

RELAPSING

healthcentral

Multiple Sclerosis

Q&A With
an MS Eye
Specialist p.3



WELCOME to the HealthCentral guide to **Relapsing Multiple Sclerosis**. In these pages, you'll learn about current research, how to make the most of every doctor visit, the latest treatments, and more. For more tips and info on MS, go to [HealthCentral.com/msguide](https://www.healthcentral.com/msguide).



Your (Foggy) Brain on MS

SCIENTISTS—and certainly people living with MS—have long known that multiple sclerosis can muddle your brain and create cognitive difficulties, in addition to vision and movement problems. In MS, the brain may shrink (a process called cortical atrophy), yet until recently, researchers didn't understand what caused the shrinkage. An international study published in *Nature* in July 2019 now sheds some light on that mystery.

Using a state-of-the-art technique known as single-nuclei RNA sequencing, researchers analyzed the genetic makeup of individual brain cells. By comparing cells from people with MS and people without it, they discovered that brain cells called “projection neurons” were more likely than others to be targeted by the immune system. Damage to and loss of these cells, they believe, could be the basis for brain shrinkage and the resulting cognitive problems common in MS. If so, therapies targeting immune cells that attack projection neurons could become MS treatments of the future.



Get the Dye Out of MRI?

Because magnetic resonance imaging (MRI) is used to assess MS progression, many people with the condition have frequent scans. Recently, the U.S. Food and Drug Administration (FDA) raised concerns about gadolinium-based contrast dyes that make MRIs easier to interpret. Several studies, including one published in *Radiology* in 2015, have shown that some of the chemical can remain in the brain even years after a scan.

A study published in the journal *Neurology* in July 2019 found that there didn't seem to be a link between exposure to the dye and MS progression or disability in the first five years after diagnosis. But Robert Zivadinov, MD, PhD, senior author of the study, stated, “We cannot completely rule out that gadolinium deposition may have an impact on disease progression.”

The FDA has advised doctors to use contrast dyes only when absolutely necessary. The good news: A German study, published in *Radiology* in March 2019, showed that newer-model MRI machines are just as effective in spotting new MS lesions without dye as older machines are with dye.

CHILDHOOD OBESITY AND MS RISK

Overweight and obese kids may have twice the risk of developing MS as normal-weight kids, according to a study comparing 453 children and teens with MS to 14,000 kids without the disease. Published in *JAMA Neurology* in July 2019, the study also found that overweight and obese children with MS were more likely to relapse after first-line treatment. No difference was found in MS rates and treatment response between boys and girls.



30

Number of years that MS can remain mild.



Eye Troubles and MS

Symptoms that affect your vision can be the first indication of MS, or an indicator of its progression, so we asked neuro-ophthalmologist Howard R. Krauss, MD, questions about MS eye symptoms and complications.

■ What is the most common visual symptom of MS?

Episodes of optic neuritis—a condition that presents with progressive, painful loss of vision—are characteristic of relapsing-remitting multiple sclerosis. Optic neuritis is often the first sign of MS. Roughly 50 percent of first-time optic neuritis patients will have evidence of MS within 15 years. The condition usually occurs in only one eye and, in most cases, improves over several months. Fortunately, 90 percent of people have very good vision recovery from their first attack, and that still holds a year after the initial event. Optic neuritis responds to glucocorticoids, which fight inflammation, and high-dose intravenous (IV) methylprednisolone. There's evidence that methylprednisolone can delay clinical onset of MS in people with a first optic neuritis attack.

■ What other common visual problems do people with MS experience?

In some, intermittent double vision, or diplopia, is the initial sign of MS, and occurs when MS shows up in the cerebellum or brain stem and affects nerves that coordinate eye movement. You may perceive it as a sense of imbalance or unsteadiness rather than a vision problem. Double vision can be temporary or persistent.



Some people experience nystagmus, which is rapid, intermittent, involuntary eye movement that may feel like vertigo—a sensation of spinning or unsteadiness, or the feeling that stationary objects around you are moving. Others may have internuclear ophthalmoplegia, which affects brain signals controlling horizontal eye movement; the eye turning inward is delayed in the speed of its movement compared to the eye moving outward, which can also result in double vision or other effects. The good news? These visual issues often respond to MS drugs.

■ When should you see an ophthalmologist for an MS vision issue?

MS or not, anyone who has a visual symptom should seek evaluation. But even for visually asymptomatic people with MS, there's benefit to having an annual eye exam. Using a technology called optical coherence tomography (OCT), we can measure the thickness of certain layers of the retina. Even many of our MS patients who have 20/20 vision and normal visual field tests show progressive thinning of these

layers, and that may correlate with damaging effects of MS. We're not far away from using OCT results as an indicator of general MS damage over time.

■ How can visual symptoms impact people living with MS?

When you have MS and an eye symptom, your mind rushes to think, “Oh my goodness, I'm going to be blind.” The psychological impediments that affect those with MS are sometimes worse than the disease, because of the dread that comes with the diagnosis and symptoms. But MS rarely progresses to legal blindness. We now have so many immunomodulating drugs and anti-inflammatory meds—and a lot of things in the pipeline that are probably going to be even more effective in the management of MS symptoms. ■



HOWARD R. KRAUSS, MD, is a surgical neuro-ophthalmologist at Providence Saint John's Health Center in Santa Monica, CA.

ISTOCK (3), COVER: GETTY IMAGES

FROM TOP: ISTOCK; COURTESY OF HOWARD R. KRAUSS, MD



MS Refresher

The good news: Better understanding of multiple sclerosis progression and newer, more effective treatments have made the condition easier to live with for many people.

25%

MS risk for someone whose twin has multiple sclerosis.

If you're sitting in an MS infusion center as you read this, you already know that multiple sclerosis is a chronic, progressive disease of the central nervous system in which the immune system mistakenly attacks myelin, a fatty substance that insulates your nerves and helps them communicate. Over time, these attacks can

cause scarring (known as sclerosis or lesions) and hardening of nerve tissue in the spinal cord, brain, and eyes. The lesions can cause pain and weakness in your extremities, vision issues, and cognitive problems. Because the exact locations of MS damage vary from person to person, so do the severity, symptoms, and course of the disease.

GETTY IMAGES

913,000

Estimated number of MS cases in the United States.

Who's at Risk

For first-timers at the infusion center, you may still be wondering how and why you ended up with MS. Here's a quick primer on possible risk factors:

- Being female; estimates vary, but up to four times as many women as men have MS.
- Where you live or grew up; MS is more prevalent farther from the equator.
- Northern European ethnicity.
- Family history of the disease.
- Certain genes.
- Exposure to certain infections, including Epstein-Barr, human herpes virus 6, and *Chlamydia pneumoniae*.
- Low levels of vitamin D.
- Smoking.
- Obesity (a recently identified risk).

4 Types of MS

Four forms of the disease have been identified: clinically isolated syndrome (CIS); relapsing-remitting MS (RRMS); primary-progressive MS (PPMS); and secondary-progressive MS (SPMS).

With CIS, you have a first episode of neurological symptoms lasting a minimum of 24 hours, caused by inflammation of or damage to myelin in the central nervous system. Some people who experience CIS go on to develop MS of one form or another, and some don't.

About 85 percent of people with MS are initially diagnosed with RRMS. Here are factors that distinguish RRMS from other forms of MS, according to the National Multiple Sclerosis Society:

- Diagnosis at an earlier age.
- More brain lesions, with more inflammatory cells, as seen on magnetic resonance imaging (MRI) scans. In contrast, people with PPMS tend to have more spinal cord lesions than brain lesions, with fewer inflammatory cells.
- Most people with RRMS eventually develop SPMS, which entails

a steady, sustained worsening of symptoms over time; the transition to SPMS generally occurs after having RRMS for a decade or longer.

Symptoms of RRMS

In the early stages of the disease, such symptoms as blurred or double vision, muscle weakness, stiffness, spasms, tingling and numbness in your limbs, coordination and balance problems, and fatigue are common.

Many people with RRMS notice that certain activities or situations, such as taking a hot bath or being under a lot of stress, seem to trigger flare-ups—periods of intensifying symptoms (also commonly referred to as relapses or exacerbations).

If damage to your central nervous system progresses with RRMS, you may develop health issues ranging from depression and mood changes to difficulties with memory and concentration, urinary urgency and frequency, bowel problems such as constipation, and sexual difficulties.

The ways in which people experience RRMS vary widely. Some have flare-ups, lasting anywhere from days to months before easing up, while others notice gradual but steady physical and cognitive decline over time. Still others live for years with only occasional, small reminders they have MS.

There's no way to predict what course the illness will take, but with the appropriate therapy, most people with MS do not become disabled, says Brian R. Apatoff, MD, PhD, associate professor of neurology and neuroscience at Weill Cornell Medical College and director of the Multiple Sclerosis Institute in New York City. "We have some amazing therapies."

The outlook is much better than it used to be, Dr. Apatoff notes. "Research in MS is one of the most active areas in the field of neurology, with several new therapies in the pipeline. MS is one of neurology's bright, shining areas of investigation." ■

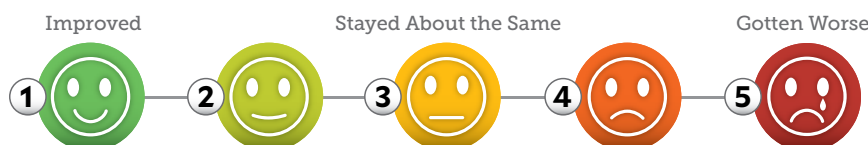


For more information on multiple sclerosis, go to [HealthCentral.com/msguide](https://www.healthcentral.com/msguide).

RELAPSING MULTIPLE SCLEROSIS

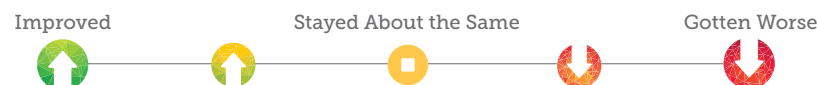
Receiving the right care and monitoring your symptoms can make a world of difference when managing your multiple sclerosis and quality of life. Take an active role in your care, ask your physician questions, and bring along your caregiver for support. Advocating for yourself is key! Complete the guide below to further your understanding of treatments and symptoms—and to help attain a partnership with your doctor.

On a scale of 1 to 5, since my last visit my symptoms have:
(Circle on scale below)



I've noticed these trends when my relapses occur:

My physical activity has: (Circle on scale below)



Are there any other treatments or therapies I should try?

What lifestyle changes can I adopt to lead a better life with MS?

This is how I would best describe my symptoms:

(Check all that apply)

- ☐ Light-sensitivity
- ☐ Trouble seeing
- ☐ Eye pain
- ☐ Difficulty swallowing
- ☐ Muscle weakness
- ☐ Stiffness
- ☐ Spasms
- ☐ Balance and coordination difficulties
- ☐ Trouble concentrating
- ☐ Memory deterioration
- ☐ Difficulty sleeping
- ☐ Slurred speech
- ☐ Fatigue
- ☐ Urinary and/or bowel issues
- ☐ Sexual difficulties
- ☐ Pain
- ☐ Tremors (shaking)
- ☐ Depression

WHO DOES WHAT

Here are some of the specialists you may be working with:

- **NEUROLOGIST:** An MD who focuses on brain and nerve conditions; ideally, you'll see one who specializes in MS.
- **SOCIAL WORKER:** Helps with work, disability, and other services.
- **PSYCHOLOGIST OR COUNSELOR:** Helps with emotional issues around MS.
- **NEUROPSYCHOLOGIST:** Deals with psychological challenges related to neurological changes in MS.
- **NUTRITIONIST:** Recommends optimal dietary choices.
- **PHYSICAL AND OCCUPATIONAL THERAPISTS:** Help you maintain the skills you need for daily life and work.

Keeping your healthcare pros up-to-date on your symptoms is key.

Team Up!

When you're living with multiple sclerosis, your health may change over time, so your treatment needs may change, too.

You're being treated to slow the progression of the disease or halt it, but MS symptoms can fluctuate from day to day and office visit to office visit. Tracking your progress is complicated, and the best way for you and your doc to know whether you're responding to treatment is by spending time with each other at regular office visits.

Your physician will probably want to see you every three to six months in the first one or two years after your diagnosis. After that, you will

most likely visit your doctor every six months or once a year. Be sure to follow the recommended appointment schedule, and check in between visits if you're having any new symptoms, medication side effects, or other issues. Monitoring your health over time, getting essential tests, and having your treatment adjusted as needed may make all the difference in your life with MS.

What's That Test?

Following are tests you'll need periodically to check on disease progression and your response to treatment:

- **Magnetic resonance imaging (MRI).** This technology produces highly detailed images of your body. With an

MRI of the brain and spinal cord, doctors can spot lesions characteristic of MS, as well as other changes.

- **Neurological exam.** Your physician will check your reflexes, coordination, gait (how you walk), and balance.

- **Vision.** It's not uncommon for people with MS to experience blurred or double vision, so your doctor will look for optic nerve damage. (For more on vision issues, see the Q&A on page 3.)

- **Other senses.** Some people with MS lose part or all of their ability to taste or smell or have problems with other senses, which may indicate progression of the disease. So your doctor will sometimes test these senses, your hearing, and your ability to feel pain and other sensations.

- **Cognitive function.** MS can affect the way your brain works, so you may have tests that evaluate speech processing, working memory, reasoning and planning, visual perception, and language. ■

HOW TO HAVE 4-STAR OFFICE VISITS

1. SEE AN MS SPECIALIST

if you can. Check with the National MS Society (nationalmssociety.org/Resources-Support/Find-Doctors-Resources) or the Consortium of Multiple Sclerosis Centers (go to mscare.org and click on MS Centers Directory under Connect) to find one.

2. TRACK CHANGES

in your health (positive and negative) between appointments, using paper or an app. Doing so regularly will make it easier to recognize problems as they occur. Bring your notes and questions to all of your healthcare appointments.

3. BE AWARE

of new or changing symptoms that may indicate an exacerbation. The most common are vision issues, vertigo, limb weakness or numbness, poor balance or coordination, falling, trouble walking or talking, memory loss, fatigue, and bladder or bowel problems.

4. DON'T WAIT FOR AN APPOINTMENT

if you think you're having an exacerbation. Call your neurologist. Sometimes the best way to stop a symptom is immediate therapy. Other times, you may just need to ride it out. You and your doc can decide on the best approach for you.



My Story Is Your Story

Her life with MS inspired Meredith to write a memoir and share her hopes and fears.

By Meredith O'Brien

Something weird was happening with my left leg, a numbness that, over only a few days, affected large swaths of my leg up to my torso. When I could no longer tell whether the razor I was using to shave was touching my skin, I decided I needed to contact my doctor. I figured I had a pinched nerve.

The general practitioner ordered tests for Lyme disease and thyroid issues (both negative) and shot down the notion of a pinched nerve before she casually mentioned she wanted me to have a brain MRI.

"For MS?" I asked. Via online sleuthing I'd done before the appointment, I'd learned that multiple sclerosis—a potential cause of my symptoms—could be diagnosed with MRI scans.

The doctor hesitated but confirmed that she wanted to check for MS. After an anxious couple of weeks of waiting through the end of August 2012, a nurse called to tell me I had a mass at the bottom of my brain.

A 'Mass' Becomes a 'Lesion'

The notion that I was walking around with a mass in my head was hard to comprehend. But the suggestion that I might have an incurable, unpredictable disease of the central nervous system was nearly too much to handle. So, I shoved my worries into the back of my mind and distracted myself with work and life with my three middle schoolers.

A second MRI ordered by a general neurologist I consulted found the same lesion as the first scan (the word "mass" had now shifted to "lesion"), but the doctor seemed skeptical about my reports of numbness. "MS doesn't usually present like this," he said. The pattern was "unusual." There was something about his tone that gave me the impression he didn't fully believe me.

The single lesion near my brain stem could be old, he said, adding that multiple sclerosis means there's more than one lesion on the brain and/or spinal cord. He urged me to de-stress, maybe take more yoga classes, and see him in a few months. (In medical records about the visit that I saw later, the doctor wrote that since I had a history of anxiety "a psychosomatic manifestation is certainly a strong possibility" for the numbness.)

Anxiety doesn't cause brain lesions, I thought.

New Symptoms Don't Count

Months later, I told the neurologist that while the leg numbness had ebbed, the sensation on the back of my left hand and across the top of my left fingers had become dull, as if I were

wearing gloves. He encouraged me to continue yoga and come back if anything new cropped up. I left confused, wondering why hand numbness didn't seem to count as new.

By the spring of 2014, I began experiencing new symptoms along with the return of old ones: relentless nocturnal leg spasms, a tingling-radiating heat sensation on the left side of my abdomen, and fatigue that caused me to consume ever-increasing amounts of caffeine.

All of this can't be a physical manifestation of anxiety.

This time, I saw an MS specialist who immediately made me feel comfortable. After completing a physical exam, he ordered a new MRI. Before I left, he seemed like he wanted to tell me something, wanted to hand me a folder he was holding. There were a couple of tense, silent moments. Ultimately, he handed over the folder—which contained information for newly diagnosed MS patients.

No Vacation From MS

The official diagnosis came a bit later, at the tail end of a couple of ugly weeks.

It started during a family vacation where my husband and I and our three kids traveled to Los Angeles. During our first morning there, the neurologist called to say he wanted to see me immediately. The latest MRI indicated I now had multiple lesions in my brain. Temporarily stupefied, I



O'Brien on her July 2014 LA vacation with her two sons, Jonah (left) and Casey; her husband, Scott; and her daughter, Abbey.

told him I'd see him after returning to Boston in 10 days.

I thought I could carry on like normal and refused to acknowledge that being told I had multiple brain lesions—*multiple*—meant that I had MS. Instead, I did things I shouldn't have, like hang out in heat and humidity. Some of us with MS develop heat sensitivity that can cause the very symptoms I experienced several days into the vacation.

I became violently ill while watching a performance at the Hollywood Bowl on a hot, humid evening, but attributed it to food poisoning from deli sandwiches. Extreme dizziness made me so weak that I required a wheelchair to get to our car.

The day we were set to return home, I awoke to dizziness, full-body weakness, and an inability to stop vomiting when I lifted my head. Given that I hadn't eaten anything, I knew this wasn't food poisoning. My doctor prescribed medications to enable me to walk and to stop vomiting long enough to board an airplane.

Forty-eight hours after we got home, an ambulance took me to the hospital after I again awoke to dizziness, weakness, vomiting, a stabbing pain in the back of my head, and an inability to walk. Within an hour of being released, I saw the neurologist, the specialist in MS, who officially told

me I had relapsing-remitting multiple sclerosis. It was a relief to hear this since the neurologists who saw me in the hospital blamed a urinary tract infection for what I was experiencing.

First Step Into a Life With MS

An MRI taken that week found two additional lesions, and my doctor concluded I was in the middle of an MS flare. Because the symptoms were quickly advancing, I had three days of steroid infusions to arrest the inflammation while we decided on a disease-modifying medication.

Diagnosis felt like validation. Those first experiences with numbness, vomiting, dizziness, and the inability to stand now had an explanation. Feeling heard was tremendously satisfying. At least now I was believed. That confusing period was, I realized, the connective tissue between my life pre- and post-MS diagnosis.

Getting diagnosed was only the first step, as it is for all of us with MS. Making peace with the disease's permanent uncertainty is never-ending. The changes MS has brought to my life inspired me to write a book, *Uncomfortably Numb: An MS Memoir* (Wyatt-MacKenzie Publishing), which is coming out in March 2020. I'm sharing my story so others will know what our lives with multiple sclerosis are really like. ■



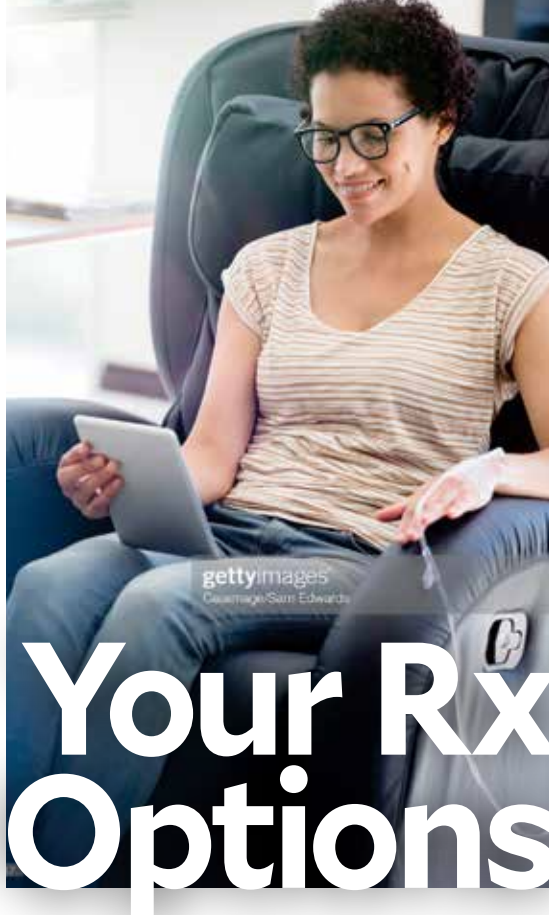
NANCY GOULD PHOTOGRAPHY

COURTESY OF MEREDITH O'BRIEN (2)



For more information on multiple sclerosis, go to [HealthCentral.com/msguide](https://www.healthcentral.com/msguide).

Multiple sclerosis treatment is one of the most dynamic areas of medicine.



Thirty years ago, there was not a single approved drug for treating MS. Today, there are 17 medications for relapsing-remitting MS (RRMS), including one also approved for primary-progressive MS (PPMS) and several for secondary-progressive MS (SPMS).

Nonetheless, planning MS treatment with your doctor can be challenging. The nature of your illness, how severe it is, and your specific symptoms all come into play when determining which medication is best for you. Disease-modifying therapies (DMTs) focus on slowing the progression of the disease and changing its course. While they can't cure MS, they can moderate the accumulation of lesions in the brain and spinal cord, as well as lessen the frequency and severity of attacks. They also play a role in slowing the progression of disability.

DMTs fall into three categories: injectable medications, those that are given via intravenous (IV) infusion, and those that are taken orally, in pill form (see chart). Other drugs are

geared toward controlling symptoms such as fatigue, depression, muscle stiffness and spasms, and bladder and bowel problems. Additionally, there are a few nondrug therapies that can help ease some symptoms.

Medication decisions come down to evaluating the balance between a drug's benefits and risks. "We may choose drugs that have fewer side effects but take longer to begin working in a patient who has a very slowly worsening disease," explains Robert Glenn Smith, MD, PhD, a neurologist at Houston Methodist Hospital in Texas. "Or we may choose a drug that's a lot more aggressive in its beneficial effects, but may have more side effects, for somebody with more active disease."

With so many treatment options available for MS, you may go through some degree of trial and error in the process. Try not to get discouraged if it takes a few attempts before finding what works best for you. Together, you and your doctor will come up with the right treatment plan for you. ■

DMT TYPES



INJECTABLES: The injectable DMTs are interferon beta-1a (Avonex, Rebif), interferon beta-1b (Betaseron, Extavia), glatiramer acetate (Copaxone, Glatopa), and peginterferon beta-1a (Plegridy). "The interferons and glatiramer acetate are overall the safest," says Vijayshree Yadav, MD, associate professor of neurology at Oregon Health & Science University School of Medicine in Portland, but they may not be as effective as some newer drugs. The most common side effects of interferons are flu-like symptoms and injection-site irritation.



INFUSIONS: The DMTs administered via IV infusion are alemtuzumab (Lemtrada), mitoxantrone (approved for RRMS and SPMS), natalizumab (Tysabri), and ocrelizumab (Ocrevus); the last of these is approved to treat both RRMS and PPMS. Depending on the medication, infusion time can range from as little as five minutes to several hours, and infusions are repeated anywhere from daily to yearly for varying periods of time. Side effects differ by drug, so be sure to ask your doctor about those.



ORAL MEDS: DMTs taken as pills include teriflunomide (Aubagio), fingolimod (Gilenya), and dimethyl fumarate (Tecfidera). Two newer pills, cladribine (Mavenclad) and siponimod (Mayzent), are approved to treat active SPMS, as well as RRMS; siponimod is also approved for clinically isolated syndrome. Oral meds are convenient, but like all MS meds, they have side effects and risks. Work with your doctor to choose your best option.

■ **Safe Space Online** My MSAA Community (mymsaa.org/msaa-community/my-msaa-community-forum) is a peer-to-peer online forum. Sponsored by the Multiple Sclerosis Association of America (MSAA), the platform provides a place to connect with others living with MS, ask questions, post about your MS journey, and offer advice and encouragement.

■ **Confused About Insurance?** Do terms like *coinsurance*, *formulary*, and *step therapy* befuddle you? Check out the MSAA health insurance guide (healthinsuranceguide.mymsaa.org). It walks you through the ins and outs of Medicare, the Health Insurance Marketplace, and private and employer-based plans. If you already have health insurance, this resource will help you make the most of it.

Science Projects

How you can help find MS answers

■ Researchers are hard at work seeking better treatments and solutions for people with MS, and they could use your help. There are plenty of things you can do to contribute to the cause, from something as simple as filling out a survey to donating to tissue banks or volunteering for a clinical trial. To find out how you can get involved with research, visit the National Multiple Sclerosis Society research site: nationalmssociety.org/Research/Participate-in-Research-Studies.



Write It Down—Faster

If cranking out pages of narrative isn't your cup of tea, you might try bullet journaling instead. This type of journaling, which uses bulleted lists to organize thoughts and plans, can be done on paper (bulletjournal.com) or in an app ([Bullet Journal Companion](#)). Whether you go with bullets or a more traditional essay style, a journal provides both practical and emotional benefits. Here are some ways journaling can work for you:

1 RECORD IT. Maintaining a record of your symptoms can help you spot relapse patterns and avoid triggers.

2 KEEP IT WITH YOU. Having your journal with you when you visit your care team can remind you of key details. So, when your doctor asks, "How long has this been going on?" you'll

have the answer right at your fingertips.

3 SHARE—OR NOT. Your journal is your private spot to explore and express feelings about your illness that you may not be comfortable sharing with family or healthcare providers. You don't have to tell anyone what you wrote unless you want to. Mum's the word.



For more tools and tips, go to HealthCentral.com/msguide.

MEDICAL EDITOR: **Brian R. Apatoff, MD, PhD**, director, Multiple Sclerosis Institute; clinical attending in neurology, NewYork-Presbyterian Hospital; and associate clinical professor of neurology and neuroscience, Weill Cornell Medical College, New York City.

HEALTHCENTRAL GUIDE MEDICAL EXPERTS: **Howard R. Krauss, MD**, surgical neuro-ophthalmologist, Providence Saint John's Health Center, Santa Monica, CA; **Robert Glenn Smith, MD, PhD**, neurologist, Houston Methodist Hospital, Houston, TX; **Vijayshree Yadav, MD**, associate professor of neurology, Oregon Health & Science University School of Medicine, Portland.

REMEDY HEALTH MEDIA: **Rose Pike**, executive vice president, editorial; **Stacey Colino**, **Meredith O'Brien**, **Tracy Middleton**, **Beth Howard**, **Paige Jacob**, writers; **Patricia Volin**, fact-checker; **Hallie Einhorn**, copy editor; **Douglas Voss**, designers.

HealthCentral Guides are free publications distributed to doctors' offices in the U.S. The information herein should not be construed as medical advice or advice on individual health matters, which should be obtained directly from a healthcare professional. The publisher of HealthCentral Guides is not responsible for advertising claims. HealthCentral Guides are published by Remedy Health Media, LLC, 461 Fifth Avenue, New York, NY 10017. Phone: 212-695-2223. Fax: 212-695-2936. remedyhealthmedia.com. Copyright © 2019 Remedy Health Media, LLC. All rights reserved. The content in HealthCentral Guides is produced by an editorially independent team of editors and writers and is medically reviewed by specialists. Our sponsors have no control over any editorial content.

Remedy Health Media websites: **HealthCentral**, **TheBody**, **TheBodyPRO**, **Berkeley Wellness**, **Psych.com**, **EndocrineWeb**, **Practical Pain Management (PPM)**, **SpineUniverse**, and **OnTrack Diabetes**. Print publications: *Health After 50*; the *University of California, Berkeley, Wellness Letter*; and medical condition white papers.