. Our patients can live their lives as if MS is more a risk factor than a disease in their daily lives. They don't develop that worsening neurodegeneration that we associate with MS. That can truly be a thing of the past."

Jeffrey Dunn, MD

Clinical Professor, Neurology and Neurological Sciences

Division Chief, Neuroimmunology

For example, using an extensive MS tissue bank to catalog thousands of MRNAs and proteins that reflect disease state and disease progress, Stanford researchers have discovered a molecule in human blood that may predict optimal responders to one class of disease-modifying therapy. By analyzing an individual according to his or her unique, personalized "immuno-fingerprint," therapies could be tailor-made and the immune system could be successfully balanced from the first sign of disease so that no brain damage occurs. This is the practice of personalized medicine, and it is how the Stanford MS Center seeks to approach the care of all our patients.

Think of MS as a form of "immune hypertension." Just as we can manage high blood pressure, treating it proactively to prevent strokes, so it is with MS. By preventing brain attacks with early detection and treatment, MS can be better managed as a condition. Patients would live with it as a risk factor, rather than as a relentlessly neurodegenerative disease.

Join Us

Given that MS is a highly prevalent disease unique to humans, the cause and cure of MS is floating in the bloodstreams of the men and women who live with it. And Stanford researchers are quickly zeroing in.

Stanford is uniquely positioned to take this challenge on. The nature of our innovative program makes us exceptionally well situated among national and international institutions to succeed in uncovering solutions.

We have all the tools in place to do that: we have the talent, the expertise, and the technology. We have MS patients who are engaged and able to participate in clinical trials. All that is needed to fuel further discovery is the support of visionary philanthropic partners to support our work.

We hope you will join our efforts.

Contact Us

To find out more about how your philanthropy can make a difference in the lives of people suffering with MS and related disorders, please contact:

Anne Chun Longo
Medical Center Development
650.387.0161 | anne.longo@stanford.edu
medicalgiving.stanford.edu

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