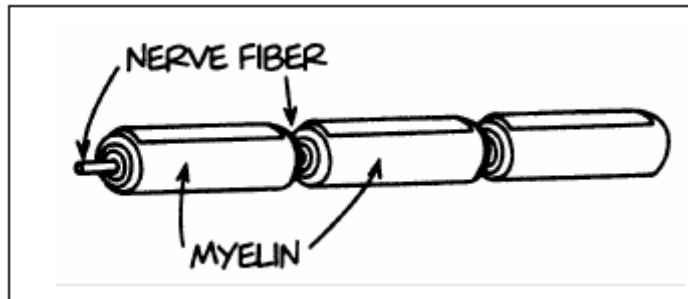


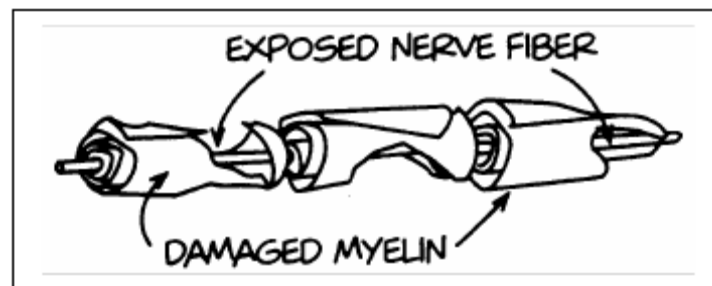
What is MS?

MS is a chronic, often disabling disease that affects the central nervous system (CNS). The CNS consists of the brain, spinal cord and the optic nerves.



The nerve fibers of the CNS are surrounded and protected by a fatty substance called myelin, which helps the nerve fibers to conduct electrical impulses.

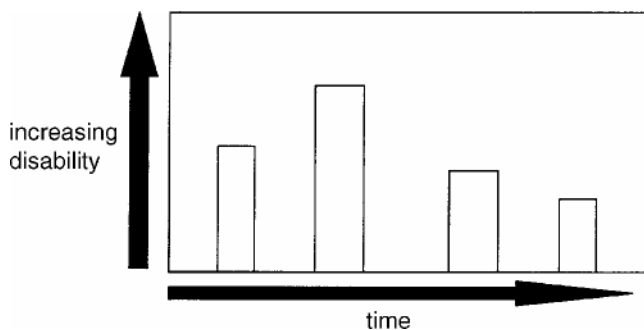
In MS, myelin is lost in **multiple** areas, leaving scarred or **sclerotic** tissue—which gives the disease its name. These damaged areas are also known as plaques or lesions. The nerve fibers themselves may also be damaged or broken.



When myelin is damaged or destroyed, the ability of nerves to conduct electrical impulses to and from the brain is disrupted, producing the various symptoms of MS. Destruction of the nerve fibers themselves is believed to cause the permanent disability that many people with MS experience.

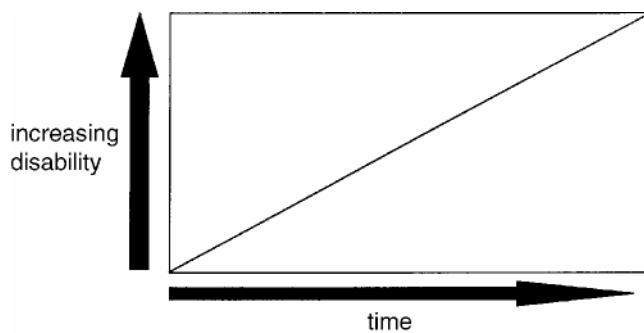
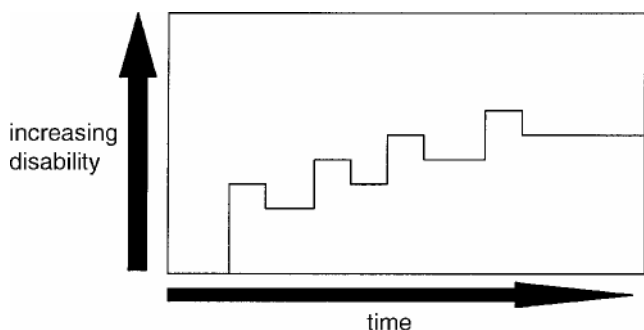
Course of the Disease

People with MS will most likely experience one of four disease courses, each of which might be mild, moderate, or severe. Since no two people have exactly the same experience of MS, the disease course may look very different from one person to another. And, it may not always be clear to the physician—at least right away—which course a person is experiencing



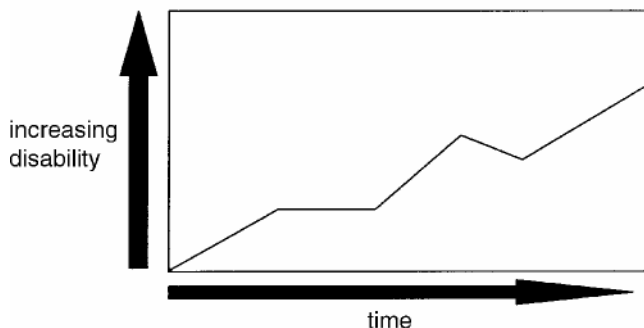
Relapsing-Remitting MS

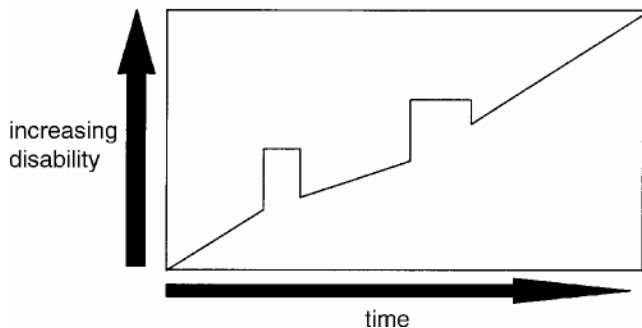
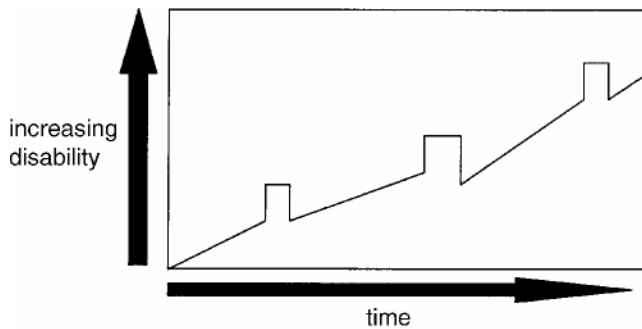
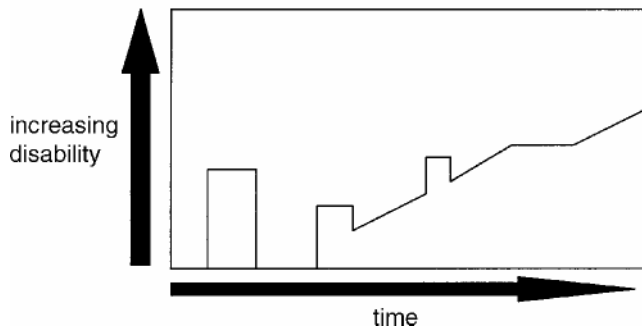
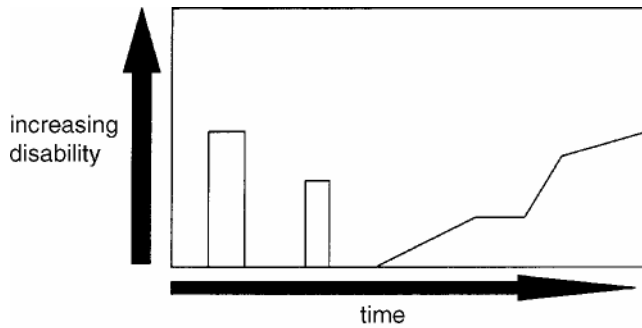
People with this type of MS experience clearly defined attacks of worsening neurologic function. These attacks—which are called relapses, flare-ups, or exacerbations—are followed by partial or complete recovery periods (remissions), during which no disease progression occurs. Approximately 85% of people are initially diagnosed with relapsing-remitting MS.



Primary-Progressive MS

This disease course is characterized by slowly worsening neurologic function from the beginning—with no distinct relapses or remissions. The rate of progression may vary over time, with occasional plateaus and temporary minor improvements. Approximately 10% of people are diagnosed with primary-progressive MS.





Secondary-Progressive MS

Following an initial period of relapsing-remitting MS, many people develop a secondary-progressive disease course in which the disease worsens more steadily, with or without occasional flare-ups, minor recoveries (remissions), or plateaus. Before disease-modifying medications became available, approximately 50% of people with relapsing-remitting MS developed this form of the disease within 10 years. Long-term data are not yet available to determine if treatment significantly delays this transition.

Progressive-Relapsing MS (PRMS)

In this relatively rare course of MS (5%), people experience steadily worsening disease from the beginning, but with clear attacks of worsening neurologic function along the way. They may or may not experience some recovery following these relapses, but the disease continues to progress without remissions.

These figures are adapted from Fred D. Lublin, MD, and Stephen C. Reingold, PhD, *Neurology*, April 1996; 46: 907-911.

What Causes MS?

The exact cause of MS is unknown. Most researchers believe that the damage to myelin results from an abnormal response by the body's immune system. This abnormal response is called an autoimmune response.

Normally, the immune system defends the body by attacking foreign invaders such as viruses or bacteria. But in an autoimmune response, the body attacks its own tissue. In MS, which is an autoimmune disease, the body attacks myelin.

Scientists do not yet know what triggers the immune system to do this. Most agree that several factors are involved, including genetics, gender, and environmental factors (e.g. a virus or toxic environmental substance).

Note that MS is not contagious and is not usually fatal. MS is not directly inherited, although a genetic predisposition is thought to be involved.

Who Gets MS?

Anyone may develop MS, but there are some patterns.

- Most people with MS are diagnosed between the ages of 20 and 50.
- Two to three times as many women as men have MS.
- Studies indicate that genetic factors make certain individuals more susceptible than others, but there is no evidence that MS is directly inherited.
- MS occurs more commonly among people with northern European ancestry, but it is also found among African-Americans, Hispanics and Asians.

Approximately 400,000 Americans have MS and 2.5 million people have MS worldwide. Every week about 200 people receive a diagnosis of MS. The prevalence of MS in a given community may vary depending upon where someone lives within the United States. Worldwide, MS occurs with much greater frequency above 40° latitude than closer to the equator. However, prevalence rates may differ significantly even within a geographic area, where latitude and climate are fairly consistent. These differences demonstrate that geographical factors are not the only ones involved.

How is MS Diagnosed?

At this time, no single test is available to identify or rule out MS. Several tests and procedures are needed. These are likely to include:

› **Complete Medical History**

The physician takes a very careful medical history, looking for past and current symptoms or changes indicative of damage in the central nervous system.

› **Nervous System Functioning**

The neurologic exam consists of tests of reflexes, balance, coordination, sensation (including tingling or numbness), and vision.

› **Diagnostic Tests** such as:

- MRI scan, which is the best imaging technology for detecting the presence of MS plaques or scarring (also called lesions) in different parts of the central nervous system (CNS). It can also differentiate old lesions from those that are new or active.
- Evoked potential tests, which measures how quickly and accurately a person's nervous system responds to stimulation
- Spinal tap, which checks spinal fluid for signs of immune system dysfunction
- Optical coherence tomography (OCT) to quantify retinal nerve fiber layer thickness (RNFLT) can detect MS disease processes.

In order to make a diagnosis of MS, the physician must

1. Find evidence (seen on a MRI) of damage in at least two separate areas of the CNS, which includes the brain, spinal cord and optic nerves **AND**
2. Find evidence that the damage occurred at least one month apart **AND**
3. Rule out all other possible diagnoses.

How is MS Treated?

Although there is still no cure for MS, effective strategies are available to

- **Modify the disease course**, reduce number of relapses, rates of progression and development of new lesions through the use of FDA-approved, disease-modifying drugs
- **Treat acute attacks**, also known as relapses or exacerbations, to shorten the duration and reduce the severity
- **Manage symptoms** successfully with strategies that include medication, self-care techniques, rehabilitation (with a physical or occupation therapist, speech/language pathologist, cognitive remediation specialist, among others), and the use of assistive devices
- **Improve function and safety**— through fitness, rehabilitation, energy management, and rehabilitation (a physical and occupational therapy, vocational and cognitive rehabilitation)
- **Provide emotional support**-- Mental health professionals (psychiatrists, psychologists, social workers, and counselors) are the members of the health care team that can help people living with MS and their friends and family meet the emotional, social, and vocational challenges of this unpredictable, chronic disease.

In combination, these strategies enhance the quality of life for people living with MS.