The National MS Society’s Professional Resource Center provides:

- Easy access to comprehensive information about MS management in a variety of formats;
- Dynamic, engaging tools and resources for clinicians and their patients; and
- Consultations and literature search services to support high quality clinical care.

For further information:

Visit our website:
nationalMSsociety.org/PRC

To receive periodic research and clinical updates and/or e-news for healthcare professionals,

Email:
healthprof_info@nmss.org

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PREFACE

The progressive nature of multiple sclerosis (MS), the unpredictability and variability of its symptoms, and the emotional and social changes it can cause, combine to create a complex, clinical challenge for healthcare professionals. This book provides an overview of MS and its treatment, with an emphasis on the unique role played by nurses in the treatment process.

The nurse is a key member of an MS team that may include neurologists, urologists, rehabilitation specialists, and mental health professionals. Day-to-day contact with the person with MS places the nurse at the hub of this system. The nurse is ideally situated to make physiologic assessments, particularly when changes in the person’s bladder and bowel functions, mobility, swallowing, vision, or skin status are subtle. The nurse may also be the first to detect psychosocial problems or cognitive changes.

Because of the chronic nature of MS, it is crucial for the patient and family to be actively involved in management of the disease and to consider themselves part of the healthcare team. The nurse often serves as their link to, and advocate within, the healthcare system. Ideally, the patient’s positive attitude and active role in self-monitoring and self-care will promote a sense of well-being and purpose, as well as an appreciation for life despite this chronic, unpredictable illness.

Portions of this material were adapted from two professional education programs co-sponsored by the National Multiple Sclerosis Society and the Consortium of MS Centers.
PART ONE:

CLINICAL VIGNETTES

The following vignettes serve to illustrate some of the medical, rehabilitative, and psychosocial issues confronting people living with multiple sclerosis (MS). The remaining sections of the book will provide an overview of the disease and its management, highlighting the pivotal role of nurses on the healthcare team.

JEANNETTE

HISTORY

Jeannette is a 30-year-old single woman who lives with her parents and sister. She was diagnosed with MS at the age of 19. Although she initially experienced a relapsing-remitting form of the disease, Jeannette’s MS quickly became more progressive. Since her last exacerbation, which occurred more than seven years ago, she has experienced a fairly steady disease progression without any periods of remission. Her MS is now described as secondary-progressive. Jeannette's current symptoms include:

- Paralysis of her lower extremities
- Spasticity
- Tremor
- Numbness and dysesthesias
- Bladder dysfunction
- Visual disturbances
- Fatigue
She has mobilized a number of resources to help her with her daily activities, including a home care attendant, visiting nurses, and accessible urban transportation.

**DIAGNOSIS**

Jeannette experienced her first symptoms while a sophomore in college. She had developed diplopia and sought medical attention to determine the cause. Her physician referred her to a neurologist for further evaluation, but because the double vision disappeared after a month, Jeannette did not pursue the matter. Four months later, the double vision recurred. Additionally, Jeannette described “heavy legs,” and observed that she was not able to run up and down stairs. The neurologist suspected MS and asked Jeannette whether she had ever heard of it. Since she had a cousin with MS, Jeannette was aware of multiple sclerosis as a chronic, potentially debilitating disease. Findings of both an MRI and a spinal tap confirmed the doctor’s clinical impression.

**INITIAL TREATMENT**

Jeannette was given a short course of IV methylprednisolone (Solu-Medrol) to manage her early symptoms. She felt better initially, but the symptoms quickly recurred. She was subsequently referred to an MS clinic where she was able to work with a physical therapist, psychologist, and a vocational social worker, as well as a neurologist, urologist, and physiatrist.

**SYMPTOM MANAGEMENT**

- During her first major post-diagnosis relapse, one of Jeannette’s legs became paralyzed. Although she regained some movement in the leg, her gait gradually worsened to the point that she needed to use forearm (Lofstrand) crutches to ambulate. She worked with the physical therapist in hopes of being able to graduate from the crutches to a cane, but the physical therapist suggested that Jeannette might be safer using a wheelchair than continuing with the crutches. It was very difficult for Jeannette to accept the idea that she might permanently require a mobility device. She requested a referral to a psychologist to help her deal with painful feelings of loss.

- Jeannette subsequently developed optic neuritis, which has never completely resolved. The condition is painful for her, but not intolerable, and her vision is now within normal limits.

- Jeannette has had a history of yearly urinary tract infections and sees a urologist every 4 to 6 months. Because of a problem with post-void residual urine (PVR), her urologist referred her to a nursing agency to learn intermittent self-catheterization (ISC). Difficulty with motor coordination, loss of sensation in her fingertips, and tremor made it impossible for Jeannette to manage ISC. A nurse now comes to her home to catheterize her in the morning and the evening; this has helped to manage the PVR and prevent more frequent UTIs.

- A bilateral, upper extremity tremor also poses significant problems for Jeannette. Because of the tremor, she initially became unable to eat without help from her mother or a personal care attendant. Instructed in the use of light weights, pulleys, and isometrics by an occupational therapist, Jeannette can now pick up a glass and feed herself.

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As a result of generalized spasticity and side effects from oral baclofen, Jeannette was given an intrathecal baclofen pump. A small pump was used because of Jeannette’s petite size. The disadvantage of the small-size pump is that it needs to be refilled approximately every two weeks.

In addition to the baclofen pump for spasticity, Jeannette takes oxybutynin — extended release (Ditropan XL) for bladder dysfunction; amantadine for fatigue; and gabapentin (Neurontin) for dysesthesias (“burning pain”).

DISEASE-MODIFYING THERAPY

Because Jeannette’s course quickly became secondary-progressive, with no further acute attacks, she was not considered a candidate for any of the disease-modifying drugs (which are approved in the United States only for relapsing forms of the disease). Because the disease-modifying drug mitoxantrone (Novantrone) is approved for secondary-progressive MS, Jeannette is working with her doctor to decide if this is a reasonable option for her to pursue.

CURRENT FUNCTIONING

Jeannette is visited by nurses in the morning and evening for intermittent catheterization. Her personal care assistant (PCA) helps her bathe, dress, and eat. Twice a week, using the local “Access-a-Ride” system for round-trip, door-to-door transportation, Jeannette volunteers at the local chapter of the National MS Society, reviewing and proof-reading informational materials. She naps each afternoon. Other appointments consist of medical visits, physical therapy, and a self-help group.

PSYCHOSOCIAL ISSUES

Although she tires easily and takes a long time to get dressed each morning, Jeannette looks forward to her time at the National MS Society. She appreciates the opportunity to work and to get out. She interacts with the staff and other volunteers, and is able to stay abreast of the latest developments in MS. Moreover, she has the sense that she is helping others.

JEFFREY HISTORY

Jeffrey is a 47-year-old married man who has been living with multiple sclerosis for more than ten years. He became unable to continue in his profession as a helicopter pilot when his MS symptoms began to interfere. He and his wife, who works as a business consultant, have a 5-year-old son. Since leaving his job, Jeffrey cares for his son and the household and volunteers at the local National MS Society chapter office.

As a helicopter pilot, Jeffrey was required to have an annual physical exam. He discussed his initial symptoms of numbness and tingling in his fingers with the examining physician and was referred to a neurologist. He had an MRI and evoked potential studies that helped to establish the diagnosis of relapsing-remitting MS.

SYMPTOM MANAGEMENT

For the first three to four years following the diagnosis, Jeffrey’s primary symptom was fatigue. He tried amantadine for a period of time but felt that it wasn’t really helpful.
Although he has learned to pace himself over the last 10 years, Jeffrey often finds the fatigue to be as overwhelming as it is difficult to describe. On the average of several times a week, he needs to lie down for 30–45 minutes before he can proceed with any routine activity. Clearly, the overwhelming fatigue precluded his ability to function as a pilot. Jeffrey’s neurologist recently prescribed modafinil (Provigil), a wakefulness-promoting medication, to see if that might be helpful for him. In addition to fatigue, Jeffrey’s gait has been affected to the point that he needs to use a cane for balance. He has also had bowel problems — primarily constipation — that he has learned to manage with dietary bran, prune juice, and occasional Therevac Plus mini enemas. Jeffrey also experiences an uncomfortable sensation termed “chest banding” that led recently to a cardiac work-up. His stress test confirmed that he did not have a cardiovascular problem and that the sensation of tightness around his chest and back is probably neurogenic. Most recently, both Jeffrey and his wife have noticed that he’s experiencing more problems with his memory.

RELAPSE MANAGEMENT

Relapses for Jeffrey consist primarily of severe dizziness. For one particularly uncomfortable episode, he was treated as an outpatient with IV methylprednisolone (Solu-Medrol), but did not experience relief.

DISEASE-MODIFYING THERAPY

Jeffrey has been taking interferon beta-1b (Betaseron) since shortly after his diagnosis. Although he tried self-injection, Jeffrey soon developed a strong aversion to the procedure. In spite of her heavy travel schedule, Jeffrey’s wife is usually available to administer the injections, which are given subcutaneously every other day. A neighbor who has been trained in the procedure helps out when Jeffrey’s wife is out of town.

Like others who are on injectable drugs for MS, Jeffrey has expressed the opinion that he “doesn’t feel better” with the interferon treatment. He has learned, however, that the goal of treatment with the disease-modifying drugs is to reduce the frequency and/or severity of exacerbations rather than to change the way he feels on a day-to-day basis. Jeffrey’s doctor has talked with him about switching to natalizumab (Tysabri) in an effort to reduce the number of relapses he experiences and the development of new lesions as seen on MRI, with one goal being to perhaps prevent further cognitive changes from occurring. Jeffrey and his wife have been discussing the doctor’s recommendation, but haven’t yet decided how they feel about the risks associated with this medication.

CURRENT FUNCTIONING

Jeffrey is not employed at the present time, but is actively engaged in taking care of his young son. He drives, manages the household, and continues his volunteer role. He is responsible for preparing the medication for the injections. Jeffrey is fairly diligent with the home exercise program that the physical therapist evaluated and approved for him.
PSYCHOSOCIAL ISSUES

Jeffrey and his wife have experienced a role reversal in their relationship. With the help of a family counselor in the early months of transition, they were able to express their feelings and concerns about this change in their lives. The family seems to have adjusted well over time.

Jeffrey has experienced one significant bout of depression since his diagnosis. Knowing that this is very common in people with MS — and that depression is thought to be a symptom of the disease as well as a reaction to its challenges — made it easier for him to get the help he needed. He responded well to treatment with an anti-depressant medication and counseling, and feels confident that he knows how to handle the situation if the depression recurs. Attending a bi-weekly MS support group has also provided him a place to share and problem-solve with others who share similar challenges.

SANDRA HISTORY

Sandra, a 40-year-old, married woman with two school-age daughters, was diagnosed with relapsing-remitting MS three years ago. She is a practicing attorney in a small law firm that has its offices in her town. Sandra has always been a very energetic and active person with a variety of interests. Her family is close-knit and very supportive.

Although, in retrospect, Sandra’s first symptoms appeared when she was a teenager (e.g., numbness in her upper and lower extremities; Lhermitte’s sign), her first attack as an adult occurred at age 37. At that time, she visited her primary care physician complaining of numbness in her hands and difficulty writing, both of which were attributed to possible carpal tunnel syndrome. When she developed double vision, loss of hearing, severe dizziness, and dysarthria, Sandra was referred to a neurologist. That initial episode had her bedridden for three weeks.

Following a battery of tests, including a CT scan, the doctor proposed several causes for Sandra’s symptoms, including benign paroxysmal vertigo. She underwent a series of kinesthetic exercises to help her cope with the dizziness, but these only exacerbated the problem. She subsequently had an MRI and evoked potential studies and was diagnosed with relapsing-remitting MS.

INITIAL TREATMENT

As soon as she was diagnosed, Sandra was given IV methylprednisolone (Solu-Medrol) for five days. The fatigue and dizziness abated rapidly. She was then treated with an oral prednisone taper. Following her recovery from this relapse, Sandra was referred to an MS specialist for a second opinion and a review of treatment options. The doctor recommended that Sandra begin one of the disease-modifying agents. She experienced a subsequent episode of optic neuritis of the right eye that resolved on its own without treatment.
DISEASE-MODIFYING THERAPY

Although she disliked the idea of daily injections, Sandra decided to try glatiramer acetate (Copaxone) rather than one of the interferons because she feared the flu-like symptoms associated with them. Sandra was taught to self-inject by a nurse practitioner, who was also very helpful in teaching her about MS. Sandra frequently develops a lump or itching at the injection site, but is otherwise free of side effects.

RELAPSE MANAGEMENT

During the past year, Sandra experienced an episode of severe fatigue, which she described as “feeling smacked” by the tiredness. At the time, she suspected that the fatigue was an early warning sign of a possible relapse. She cancelled all her activities and rested. Although initially reluctant, her husband has been trained to help her with the injections. Sandra reports that as a family, they have learned to become more organized in order to ensure consistency with the Copaxone.

While continuing to be very active, Sandra is learning to listen to her body and rest before becoming overtired. She also changed jobs after her diagnosis to limit the physical and emotional demands of long-distance commuting.

CURRENT FUNCTIONING

Sandra is highly functional, with little change in her ability to work full-time and take care of her family. She occasionally suffers from headaches, which she believes may be related to MS, and describes a burning sensation in her legs that is not debilitating. Her fatigue remains manageable without any medication.

PSYCHOSOCIAL ISSUES

Sandra is able to inject herself, but finds some sites (e.g., backs of the arms, tops of the buttocks) difficult to reach. Although initially reluctant, her husband has been trained to help her with the injections. Sandra reports that as a family, they have learned to become more organized in order to ensure consistency with the Copaxone.

Sandra is still grappling with the emotional and psychological consequences of receiving the diagnosis of MS. She and her family are determined to live their lives fully and not let MS alter their lifestyle. Nevertheless, they worry about the unpredictability of the disease.
PART TWO:
DISEASE OVERVIEW

PATHOPHYSIOLOGY
ETIOLOGY
Environmental
Infectious
Genetic

EPIDEMIOLOGY

DISEASE COURSE
CLASSIFICATIONS

DIAGNOSIS
SYMPTOMS
PROGNOSIS

TREATMENT
Treatment of Acute Exacerbations
Symptom Management
Disease Modification
Rehabilitation
Psychosocial Support
The Evolving Role of Nursing in MS Care

SOURCE MATERIALS

PATHOPHYSIOLOGY

Multiple sclerosis is thought to be an immune-mediated (most likely auto-immune) disease that primarily affects the central nervous system (CNS) — the brain, spinal cord, and optic nerves. Random attacks of inflammation (also called relapses or exacerbations) damage the myelin sheath (the fatty insulating substance surrounding nerve fibers in the white matter of the brain and spinal cord) causing scarring (also called plaques or lesions). The name multiple sclerosis comes from the multiple areas of scarring that characterize the disease process. The inflammatory attacks — along with the scarring they produce — occur randomly, varying widely in number and frequency from one person to another. The scars along the myelin sheath interfere with the transmission of nerve impulses, thereby producing the symptoms experienced by people with MS. Because of the randomness of the plaques within the CNS, no two people with MS will have exactly the same symptoms.

Until fairly recently, it was believed that any damage to the nerve fibers (axons) themselves was secondary and less substantial than the damage to the myelin sheath. A study by Trapp et al. (1998), however, confirmed that the nerve fibers can become irreversibly damaged as a consequence of the immune system’s attacks on myelin and the inflammation that occurs during relapses. This irreversible axonal loss, which can occur even in the earliest stages of the disease, is thought to be a major cause of the persistent neurologic deficits in multiple sclerosis. Thus, symptoms may become permanent when the ability to conduct nerve impulses is lost. In light of this information, medical experts in multiple sclerosis recommend that early intervention with one of the available disease-modifying agents be considered for any person with a confirmed diagnosis of MS and active disease. See the Disease Management Consensus Statement, Appendix A, page 31, for specific recommendations in the United States.
ETIOLOGY

While the precise cause of MS is still unknown, decades of research indicate that multiple sclerosis may be the result of an abnormal autoimmune response to some infection or environmental trigger in a genetically susceptible individual. Each of these factors — immunologic, environmental, infectious, and genetic — is the subject of intensive ongoing research.

MS is believed by most MS experts to be an autoimmune disease, in which the body’s immune system attacks apparently healthy tissues (i.e., the myelin sheath surrounding the nerve fibers and the nerve fibers themselves) in the CNS. The exact antigen (the target that the immune cells are sensitized to attack) remains unknown. Recently, however, researchers have been able to identify which immune cells are mounting the attack, how these cells are activated to attack, and some of the sites on the attacking cells that seem to be attracted to the myelin to begin the destructive process. Researchers are looking for highly specific immune modulating therapies to stop this abnormal immune response without harming normal immune cells.

ENVIRONMENTAL

Migration patterns and epidemiologic studies (that take into account variations in geography, socieconomics, genetics, and other factors) have demonstrated that people who are born in an area of the world with a high risk of MS, and move to an area with a lower risk before 15 years of age, acquire the risk level of their new home. These data suggest that exposure before puberty to some environmental agent may predispose a person to develop MS.

INFECTIOUS

While researchers do not yet know what factors within the environment cause MS to become active, most believe that some unidentified infectious agent — either viral or bacterial — is responsible. Although dozens of viruses and bacteria have been investigated to determine if they are involved in the development of MS, we still do not know which, if any, might be the culprit.

GENETIC

MS is not hereditary — like hair or eye color, for example. Support for this conclusion comes from the fact that an identical twin of a person with MS has only a 25 percent chance of developing MS rather than a 100 percent chance. However, a person who has a first-degree relative (e.g., a parent or sibling) with MS, has a significantly greater risk of developing MS than a person with no MS in the family. Thus, while the risk of MS in the general population is 1/750, it rises to 1/40 for a person who has a parent or sibling with MS. Scientists theorize that MS develops in individuals who are born with a genetic predisposition to react to some environmental agent. Exposure to that agent then triggers the autoimmune response. Research has demonstrated a higher prevalence of certain genes in populations with high rates of MS. Common genetic factors have also been found in some families where there is more than one person with MS.
Epidemiology

MS is typically diagnosed between the ages of 20 and 50. Although 90 percent of people are diagnosed between the ages of 16 and 60, MS can develop in infancy or well after the age of 60. MS is more common in women than men by a ratio of 2–3:1, and appears more frequently in Caucasians (particularly of northern European ancestry) than in Hispanics or African Americans. The disease is relatively rare among Asians and certain other groups. MS is more prevalent in temperate areas of the world and relatively rare in the tropical areas closer to the equator. At the present time, it is estimated that there are more than 500,000 people with MS in the United States and Canada, and more than 2.1 million worldwide.

Disease Course Classifications

The charts on the following pages (Figures 1–4) describe the results of an international survey of disease patterns in MS conducted by Fred D. Lublin, M.D. and Stephen C. Reingold, Ph.D. (1996).

It is important to keep in mind that these disease categories serve primarily as a tool for the development of clinical research protocols, and as a guide for certain types of treatment decisions. The disease categories became a focus of attention for people with MS when they were used by researchers to identify participants for the clinical trials of the disease-modifying therapies and then by insurance companies, to determine a person’s eligibility for reimbursement of these drugs. Although the categories have come to play a significant role in MS research and management decisions, they were designed to be descriptive in nature rather than a “report card” or rating scale of a person’s disease. A particular individual may not fit neatly into one category or another.
The categories can, however, provide people with MS and their healthcare providers with a useful guide to treatment options.

**RELAPSING-REMITTING MS (RRMS)**

RRMS is characterized by clearly defined acute attacks with full recovery (1A) or with residual deficit upon recovery (1B). Periods between disease relapses are characterized by a lack of disease progression. Approximately 85% of people are diagnosed initially with relapsing-remitting MS.

**SECONDARY-PROGRESSIVE MS (SPMS)**

SPMS begins with an initial relapsing-remitting disease course, followed by progression of variable rate (2A) that may also include occasional relapses and minor remissions and plateaus (2B). Natural history data suggest that of the 85% who start with relapsing-remitting disease, more than 50% will develop SPMS within 10 years; 90% within 25 years. The full impact of the disease-modifying therapies on this transition to progressive disease in not yet known.

**PRIMARY-PROGRESSIVE MS (PPMS)**

PPMS is characterized by progression of disability from onset, without plateaus or remissions (3A) or with occasional plateaus and temporary minor improvements (3B). Approximately 10% of people are diagnosed with PPMS.
PROGRESSIVE-RELAPSING MS (PRMS)

PRMS, which is the least common disease course, shows progression from onset but with clear acute relapses, with (4A) or without (4B) full recovery. Approximately 5% of people appear to have PRMS at diagnosis.

(Figures 1 through 4 adapted from Fred D. Lublin, M.D., and Stephen C. Reingold, Ph.D., Neurology, April 1996, 46:907–911.)

DIAGNOSIS

There is no single test that can determine whether a person has MS. The diagnosis is a clinical one, made on the basis of medical history, signs detected by the physician during a neurologic exam, and symptoms reported by the patient. A definitive diagnosis of MS requires the following:

- Evidence of plaques or lesions in two distinct areas of the CNS
- Evidence that the plaques occurred at discrete points in time
- The plaques in the white matter of the CNS have no explanation other than MS.

Because there is no specific test for MS, and the time between attacks can range from months to years, the diagnostic process can be a long and frustrating one. In addition, the symptoms are so variable and sometimes so subjective, that people’s complaints may be ignored or misinterpreted as “psychiatric.” Although the advent of magnetic resonance imaging (MRI) has greatly facilitated the diagnostic process, MRIs of the brain are abnormal in only 95% of newly-diagnosed individuals. They can therefore be used only as confirmatory evidence of the disease. Other tests used to confirm the diagnosis and/or rule out other problems include visual evoked potentials and a lumbar puncture.

SYMPTOMS

As a result of the inflammatory process in the CNS, people with MS can experience any or all of the following symptoms: fatigue, visual disturbances, spasticity, weakness, imbalance, sensory changes, pain, bladder and/or bowel dysfunction, sexual dysfunction, speech impairment (dysarthria), swallowing problems (dysphagia), emotional changes, and cognitive impairment. In a large (N = 697), population-based survey of individuals with MS (Aronson et al., 1996), the following symptoms were reported:

- Fatigue — 88%
- Ambulation problems — 87%
- Bowel/bladder problems — 65%
- Visual disturbances — 58%
- Cognitive problems — 44%
- Tremor — 41%
- Movement problems in the arms — 41%
The consensus from other studies is that more than 50 percent of people living with MS will experience some degree of cognitive dysfunction (LaRocca & Kalb, 2006; Rao et al., 1991). A prevalence study found that 73.1 percent of people living with MS reported sexual dysfunction (Zorzon et al., 2001; 1999). Studies of depression in MS indicate that 50 percent of people living with MS will experience a major depressive episode at some point over the course of the disease — a higher prevalence than is seen in other, equally disabling chronic illnesses, resulting in part from the disease process itself (Patten et al., 2003; Minden et al., 1987).

**PROGNOSIS**

Although prognosis in MS is uncertain, there are certain factors that seem to predict a more favorable course:

- Female gender
- Onset before age 35
- Monoregional (single area of CNS involvement) vs. polyregional (multiple areas) attacks
- Complete recovery after an exacerbation, leaving little or no residual impairment

Factors that tend to be associated with a poor prognosis include:

- Male gender
- Onset after age 35
- Brainstem symptoms such as nystagmus, tremor, ataxia, and dysarthria
- Poor recovery following exacerbations
- Frequent attacks

Studies have also indicated that although African-Americans are less likely than Caucasians to develop MS, they tend to experience a more progressive disease course (Naismith et al., 2006).
TREATMENT

Treatment strategies in MS fall into five general categories:

1. Treatment of acute exacerbations (attacks)
2. Symptom management
3. Disease modification
4. Rehabilitation (to enhance and maintain physical function)
5. Psychosocial support

TREATMENT OF ACUTE EXACERBATIONS

Although the exact protocol may differ, most neurologists use a high-dose intravenous (IV) corticosteroid agent such as methylprednisolone plus sodium succinate. Most commonly used is a 3- to 5-day course of treatment, either in the hospital or as an outpatient, which may or may not be followed by a gradually tapering dose of an oral corticosteroid such as prednisone. Steroids work to decrease acute inflammation in the CNS, but have no long-term benefits in MS. Many people feel better while taking them, in part because steroids can sometimes have a mood-elevating effect. The chronic use of steroids, however, causes serious side effects including hypertension, diabetes, bone loss (osteoporosis), cataracts, and ulcers.

Short courses of steroids tend to be well-tolerated by most people. Mood changes, however, are relatively common, with people reporting feeling “high,” energetic, and unable to sleep, and/or depressed, particularly as they come off the medication. A small percentage of people may experience quite severe disturbances in mood or behavior. Lithium, divalproex (Depakote), and carbamazepine (Tegretol) have all been shown to be effective in preventing or managing these symptoms. Patients should be alerted to these potential side effects before taking corticosteroids, and reminded that a person can react very differently to corticosteroids from one course to the next.

A second option for the treatment of acute exacerbations is ACTH (H.P. Acthar Gel — repository corticotropin injection). ACTH has been approved by the FDA for this purpose since 1978. Although there was a period when its availability in the U.S. and elsewhere became very restricted due to limited manufacturing production, the product is once again available.

SYMPTOM MANAGEMENT

Table 1 on the following pages presents the symptoms of MS, the treatments recommended to manage them, and the potential emotional and social impact of these symptoms on people’s lives.
### TABLE 1: SYMPTOM MANAGEMENT & ITS PSYCHOSOCIAL IMPLICATIONS *

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<th>SYMPTOM</th>
<th>TREATMENT</th>
<th>PSYCHOSOCIAL IMPLICATIONS</th>
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<tr>
<td><strong>AMBULATION PROBLEMS</strong></td>
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<td>Spasticity</td>
<td>SEE: Spasticity</td>
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| Impaired balance             | INTERVENTION: Referral to PT: mobility aids; exercise | ■ Resistance to use of mobility aids:  
  – Perceptions of self: damaged; weak; giving in  
  – Others’ perceptions: intoxication |
| Weakness                     | INTERVENTION: Referral to PT: mobility aids; exercise  
  MEDICATION: Fampridine-SR (Ampyra) to improve walking speed | |
| **BLADDER DYSFUNCTION****     |           |                           |
| Failure to store (urgency, frequency, incontinence, nocturia) | Anti-cholinergic/anti-muscarinic agents [oxybutynin (Ditropan); tolterodine (Detrol); hyoscyamine sulfate; propantheline bromide (Pro-Banthine); trospium chloride (Sanctura); solifenacin succinate (Vesicare)]; scheduled voiding; avoidance of diuretics | Fear of drinking liquids; anxiety over loss of control; fear of leaving the vicinity of bathroom; embarrassment/shame; fear of incontinence during intercourse; increased fatigue due to interrupted sleep |

* Visit nationalMSsociety.org/PRCPublications to read the Clinical Bulletins and Expert Opinion Papers relating to symptom management

** Invisible symptoms can be stressful since they tend to be ignored, misunderstood, or misinterpreted by other people.
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<th>PSYCHOSOCIAL IMPLICATIONS</th>
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<td>Failure to empty (urgency,</td>
<td>Intermittent self-catheterization (ISC); may</td>
<td>Anxiety about loss of</td>
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<tr>
<td>hesitancy, double voiding,</td>
<td>require indwelling catheter</td>
<td>control; fear of ISC</td>
</tr>
<tr>
<td>feelings of incomplete</td>
<td></td>
<td></td>
</tr>
<tr>
<td>emptying)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combined failure to store/</td>
<td>Combination of the above</td>
<td></td>
</tr>
<tr>
<td>failure to empty</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BOWEL DYSFUNCTION</strong>**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constipation</td>
<td>Bowel training; high fiber diet; exercise;</td>
<td>Discomfort; exacerbation</td>
</tr>
<tr>
<td></td>
<td>medication (e.g., softeners, mild laxatives,</td>
<td>of spasticity</td>
</tr>
<tr>
<td></td>
<td>mini-enemas)</td>
<td></td>
</tr>
<tr>
<td>Fecal impaction</td>
<td>Manual disimpaction</td>
<td>Discomfort; embarrassment</td>
</tr>
<tr>
<td>Diarrhea (usually from</td>
<td>Disimpact and relieve constipation</td>
<td>Discomfort; embarrassment</td>
</tr>
<tr>
<td>constipation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fecal incontinence</td>
<td>Bowel program; anticholinergic</td>
<td>Loss of control; anxiety</td>
</tr>
<tr>
<td></td>
<td>medication (for hyperreflexic bowel)</td>
<td>about leaving home/being</td>
</tr>
<tr>
<td></td>
<td></td>
<td>among others; shame</td>
</tr>
</tbody>
</table>

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### COGNITIVE SYMPTOMS**

- Memory impairment
- Impaired attention/concentration
- Slowed processing speed
- Impaired executive functions
- Impaired spatial relations
- Impaired word-finding ability

*Note: Cognitive deficits are often missed in a standard neurologic exam.*

**INTERVENTIONS:**
- Cognitive rehabilitation
  - Restorative approach: direct retraining exercises (have only limited benefit for daily activities)
  -Compensatory approach: aims to improve function via substitution of compensatory strategies/tools for the impaired function

**MEDICATIONS:**
- Donepezil hydrochloride (Aricept) may be useful; disease-modifying agents may be beneficial in preventing or slowing progression of cognitive changes

**INDIVIDUAL:**
- Denial; anxiety; loss of self-esteem/self-confidence; depression; may interfere with self-care and independence

**INTERPERSONAL:**
- Family strain; marital strain; impaired communication; role shifts within the family

**EMPLOYMENT:**
- Major cause of high unemployment rate in people living with MS

**HEALTHCARE:**
- May affect communication with providers and compliance with treatment

### FATIGUE**

**PRIMARY (NEUROLOGIC):**
- Overwhelming lassitude or tiredness that can strike at any time of day

**SECONDARY:**
- Resulting from disturbed sleep; depression; extra exertion due to impairments; medications

**INTERVENTIONS:**
- Referrals to PT and OT; naps; moderate aerobic exercise; work simplification; use of assistive devices (e.g., electric scooter); cooling strategies/devices

**MEDICATIONS:**
- Amantadine (Symmetrel); modafinil (Provigil); fluoxetine (Prozac)

**INDIVIDUAL:**
- Inability to carry out activities at home and at work; fatigue of this magnitude is depressing; invisible symptom that is easily misinterpreted by others

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## SYMPTOMS/PAIN

### PRIMARY PAIN (FROM LOSS OF MYELIN):
- **Trigeminal neuralgia** (sharp facial pain)
- **Dysesthesias** (electric shock-like sensations in trunk or extremities)
- **Numbness, tingling: retro-orbital pain** (with optic neuritis)

### MEDICATIONS:
- Carbamazepine (Tegretol);
- gabapentin (Neurontin);
- phenytoin (Dilantin);
- duloxetine (Cymbalta);
- baclofen (Lioresal)

### SURGERY:
- Radiofrequency rhizotomy;
- radiofrequency electrocoagulation; glycerol rhizotomy

### MEDICATIONS:
- Same as above, or topical application of capsaicin acid cream
- High-dose IV steroids

### SECONDARY PAIN (MUSCULOSKELETAL):
- Resulting from poor posture/balance in ambulatory individuals or improper use/fitting of wheelchair

### TREATMENT:
- Analgesics; gait training; assessment of all seating (home, automobile, work, and wheelchair/scooter)

### PSYCHOSOCIAL IMPLICATIONS
- Anxiety; discomfort; clumsiness; fatigue increased by medications and interrupted sleep
- Medications increase fatigue
- Steroids can affect mood
- Discomfort

Note: People often told by doctors that MS does not cause pain.

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<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>TREATMENT</th>
<th>PSYCHOSOCIAL IMPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SEXUAL DYSFUNCTION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PRIMARY (RESULT OF NEUROLOGIC IMPAIRMENT):</strong></td>
<td>Evaluation of medications that might be interfering with sexual function (e.g. antidepressants)</td>
<td><strong>INDIVIDUAL:</strong> Significant impact on gratification, self-esteem, self-confidence; difficult/embarrassing to discuss with healthcare providers</td>
</tr>
<tr>
<td>Impaired arousal; sensory changes; reduced vaginal lubrication; erectile dysfunction; inability to reach orgasm</td>
<td><strong>MEN:</strong> Oral medications (sildenafil — Viagra; vardenafil — Levitra; tadalafil — Cialis); injectable or insertable medication (alprostadil—Prostin VE, MUSE); prosthetic devices</td>
<td><strong>INTERPERSONAL:</strong> Significant impact on intimate relationships:</td>
</tr>
<tr>
<td></td>
<td><strong>WOMEN:</strong> Lubricating substances; enhanced stimulation</td>
<td>■ Sexual activity can be difficult, exhausting, painful, and unsatisfying</td>
</tr>
<tr>
<td><strong>SECONDARY (RESULTING FROM OTHER MS SYMPTOMS):</strong></td>
<td>Effective management of MS symptoms to reduce impact on sexual function</td>
<td>■ Lack of arousal can be misunderstood and resented by partner</td>
</tr>
<tr>
<td>Fatigue; spasticity; bladder/bowel problems; sensory changes interfere with sexual activity</td>
<td></td>
<td>■ Learning new ways to be intimate can be frightening and difficult</td>
</tr>
<tr>
<td>Note: Impaired arousal, erectile dysfunction, and inability to reach orgasm can also result from medications taken to relieve other symptoms, most notably antidepressants.</td>
<td></td>
<td>■ Caregivers may become disinterested in, or uncomfortable with, their disabled partner</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Person with MS may be reluctant to become intimate with new partner</td>
</tr>
</tbody>
</table>

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### Spasticity

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Treatment</th>
<th>Psychosocial Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phasic spasms (flexor or extensor)</strong></td>
<td>1. Rehabilitative PT (stretching; gait assessment)</td>
<td></td>
</tr>
<tr>
<td><strong>Sustained increase in muscle tone</strong></td>
<td>2. Oral medications (baclofen — Lioresal; tizanidine — Zanaflex; diazepam — Valium)</td>
<td>Oral medications increase fatigue and weakness</td>
</tr>
<tr>
<td></td>
<td>3. Intrathecal baclofen pump</td>
<td>Surgical implantation of pump in abdomen can be frightening</td>
</tr>
<tr>
<td></td>
<td>4. Botulinum toxin injections into individual muscles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Surgery</td>
<td>Severing of tendons is irreversible</td>
</tr>
</tbody>
</table>

*Some degree of spasticity may be required to support weakened limbs.*

---

**Sexual Dysfunction**

<table>
<thead>
<tr>
<th>Tertiary (Resulting from Disability-Related Attitudes/Feelings)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeling unattractive; unable to attract a partner; believing sexuality is incompatible with disability</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Treatment</th>
<th>Psychosocial Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tertiary (resulting from disability-related attitudes/feelings)</td>
<td>Individual and couple’s counseling and education</td>
<td>Same as listed on page 19</td>
</tr>
</tbody>
</table>

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*Visit nationalMSsociety.org/PRCPublications to read the Clinical Bulletins and Expert Opinion Papers relating to symptom management*

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<thead>
<tr>
<th>SYMPTOM</th>
<th>TREATMENT</th>
<th>PSYCHOSOCIAL IMPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPEECH/SWALLOWING PROBLEMS**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>■ Dysarthria — poorly</td>
<td>Assessment; exercise program;</td>
<td>Slurring can be misinterpreted as drunkenness or lack of</td>
</tr>
<tr>
<td>articulated, slurred speech</td>
<td>training with augmentative or alternative communication devices, if needed</td>
<td>intelligence; slow, slurred speech interferes with</td>
</tr>
<tr>
<td></td>
<td></td>
<td>communication</td>
</tr>
<tr>
<td>■ Dysphagia — difficulty in</td>
<td>Assessment; oral exercise program; modified diet; non-oral feeding</td>
<td>Fear of loss of control, choking; food needs to be</td>
</tr>
<tr>
<td>swallowing that can lead</td>
<td>strategies, if needed</td>
<td>be blended; eating is exhausting; loss of pleasurable</td>
</tr>
<tr>
<td>to aspiration and/or</td>
<td></td>
<td>mealtimes; loss of ability to eat orally</td>
</tr>
<tr>
<td>inadequate nutrition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TREMOR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Involuntary movements of the</td>
<td>INTERVENTIONS: Balance/coordination exercises;</td>
<td>Fear of loss of control — severe tremor is a major threat</td>
</tr>
<tr>
<td>arms, legs, or head; tremor</td>
<td>weights on limbs or utensils</td>
<td>to independence</td>
</tr>
<tr>
<td>can be the least treatable</td>
<td></td>
<td>Medications can increase fatigue</td>
</tr>
<tr>
<td>and most debilitating symptom of MS</td>
<td>MEDICATIONS: Propranolol; clonazepam (Klonopin); primidone (Mysoline); isoniazid (Laniazid); buspirone (BuSpar); ondansetron (Zofran)</td>
<td></td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>SYMPTOM</th>
<th>TREATMENT</th>
<th>PSYCHOSOCIAL IMPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VERTIGO</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe dizziness and nausea caused by inflammation in the brainstem</td>
<td>Oral medication (meclizine — Antivert); IV fluids and high dose corticosteroids if nausea prevents the use of oral medications</td>
<td>Vertigo interferes with functioning at home and at work; steroids can impact mood</td>
</tr>
<tr>
<td><strong>VISUAL IMPAIRMENT</strong>**</td>
<td><strong>MEDICATIONS:</strong> High-dose corticosteroids</td>
<td>Visual symptoms can threaten independent functioning (e.g., driving), increase fatigue, and interfere with activities at work and at home</td>
</tr>
<tr>
<td>■ Optic neuritis — temporary loss or disturbance of vision, often accompanied by pain; may also cause “blind spot” (scotoma) in center of vision</td>
<td><strong>MEDICATIONS:</strong> High-dose corticosteroids</td>
<td>Steroids can impact mood</td>
</tr>
<tr>
<td>■ Diplopia — double vision</td>
<td><strong>MEDICATIONS:</strong> Clonazepam (Klonopin) if necessary</td>
<td>Medication can increase fatigue</td>
</tr>
<tr>
<td>■ Nystagmus — rhythmic jerkiness or bounce in one or both eyes</td>
<td><strong>INTEVENTIONS:</strong> Training in visual compensation, environmental modifications, adaptive equipment, as needed</td>
<td></td>
</tr>
</tbody>
</table>

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** Invisible symptoms can be stressful since they tend to be ignored, misunderstood, or misinterpreted by other people.
DISCUSSING DIFFICULT TOPICS WITH YOUR PATIENTS

As demonstrated in Table 1, MS can cause a wide variety of symptoms. Identifying and discussing a person’s symptoms can be challenging at times, for several important reasons.

- While some changes are readily apparent — such as walking problems, speech impairments, or tremor — others, including fatigue, bladder and bowel changes, and cognitive and emotional changes, are less visible to the observer.

- While some symptoms are relatively easy for people to discuss — like fatigue, or double vision, stiffness, or pain — others are more embarrassing, such as cognitive symptoms, bladder and bowel dysfunction, sexual dysfunction, and even depression.

For all these reasons, it is important to do a complete assessment at every visit, asking about symptoms or changes whether or not a person has mentioned any difficulties. It is equally important to make sure that people with MS have access to accurate and comprehensive information about the disease so that they are aware of the kinds of changes and symptoms it can cause. Publications about virtually every aspect of MS and its management can be downloaded from the National MS Society website nationalMSsociety.org/Library or requested in hard copy (800-344-4867). The Society is happy to make materials available for you and your patients.

Note: The series entitled Talking with Your MS Patients about Difficult Topics can be downloaded in PDF format from the Society’s professional website at nationalMSsociety.org/PRC Publications.

DISEASE MODIFICATION

Since 1993, the U.S. Food and Drug Administration (FDA) has approved several medications for use in multiple sclerosis. For the first time, we have the ability to reduce disease activity for many people living with MS. These medications are not designed to cure MS or provide relief from current symptoms — in fact, the effects on the disease may not be immediately apparent. However, each of these medications has been shown in phase III clinical trials to provide significant long-term benefit for people with relapsing forms of MS. Unfortunately, no medications have yet been approved for the treatment of primary-progressive MS.

And none of these medications are recommended for use by women who are pregnant or trying to become pregnant, or who are breastfeeding. Women should be encouraged to discuss all of their medications with their physician and/or nurse prior to trying to conceive.

The most current information for clinicians about the disease modifying therapies can be found on the Society’s website at nationalMSsociety.org/DMTUUpdate and for patients at nationalMSsociety.org/Treatments.
Ongoing clinical trials are listed at: nationalMSsociety.org/ClinicalTrials. Since new trials are announced periodically, and additional information becomes available as trials are completed, it is important to check these sites on a routine basis.

THE ROLE OF EARLY INTERVENTION

Based on clinical experience with the interferon beta medications and glatiramer acetate — and the results of recent studies confirming that early relapses can cause permanent axonal damage as well as destruction of myelin, the National MS Society Clinical Advisory Board (NCAB) supports early intervention with one of these agents. The Consensus Statement by the NCAB (last revised in 2008 — see Appendix C) recommends that:

- Initiation of therapy with an immunomodulatory medication should be considered as soon as possible following a definite diagnosis of MS with active disease, and may also be considered for selected patients with a first attack who are at high risk of MS.

- Therapy should be continued indefinitely unless there is clear lack of benefit, intolerable side effects, or a better therapy is identified.

- Natalizumab is generally recommended by the FDA for patients who have had an inadequate response to, or are unable to tolerate, other multiple sclerosis therapies.

- Immunosuppressant therapy with Novantrone may be considered for selected relapsing patients with worsening disease.

The full text of the Consensus Statement, which is currently under revision, can be downloaded from the website at: nationalMSsociety.org/Consensus.

ADHERENCE TO THE DISEASE MODIFYING THERAPIES

The challenge to medical and mental health providers is to support the patient’s optimism and hope for a benign disease course while emphasizing the potential benefit of early treatment for a disease that is chronic, unpredictable and largely invisible. At the present time, about 60 percent of the 400,000 individuals with MS in the U.S. are receiving treatment with one of the disease-modifying therapies. A study by the North American Research Committee on Multiple Sclerosis (NARCOMS) found that one-third of people stop treatment within the first nine months. The major obstacle to long-term use of these treatments was the perceived lack of effectiveness as evidenced by the fact that the symptoms stayed the same or got worse.

These therapies are known to be partially effective — i.e., they slow disease progression but do not stop progression or cure the disease. This means that people are stopping the medications because they do not understand why they are taking them in the first place. They start with unrealistic expectations, and stop in frustration when those expectations are not met. Based on these findings, the researchers recommended improved education for people living with MS and their families in order to bring their expectations more in line with those of their physicians. They further recommended careful monitoring by healthcare providers, in order to address patients’ concerns, clarify misconceptions, and manage side effects (NARCOMS, 1999).
It has been demonstrated that interventions to promote adherence will be more effective if they match the patient’s readiness for change (Cassidy, 1999). The Transtheoretical Model of Behavior Change as it applies to MS comprises several stages. While this is essentially a nursing model, the principles are basically the same for all health professionals working with persons with MS.

1. Pre-contemplative stage: The newly-diagnosed patient is not yet contemplating treatment (“I’m not sick enough for that yet”). The provider’s role is to explore the patient’s understanding of MS, personal beliefs about therapy, and perceived obstacles to starting therapy in an effort to foster awareness of the disease and understanding of his/her personal barriers to treatment.

2. Contemplative stage: The patient is actively considering therapy but with some ambivalence. The provider’s role is to educate with a focus on anticipated benefits, the risks associated with no treatment, and a clarification of the patient’s goals.

3. Preparation stage: The patient expresses a determination to start treatment within the next month and together with the physician and nurse, chooses the most appropriate of the five available drugs. The provider’s role is to work with the patient to develop a treatment regimen, address financial arrangements, and establish a support system.

4. Action stage: The patient is engaging in therapy with one of the five agents. The provider’s role is to be available to address concerns, problem-solve, and provide continuing support.

5. Maintenance stage: Patients strive to adhere to commitment to treatment. Professionals continue to provide support and follow-up, reinforce realistic expectations, and repeat the intervention stages in the event that the patient goes off therapy (Cassidy, 1999; Holland et al., 2001).

REHABILITATION

Although we now have disease-modifying therapies available to help slow the progression of multiple sclerosis, most people with MS will continue to have limitations. Rehabilitation in MS involves the intermittent or ongoing use of multidisciplinary strategies to promote functional independence, prevent complications, and enhance overall quality of life. It is an active process directed toward helping the person recover and/or maintain the highest possible level of functioning and realize his or her optimal physical, mental, and social potential given any limitations that exist.

Rehabilitation specialists target the following impairments in their work with individuals with MS: fatigue, weakness, spasticity, cognitive impairments, imbalance, sensory loss, ataxia/tremor, pain, paraparesis, speech and swallowing problems, visual disturbances, and bowel and bladder problems. The goal of these rehabilitation interventions is to reduce “disablement,” as defined by the World Health Organization (WHO) in the International Classification of Impairments, Activities, and Participation: A Manual of Dimensions of Disablement and Health (ICIDH-2). Disablement
is an umbrella term used to describe the consequences of any health condition (disease, disorder, or injury) on a person’s body structures or functions, personal activities, and participation in society. Although rehabilitation interventions cannot reverse the neurologic damage caused by MS, they can reduce disableness by:

- Minimizing the impact of existing impairment(s) on day-to-day functioning
- Enhancing the person’s ability to carry out daily activities and participate to the fullest extent possible in all of his or her life roles

THE UNIQUE ROLE OF REHABILITATION IN MS

In general medical practice, the skills of rehabilitation professionals are called upon following a patient’s acute injury or illness, with the goal being one of partial or complete recovery. The specialist enters the picture to solve a problem, and leaves when the problem is solved. Rehabilitation specialists have a somewhat different role in a chronic disease like MS. From the time of diagnosis onward — even before the advent of obvious impairment — the rehabilitation specialist can provide education and treatment designed to promote good health and general conditioning, reduce fatigue, and maximize participation in all life roles. With the progression of the disease, the rehabilitation specialist’s role becomes a more active one, involving structured, problem-focused interventions to manage symptoms, enhance function, facilitate activities of daily living, identify appropriate assistive devices and environmental modifications, and prevent injuries and unnecessary complications.

While each intervention might be of relatively short duration, the expectation is that the chronic, often progressive nature of MS will necessitate repeated assessments and interventions over the course of the illness.

RESTORATIVE & PREVENTIVE GOALS OF REHABILITATION IN MS

In multiple sclerosis, rehabilitation has both restorative and preventive goals. Restorative rehabilitation is designed to help the person reach his or her highest physical, emotional, and functional level given the limitations imposed by the illness. Thus, individuals who have recently experienced an exacerbation and accompanying decrease in functional abilities, may require rehab interventions designed to help them regain as much as possible of their previous functional abilities. While total restoration of function may not be possible, the goal is always to maximize independence, productivity, comfort, and self-care while minimizing the impact of the impairment and secondary complications on the person’s activities and participation.

When multiple sclerosis has a progressive course, rehabilitation interventions are also designed to help people maintain maximal function in the face of disease progression, and prevent injuries and complications resulting from immobility. Remaining stable, or “holding one’s own,” replaces improvement as the targeted outcome. It is important to keep in mind that accepting limitations of function at any point in the disease process can be emotionally devastating. Rehabilitation professionals and mental health professionals may have a critical role to play in helping people with MS modify their expectations and develop realistic goals, while maintaining their self-esteem in the process.

THE REHABILITATION “TEAM”

The “team” concept is critical to the rehabilitation of people with MS whether or not the various members of the team actually work in tandem within a single setting. Because MS strikes at the peak years of career formation and family life, and because it can affect so many different physical and psychological functions, it demands the coordinated efforts of an interdisciplinary team of professionals working collaboratively with the person with MS and his or her care partners (significant other, other family members, paid assistant(s)).

PERSON WITH MS

As the hub of the rehabilitation team, the person with MS and his or her care partners are the driving force behind the rehabilitation process. In order for the process to be successful, the needs and priorities of the person with MS must always serve to guide the rehabilitation plan. The other members of the team educate the person with MS about his or her options for care, and work collaboratively with that person, and each other, to coordinate and facilitate the interventions that are chosen.

PHYSICIAN (GENERALLY A NEUROLOGIST OR PHYSIATRIST):

The physician often functions as the team leader. Beginning with the initial assessment, the physician works with the person to identify treatment needs and initiate the treatment process. Ideally, referrals to rehabilitation specialists are made during these early days of treatment, while problems are smaller and more manageable, and before medical or psychosocial crises have had a chance to develop. These early interventions can begin the educational process that will help the person with MS to become an active, well-informed partner in his or her own care.

NURSE

The nurse generally functions as the team’s coordinator. While this nursing role may vary from one setting to another, it is generally true that the nurse, who has the most frequent contact with the person with MS, is in the best position to identify the person’s ongoing needs and coordinate referrals to, and communication with, other team members. The nurse can also serve in the role of case manager for those individuals with MS who are unable—or unwilling—to handle that role themselves.

As a member of the rehabilitation team, the nurse provides education about MS, teaches self-management skills (self-injection and symptom management strategies, bowel/bladder care, and skin care), facilitates referrals, and provides ongoing support for the rehabilitation process.

PHYSICAL THERAPIST

The physical therapist’s goal is to evaluate and improve movement and function, with particular emphasis on physical mobility, balance, posture, exercise, and fatigue and pain management. As part of the rehabilitative process, the physical therapist helps people meet their mobility challenges and identifies and orders appropriate equipment. Physical therapy also assists people in managing the physical demands in their family, work, and social lives while accommodating the physical changes brought about by the disease.

OCCUPATIONAL THERAPIST

The occupational therapist’s role on the rehabilitation team is to help people maintain the everyday skills that are essential for independent living and that allow for productivity at home and at work.
The major areas targeted by the occupational therapist include: fatigue, cognition, upper body strength and coordination, the use of assistive technology, and instruction in behavioral and environmental modifications to maintain maximal home, work, and community participation.

**SPEECH-LANGUAGE PATHOLOGIST**

The speech-language pathologist primarily addresses problems resulting from impaired muscle control in the lips, tongue, soft palate, vocal cords, and diaphragm, which interfere with speech production, voice quality, and swallowing. The goals are to promote effective communication and identify and address swallowing problems that can compromise a person’s health, comfort, and safety. Speech-language pathologists are also involved in the assessment and management of cognitive dysfunction in people with MS, particularly as it relates to communication.

**ADDITIONAL REHABILITATION RESOURCES**

The comprehensive rehabilitation team must have access to a variety of other resources, including psychologists, neuropsychologists, social workers, dieticians, orthotists, vocational rehabilitation specialists, and any other professionals whose services might be enlisted to enhance a person’s health and safety, functional independence, and quality of life.

**PSYCHOSOCIAL SUPPORT**

Psychosocial support is the fifth major category of treatment in MS, encompassing:

1. Disease-related education (more recently termed psychoeducation — a supportive educational process designed to enhance people’s understanding of the disease, adaptive coping strategies, and available resources)
2. Diagnosis/treatment of emotional and/or cognitive problems
3. Family interventions designed to support family members’ efforts to cope with the intrusion of MS into the household
4. Support for people’s efforts to remain productively employed as long as they are able and interested, and to transition out of the workforce when, and if, it is necessary to do so
5. Helping individuals with MS and their families to access available resources

**THE EVOLVING ROLE OF NURSING IN MS CARE**

Long gone are the days of “Diagnose and Adios,” as Dr. Labe Scheinberg described the era of MS treatment before the advent of comprehensive, interdisciplinary care models and effective disease modifying therapies. Today, from the time of diagnosis onward, people with MS and their families can look to an array of healthcare professionals that have the skills and tools to help them live more comfortably and productively with the disease. Over the past twenty years, nurses have played an increasingly active role in MS care, helping patients and their families to implement treatment strategies, attend to their own and each other’s health and wellness, and partner effectively with their healthcare providers.
As the health professional with most frequent contact with patients, the nurse often serves as the treatment hub — identifying medical, psychological, and social issues, making referrals, acting as patient advocate and/or care manager, and fostering communication among the clinicians involved, and between the clinicians and the patient and family. The nurse thus has a crucial role to play throughout the disease course:

FOR THE NEWLY DIAGNOSED:
- Providing education about the disease and its treatment to individuals with MS and their families
- Teaching injection techniques and supporting adherence to treatment interventions
- Helping people learn how to manage their symptoms
- Identifying important resources such as the National MS Society and other area organizations or services
- Promoting overall health and wellness
- Being on the lookout for medical, emotional, cognitive, social, or vocational changes requiring attention and/or referral

FOR THE PERSON TRANSITIONING TO MORE PROGRESSIVE DISEASE:
- Promoting understanding of disease progression
- Supporting the person’s efforts to manage symptoms and avoid unnecessary complications
- Reinforcing the need for rehabilitation strategies to enhance function and independence, and facilitating appropriate referrals
- Helping people adhere to their recommended treatment regimen
- Educating families about the potential impact of progressive disease on individuals and families, and encouraging collaborative problem-solving and planning
- Promoting overall health and wellness

FOR THE PERSON WITH ADVANCED MS:
- Facilitating interdisciplinary treatment interventions
- Acting as care manager if necessary
- Supporting the person’s efforts to manage symptoms, maintain safety, and prevent complications
- Educating individuals and families about long-term care options and supporting people’s efforts to communicate about these options
- Working within the long-term care setting to promote independence, self-esteem, productivity, and self-determination
- Promoting overall health and wellness

Today, nurses are working with MS patients in outpatient clinics and MS centers, acute care settings, rehabilitation units, long-term care facilities, and in the home. Some opt to become nurse practitioners or MS nurse specialists, taking on an even larger role in MS evaluation and treatment. In addition to their active role in the clinical care of people with MS, nurses have become increasingly involved in MS research, designing and implementing outcome studies of nursing interventions and coordinating clinical trials. The opportunities to have a significant impact on the well-being of people with MS and their families are limitless.
SOURCE MATERIALS

The Society recognizes that the factors that enter into a decision to treat are complex and best analyzed by the individual patient’s neurologist.

Initiation of treatment with an interferon beta medication or glatiramer acetate should be considered as soon as possible following a definite diagnosis of MS with active, relapsing disease, and may also be considered for selected patients with a first attack who are at high risk of MS.*

Natalizumab is generally recommended by the Food and Drug Administration (FDA) for patients who have had an inadequate response to, or are unable to tolerate, other multiple sclerosis therapies.

Treatment with mitoxantrone may be considered for selected relapsing patients with worsening disease or patients with secondary-progressive multiple sclerosis who are worsening, whether or not relapses are occurring.

Patients’ access to medication should not be limited by the frequency of relapses, age, or level of disability.

Treatment is not to be stopped while insurers evaluate for continuing coverage of treatment, as this would put patients at increased risk for recurrent disease activity.
INTRODUCTION

The management of multiple sclerosis (MS) has been substantially advanced by the availability of the disease-modifying agents, glatiramer acetate and interferon beta 1a and 1b, mitoxantrone, and natalizumab. A number of positive outcomes have been demonstrated in people with relapsing disease: reduction in the frequency of relapses [Betaseron; Avonex; Copaxone; Rebif; Novantrone; Tysabri]; reduction of brain lesion development, as evidenced by magnetic resonance imaging (MRI) [Betaseron; Avonex; Copaxone; Rebif; Novantrone; Tysabri] and the possible reduction of disability progression [Betaseron; Avonex; Copaxone; Rebif; Novantrone; Tysabri].

Based on several years of experience with glatiramer acetate, interferon beta 1a and 1b and mitoxantrone, and the more recent experience with natalizumab, it is the consensus of researchers and clinicians with expertise in MS that these agents are likely to reduce future disease activity and improve quality of life for many individuals with relapsing forms of MS, including those with secondary progressive disease who continue to have relapses. For those who are appropriate candidates for one of these drugs, treatment must be sustained for years. Cessation of treatment may result in a resumption of pre-treatment disease activity.

Clinical trials are designed to evaluate the smallest number of people, over the shortest period of time, at the lowest cost. In order to accomplish this, inclusion criteria are necessarily narrow. These restricted parameters of clinical trials are not intended to regulate subsequent clinical use of the agent. With demonstrated benefit to people living with MS from continued use of glatiramer acetate, interferon beta 1a, or interferon beta 1b, it is critical that these therapies be made available early in the disease process to appropriate candidates as indicated in the labeling of each of these medications, and that mitoxantrone and natalizumab be available for judicious use in aggressive relapsing disease and for those not responding to other disease-modifying therapies.

If a copy of the entire document with references is desired, call 1-800-344-4867 or go to nationalMSsociety.org/Consensus.
# APPENDIX B:

## MEDICATIONS COMMONLY USED IN MS

<table>
<thead>
<tr>
<th>GENERIC NAME</th>
<th>BRAND NAME¹²</th>
<th>USAGE IN MS</th>
</tr>
</thead>
<tbody>
<tr>
<td>adrenocorticotropic hormone (ACTH)</td>
<td>H.P. Acthar Gel</td>
<td>Acute exacerbations</td>
</tr>
<tr>
<td>alprostadil</td>
<td>Prostin VR</td>
<td>Erectile dysfunction</td>
</tr>
<tr>
<td>alprostadil</td>
<td>MUSE</td>
<td>Erectile dysfunction</td>
</tr>
<tr>
<td>amantadine</td>
<td>Symmetrel</td>
<td>Fatigue</td>
</tr>
<tr>
<td>amitriptyline</td>
<td>Elavil</td>
<td>Pain (paresthesias)</td>
</tr>
<tr>
<td>baclofen</td>
<td>Lioresal</td>
<td>Spasticity</td>
</tr>
<tr>
<td>baclofen (intrathecal)</td>
<td>Intrathecal Baclofen (ITB)</td>
<td>Spasticity</td>
</tr>
<tr>
<td>bisacodyl¹</td>
<td>Dulcolax</td>
<td>Constipation</td>
</tr>
<tr>
<td>bupropion</td>
<td>Wellbutrin</td>
<td>Depression</td>
</tr>
</tbody>
</table>

¹ Available without a prescription. ² Available in US and Canada unless otherwise noted.

Note: The materials in this appendix are adapted with permission from Rosalind C. Kalb (ed.), Multiple Sclerosis: The Questions You Have; The Answers You Need (4th ed.). New York: Demos Medical Publishing, 2008. They are also available on the website of the National MS Society (nationalMSsociety.org) in the Treatments section.
<table>
<thead>
<tr>
<th><strong>GENERIC NAME</strong></th>
<th><strong>BRAND NAME</strong></th>
<th><strong>USAGE IN MS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>carbamazepine</td>
<td>Tegretol</td>
<td>Pain (trigeminal neuralgia)</td>
</tr>
<tr>
<td>ciprofloxacin</td>
<td>Cipro</td>
<td>Urinary tract infections</td>
</tr>
<tr>
<td>citalopram</td>
<td>Celexa</td>
<td>Depression</td>
</tr>
<tr>
<td>clonazepam</td>
<td>Klonopin</td>
<td>Tremor; Pain; Spasticity</td>
</tr>
<tr>
<td>dalfampridine (formerly called fampridine, 4-aminopyridine, and 4-AP)</td>
<td>Ampyra</td>
<td>Walking</td>
</tr>
<tr>
<td>dantrolene</td>
<td>Dantrium</td>
<td>Spasticity</td>
</tr>
<tr>
<td>desmopressin</td>
<td>DDAVP nasal spray; DDAVP tablets</td>
<td>Urinary frequency</td>
</tr>
<tr>
<td>dexamethasone</td>
<td>Decadron</td>
<td>Acute exacerbations</td>
</tr>
<tr>
<td>diazepam</td>
<td>Valium</td>
<td>Spasticity (muscle spasms)</td>
</tr>
<tr>
<td>docusate(^1)</td>
<td>Colace</td>
<td>Constipation</td>
</tr>
<tr>
<td>docusate(^1)</td>
<td>Enemeez Mini Enema</td>
<td>Constipation</td>
</tr>
<tr>
<td>duloxetine hydrochloride</td>
<td>Cymbalta</td>
<td>Depression; Neuropathic pain</td>
</tr>
<tr>
<td>fluoxetine</td>
<td>Prozac</td>
<td>Depression; Fatigue</td>
</tr>
<tr>
<td>gabapentin</td>
<td>Neurontin</td>
<td>Pain</td>
</tr>
<tr>
<td>glatiramer acetate</td>
<td>Copaxone</td>
<td>Disease modifying agent</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th><strong>GENERIC NAME</strong></th>
<th><strong>BRAND NAME</strong></th>
<th><strong>USAGE IN MS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>glycerin¹</td>
<td>Sani-Supp Suppository</td>
<td>Constipation</td>
</tr>
<tr>
<td>hydroxyzine</td>
<td>Atarax</td>
<td>Itching</td>
</tr>
<tr>
<td>imipramine</td>
<td>Tofranil</td>
<td>Bladder dysfunction; Pain</td>
</tr>
<tr>
<td>interferon beta-1a</td>
<td>Avonex</td>
<td>Disease modifying agent</td>
</tr>
<tr>
<td>interferon beta-1a</td>
<td>Rebif</td>
<td>Disease modifying agent</td>
</tr>
<tr>
<td>interferon beta-1b</td>
<td>Betaseron; Extavia</td>
<td>Disease modifying agent</td>
</tr>
<tr>
<td>isoniazid</td>
<td>Laniazid; Nydrazid</td>
<td>Tremor</td>
</tr>
<tr>
<td>magnesium hydroxide¹</td>
<td>Phillips’ Milk of Magnesia</td>
<td>Constipation</td>
</tr>
<tr>
<td>meclizine</td>
<td>Antivert</td>
<td>Nausea; Vomiting; Dizziness</td>
</tr>
<tr>
<td>methenamine</td>
<td>Hiprex, Mandelamine (preventive)</td>
<td>Urinary tract infections</td>
</tr>
<tr>
<td>methylprednisolone</td>
<td>Depo-Medrol; Solu-Medrol</td>
<td>Acute exacerbations</td>
</tr>
<tr>
<td>mineral oil¹</td>
<td></td>
<td>Constipation</td>
</tr>
<tr>
<td>mitoxantrone</td>
<td>Novantrone</td>
<td>Disease modifying agent</td>
</tr>
<tr>
<td>modafinil</td>
<td>Provigil</td>
<td>Fatigue</td>
</tr>
<tr>
<td>natalizumab</td>
<td>Tysabri</td>
<td>Disease modifying agent</td>
</tr>
</tbody>
</table>

¹ Available without a prescription. ² Available in US and Canada unless otherwise noted.
<table>
<thead>
<tr>
<th>GENERIC NAME</th>
<th>BRAND NAME</th>
<th>USAGE IN MS</th>
</tr>
</thead>
<tbody>
<tr>
<td>nitrofurantoin</td>
<td>Macrodantin</td>
<td>Urinary tract infections</td>
</tr>
<tr>
<td>nortriptyline</td>
<td>Pamelor</td>
<td>Depression</td>
</tr>
<tr>
<td>oxybutynin</td>
<td>Ditropan</td>
<td>Bladder dysfunction</td>
</tr>
<tr>
<td>oxybutynin chloride (extended release formula)</td>
<td>Ditropan XL</td>
<td>Bladder dysfunction</td>
</tr>
<tr>
<td>oxybutynin (transdermal patch)</td>
<td>Oxytrol</td>
<td>Bladder dysfunction</td>
</tr>
<tr>
<td>papaverine</td>
<td></td>
<td>Erectile dysfunction</td>
</tr>
<tr>
<td>paroxetine</td>
<td>Paxil</td>
<td>Depression</td>
</tr>
<tr>
<td>phenazopyridine</td>
<td>Pyridium</td>
<td>Urinary tract infections (symptom relief)</td>
</tr>
<tr>
<td>phenytoin</td>
<td>Dilantin</td>
<td>Pain (dysesthesia)</td>
</tr>
<tr>
<td>prazosin</td>
<td>Minipress</td>
<td>Bladder dysfunction</td>
</tr>
<tr>
<td>prednisone</td>
<td>Deltasone</td>
<td>Acute exacerbations</td>
</tr>
<tr>
<td>propantheline bromide</td>
<td>Pro-Banthine</td>
<td>Bladder dysfunction</td>
</tr>
<tr>
<td>psyllium hydrophilic mucilloid(^1)</td>
<td>Metamucil</td>
<td>Constipation</td>
</tr>
<tr>
<td>sertraline</td>
<td>Zoloft</td>
<td>Depression</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>GENERIC NAME</th>
<th>BRAND NAME(^2)</th>
<th>USAGE IN MS</th>
</tr>
</thead>
<tbody>
<tr>
<td>sildenafil</td>
<td>Viagra</td>
<td>Erectile dysfunction</td>
</tr>
<tr>
<td>sodium phosphate(^1)</td>
<td>Fleet Enema</td>
<td>Constipation</td>
</tr>
<tr>
<td>solifenacin succinate</td>
<td>Vesicare</td>
<td>Bladder dysfunction</td>
</tr>
<tr>
<td>sulfamethoxazole + trimethoprim combination</td>
<td>Bactrim; Septra</td>
<td>Urinary tract infections</td>
</tr>
<tr>
<td>imipramine</td>
<td>Tofranil</td>
<td>Bladder dysfunction; Pain</td>
</tr>
<tr>
<td>tadalafil</td>
<td>Cialis</td>
<td>Erectile dysfunction</td>
</tr>
<tr>
<td>tamsulosin</td>
<td>Flomax</td>
<td>Bladder dysfunction</td>
</tr>
<tr>
<td>terazosin</td>
<td>Hytrin</td>
<td>Bladder dysfunction</td>
</tr>
<tr>
<td>tizanidine</td>
<td>Zanaflex</td>
<td>Spasticity</td>
</tr>
<tr>
<td>tolterodine</td>
<td>Detrol</td>
<td>Bladder dysfunction</td>
</tr>
<tr>
<td>trospium chloride</td>
<td>Sanctura</td>
<td>Bladder dysfunction</td>
</tr>
<tr>
<td>vardenafil</td>
<td>Levitra</td>
<td>Erectile dysfunction</td>
</tr>
<tr>
<td>venlafaxine</td>
<td>Effexor</td>
<td>Depression</td>
</tr>
</tbody>
</table>

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MEDICATION SHEETS FOR CONSUMERS

Note: The * next to a side effect listed on a medication sheet indicates that it may be confused with a symptom of multiple sclerosis. A person who abruptly experiences any of these changes should consult his or her healthcare professional.

ADRENO-CORTICOTROPIC HORMONE (ACTH)

CHEMICAL NAME
- adrenocorticotropic (ah-dree-no-kore-ti-koe-TROE-pick)

BRAND NAME
- H.P. Acthar Gel (Repository Corticotropin Injection) (U.S.)

GENERIC AVAILABLE
- No

DESCRIPTION
- Acthar Gel is a highly purified preparation of adrenocorticotropic hormone (ACTH) in a gel that is designed to provide extended release of the ACTH following injection. ACTH, which stimulates the adrenal cortex gland to secrete cortisol, corticosterone, and aldosterone, has been shown in controlled clinical trials to be effective in speeding the resolution of acute MS attacks.
- ACTH was approved in 1978 by the U.S. Food and Drug Administration (FDA) as a short-term treatment for acute exacerbations of MS. Although there was a period when its availability in the U.S. and elsewhere became very restricted due to limited manufacturing production, the product is once again available. According to its FDA labeling, corticosteroids (such as methylprednisolone or dexamethasone) are considered the treatment of choice for acute exacerbations; ACTH is recommended as a secondary option when corticosteroids are not available or are not well-tolerated. Like corticosteroids, ACTH does not affect the ultimate outcome or long-term natural history of the disease. ACTH is included in the updated list of medications covered under the Medicare Replacement Drug Demonstration Project.

PROPER USAGE
- ACTH is administered via intramuscular injection for the treatment of MS exacerbations. Varied dosing schedules have been used in the studies of ACTH and in clinical practice, generally starting at 80 units per day for a week followed by a tapering schedule over a second week. The dosing schedule that is given in the package insert is 80–120 units daily for 2–3 weeks.
- The medication should be stored in the refrigerator and allowed to come to room temperature before injecting.
Do not stop taking this medicine without checking with your physician. Serious side effects can occur if the medication is stopped suddenly.

If you are taking this medication daily and miss an injection, take it as soon as you remember and then resume your regular dosing schedule.

**PRECAUTIONS**

- ACTH should not be taken by individuals with scleroderma, osteoporosis, systemic fungal infections, ocular herpes simplex, a current or past peptic ulcer, congestive heart failure, or hypertension, or by anyone with reduced function of the adrenal cortex.

- There have been no adequate studies of ACTH in pregnant women. Since it has been shown in animal studies to be harmful to embryos, ACTH should be used during pregnancy only if the potential benefits outweigh the risks.

- It is not known if ACTH passes into breast milk. If you are nursing or plan to nurse, be sure to discuss this with your physician.

- ACTH can stimulate the appetite and increase water retention. It is advisable to follow a low-salt and/or potassium-rich diet and watch your caloric intake. Your physician will make specific dietary recommendations for you.

- ACTH can lower your resistance to infection and make any infection that you get more difficult to treat. Contact your physician if you notice any sign of infection, such as sore throat, fever, coughing, or sneezing. While on this medication, check with your physician before having any immunizations (vaccinations). People in your household should not be given any live vaccines while you are on this medication.

- ACTH may produce mood changes and/or mood swings of varying intensity. These mood alterations can vary from relatively mild to extremely intense, and can vary in a single individual from one course of treatment to another. Neither the patient nor the physician can predict with any certainty whether the ACTH is likely to precipitate these mood alterations. If you have a history of mood disorders (depression or bipolar disorder, for example), be sure to share this information with your physician. If you begin to experience mood changes or swings that feel unmanageable, contact your physician so that a decision can be made about whether or not you need an additional medication to help you until the mood alterations subside.

**POSSIBLE SIDE EFFECTS**

- Side effects that may go away as your body adjusts to the medication and do not require medical attention unless they continue or are bothersome: vomiting, changed in appetite; diarrhea, constipation, restlessness, difficulty sleeping, sweating.

- Less common side effects that should be reported as soon as possible to your physician: severe mood changes or mood swings; decreased or blurred vision*; frequent urination*.

- Additional side effects that can result from the prolonged use of ACTH and should be reported to your physician: acne or other skin problems; swelling of the face; swelling of the feet or lower legs; rapid weight gain; pain in the hips or other joints (caused by bone cell degeneration); stomach pain; elevated blood pressure; markedly increased thirst (with increased urination indicative of diabetes mellitus); menstrual irregularities; unusual bruising of the skin; thin, shiny skin; hair loss; muscle cramps or pain.

- Once you stop this medication after taking it for a long period of time, it may take several months for your body to readjust.
ALPROSTADIL (MUSE)

CHEMICAL NAME
- alprostadil (al-PROSS-ta-dill)

BRAND NAME
- Muse (U.S. and Canada) [Suppository]

GENERIC AVAILABLE
- No

DESCRIPTION
- Alprostadil belongs to a group of medicines called vasodilators, which cause blood vessels to expand, thereby increasing blood flow. It is a semisolid pellet of medication in the form of a suppository. When alprostadil is inserted into the urethra, it produces an erection by increasing blood flow to the penis.

PROPER USAGE
- Alprostadil should never be used as a sexual aid by men who are not impotent. If improperly used, this medication can cause permanent damage to the penis.
- Alprostadil is available by prescription and should be used only as directed by your physician.

PRECAUTIONS
- Do not use more of this medicine or use it more often than it has been prescribed for you. Using too much of this medicine will result in a condition called priapism, in which the erection lasts too long and does not resolve when it should. Permanent damage to the penis can occur if blood flow to the penis is cut off for too long a period of time.

POSSIBLE SIDE EFFECTS
- Side effects that you should report to your physician so he or she can adjust the dosage or change the medication: burning or aching during erection.
- Rare side effects that require immediate attention: erection continuing for more than four hours. If you cannot be seen immediately by your physician, you should go to the emergency room for prompt treatment.
ALPROSTADIL

CHEMICAL NAME

- alprostadil (al-PROSS-ta-dill); also called Prostaglandin E1

BRAND NAME

- Prostin VR (U.S. and Canada)

GENERIC AVAILABLE

- No

DESCRIPTION

- Alprostadil belongs to a group of medicines called vasodilators, which cause blood vessels to expand, thereby increasing blood flow. When alprostadil is injected into the penis, it produces an erection by increasing blood flow to the penis.

PROPER USAGE

- Alprostadil should never be used as a sexual aid by men who are not impotent. If improperly used, this medication can cause permanent damage to the penis.
- Alprostadil is available by prescription and should be used only as directed by your physician, who will instruct you in the proper way to give yourself an injection so that it is simple and essentially pain-free.
- Alprostadil is sometimes used in combination with a medicine called phentolamine (Regitine — U.S.; Rogitine — Canada).

PRECAUTIONS

- Do not use more of this medicine or use it more often than it has been prescribed for you. Using too much of this medicine will result in a condition called priapism, in which the erection lasts too long and does not resolve when it should. Permanent damage to the penis can occur if blood flow to the penis is cut off for too long a period of time.

POSSIBLE SIDE EFFECTS

- Side effects that you should report to your physician so he or she can adjust the dosage or change the medication: pain at the injection site; burning or aching during erection.
- Rare side effects that require immediate attention: erection continuing for more than four hours. If you cannot be seen immediately by your physician, you should go to the emergency room for prompt treatment.
AMANTADINE

CHEMICAL NAME
■ amantadine (a-MAN-ta-deen)

BRAND NAME
■ None (previously available as Symmetrel in U.S. and Canada)

GENERIC AVAILABLE
■ Yes

DESCRIPTION
■ Amantadine is an antiviral medication used to prevent or treat certain influenza infections; it is also given as an adjunct for the treatment of Parkinson’s disease. It has been demonstrated that this medication, through some unknown mechanism, is sometimes effective in relieving fatigue in multiple sclerosis.

PROPER USAGE
■ The usual dosage for the management of fatigue in MS is 100 to 200 mg daily, taken in the earlier part of the day in order to avoid sleep disturbance. Doses in excess of 300 mg daily usually cause livedo reticularis, a blotchy discoloration of the skin of the legs.

PRECAUTIONS
■ The precautions listed here pertain to the use of this medication as an antiviral or Parkinson’s disease treatment. There are no reports at this time concerning the precautions in the use of the drug to treat fatigue in multiple sclerosis.
■ Drinking alcoholic beverages while taking this medication may cause increased side effects such as circulation problems, dizziness, lightheadedness, fainting, or confusion. Do not drink alcohol while taking this medication.
■ This medication may cause some people to become dizzy, confused, or lightheaded, or to have blurred vision or trouble concentrating.
■ Amantadine may cause dryness of the mouth and throat. If your mouth continues to feel dry for more than two weeks, check with your physician or dentist since continuing dryness may increase the risk of dental disease.
■ This medication may cause purplish red, net-like, blotchy spots on the skin. This problem occurs more often in females and usually occurs on the legs and/or feet after amantadine has been taken regularly for a month or more. The blotchy spots usually go away within two to twelve weeks after you stop taking the medication.

■ Studies of the effects of amantadine in pregnancy have not been done in humans. Studies in some animals have shown that amantadine is harmful to the fetus and causes birth defects.

■ Amantadine passes into breast milk. However, the effect of amantadine in newborn babies and infants is not known.

POSSIBLE SIDE EFFECTS

■ The side effects listed here pertain to the use of amantadine as an antiviral or Parkinson’s disease treatment. There are no reports at the present time of the side effects associated with the use of this drug in the treatment of MS-related fatigue.
  – Side effects that may go away as your body adjusts to the medication and do not require medical attention unless they continue or are bothersome: difficulty concentrating; dizziness; headache; irritability; loss of appetite; nausea; nervousness; purplish red, net-like, blotchy spots on skin; trouble sleeping or nightmares; constipation*; dryness of the mouth; vomiting.
  – Rare side effects that should be reported as soon as possible to your physician: blurred vision*; confusion; difficult urination*; fainting; hallucinations; convulsions; unusual difficulty in coordination*; irritation and swelling of the eye; mental depression; skin rash; swelling of feet or lower legs; unexplained shortness of breath.

AMITRIPTYLINE

CHEMICAL NAME

■ amitriptyline (a-mee-TRIP-ti-leen)

BRAND NAME

■ Elavil (U.S. and Canada)

GENERIC AVAILABLE

■ Yes

DESCRIPTION

■ Amitriptyline is a tricyclic antidepressant used to treat mental depression. In multiple sclerosis, it is frequently used to treat painful paresthesias in the arms and legs (e.g., burning sensations, pins and needles, stabbing pains) caused by damage to the pain regulating pathways of the brain and spinal cord.
NOTE

- Other tricyclic antidepressants are also used for the management of neurologic pain symptoms: clomipramine (Anafranil — U.S. and Canada), desipramine (Norpramin — U.S. and Canada), doxepin (Sinequan — U.S. and Canada), imipramine (Tofranil — U.S. and Canada), nortriptyline (Pamelor — U.S.; Aventyl — Canada), trimipramine (U.S. and Canada).

- While each of these medications is given in different dosage levels, the precautions and side effects listed for amitriptyline apply to these other tricyclic medications as well.

PRECAUTIONS

- Amitriptyline adds to the effects of alcohol and other central nervous system depressants (e.g., antihistamines, sedatives, tranquilizers, prescription pain medications, seizure medications, muscle relaxants, sleeping medications), possibly causing drowsiness. Be sure that your physician knows if you are taking these or other medications.

- This medication causes dryness of the mouth. Because continuing dryness of the mouth may increase the risk of dental disease, alert your dentist that you are taking amitriptyline.

- This medication may cause your skin to be more sensitive to sunlight than it is normally. Even brief exposure to sunlight may cause a skin rash, itching, redness or other discoloration of the skin, or severe sunburn.

- This medication may affect blood sugar levels of diabetic individuals. If you notice a change in the results of your blood or urine sugar tests, check with your physician.

- Do not stop taking this medication without consulting your physician. The physician may want you to reduce the amount you are taking gradually in order to reduce the possibility of withdrawal symptoms such as headache, nausea, and/or an overall feeling of discomfort.

- Studies of amitriptyline have not been done in pregnant women. There have been reports of newborns suffering from muscle spasms and heart, breathing, and urinary problems when their mothers had taken tricyclic antidepressants immediately before delivery. Studies in animals have indicated the possibility of unwanted effects in the fetus.

- Tricyclics pass into breast milk. Only doxepin (Sinequan) has been reported to cause drowsiness in the nursing baby.

POSSIBLE SIDE EFFECTS

- Side effects that may go away as your body adjusts to the medication and do not require medical attention unless they continue for more than two weeks or are bothersome: dryness of mouth; constipation*; increased appetite and weight gain; dizziness; drowsiness*; decreased sexual ability*; headache; nausea; unusual tiredness or weakness*; unpleasant taste; diarrhea; heartburn; increased sweating; vomiting.

- Uncommon side effects that should be reported to your physician as soon as possible: blurred vision*; confusion or delirium; difficulty speaking or swallowing*; eye pain*; fainting; hallucinations; loss of balance control*; nervousness or restlessness; problems urinating*; shakiness or trembling; stiffness of arms and legs*.
Rare side effects that should be reported to your physician as soon as possible: anxiety; breast enlargement in males and females; hair loss; inappropriate secretion of milk in females; increased sensitivity to sunlight; irritability; muscle twitching; red or brownish spots on the skin; buzzing or other unexplained sounds in the ears; skin rash, itching; sore throat and fever; swelling of face and tongue; weakness*; yellow skin.

Symptoms of acute overdose: confusion; convulsions; severe drowsiness*; enlarged pupils; unusual heartbeat; fever; hallucinations; restlessness and agitation; shortness of breath; unusual tiredness or weakness; vomiting.

BACLOFEN

CHEMICAL NAME

- baclofen (BAK-loe-fen)

BRAND NAME

- Lioresal (U.S. and Canada)

GENERIC AVAILABLE

- Yes

DESCRIPTION

Baclofen acts on the central nervous system (CNS) to relieve spasms, cramping, and tightness of muscles caused by spasticity in multiple sclerosis. It is usually administered orally in pill form. An intrathecal delivery system (via a surgically implanted pump) is available for those individuals with significant spasticity who cannot tolerate a sufficiently high dose of the oral form of the medication.

PROPER USAGE

People with MS are usually started on an initial dose of 5 mg every six to eight hours. If necessary, the amount is increased by 5 mg per dose every three to five days until symptoms improve. The goal of treatment is to find a dosage level that relieves spasticity without causing excessive weakness or fatigue. The effective dose may vary from 15 mg to 160 mg per day or more.

PRECAUTIONS

- If you are taking more than 30 mg daily, do not stop taking this medication suddenly. Stopping high doses of this medication abruptly can cause convulsions, hallucinations, increases in muscle spasms or cramping, mental changes, or unusual nervousness or restlessness. Consult your physician about how to reduce the dosage gradually before stopping the medication completely.
- This drug adds to the effects of alcohol and other CNS depressants (such as antihistamines, sedatives, tranquilizers, prescription pain medications, seizure medications, other muscle relaxants), possibly causing drowsiness. Be sure that your physician knows if you are taking these or other medications.

- Studies of birth defects with baclofen have not been done with humans. Studies in animals have shown that baclofen, when given in doses several times higher than the amount given to humans, increases the chance of hernias, incomplete or slow development of bones in the fetus, and lower birth weight.

- Baclofen passes into the breast milk of nursing mothers but has not been reported to cause problems in nursing infants.

**POSSIBLE SIDE EFFECTS**

- Side effects that typically go away as your body adjusts to the medication and do not require medical attention unless they continue for several weeks or are bothersome: drowsiness or unusual tiredness*; increased weakness*; dizziness or lightheadedness; confusion; unusual constipation*; new or unusual bladder symptoms*; trouble sleeping; unusual unsteadiness or clumsiness*.

- Unusual side effects that require immediate medical attention: fainting; hallucinations; severe mood changes; skin rash or itching.

- Symptoms of overdose: sudden onset of blurred or double vision*; convulsions; shortness of breath or troubled breathing; vomiting.

**BACLOFEN (INTRATHecal)**

**CHEMICAL NAME**

- baclofen (BAK-loe-fen) (intrathecal)

**BRAND NAME**

- Intrathecal Baclofen (ITB Therapy)

**GENERIC AVAILABLE**

- No

**DESCRIPTION**

- Baclofen acts on the central nervous system to relieve spasms, cramping, and tightness of muscles caused by spasticity in multiple sclerosis. Intrathecal baclofen therapy (ITB) consists of long-term delivery of baclofen to the intrathecal space in the spinal column. It is used in MS for those individuals with severe spasticity whose symptoms are not sufficiently relieved with oral baclofen and other oral medications.
Because ITB is administered directly into the intrathecal space, it provides better spasticity reduction at lower doses than can be achieved with oral medications that, at higher doses, can produce sedation, sleepiness, and imbalance.

PROPER USAGE

- Individuals who are considered candidates for intrathecal baclofen are given a test dose via lumbar puncture. Those who respond positively to the test dose can be considered for ongoing ITB therapy.

- The SynchroMed Infusion System consists of: a small titanium disk, about three inches in diameter and one inch thick, which contains a refillable reservoir for the liquid, and a computer chip that regulates the battery-operated pump; a flexible silicone catheter that serves as the pathway from the pump to the intrathecal space.

- Implantation of the pump requires two incisions — one in the lower abdomen to create a pocket for the pump, and another one in the lower back for inserting the catheter that is looped around the torso, inside the body, connecting the pump to the intrathecal space.

- The dose of medication delivered by the pump is programmed, and subsequently adjusted if necessary, by non-invasive radio-telemetry. The pump is refilled every 4 to 12 weeks by injection, in a procedure lasting about 20 minutes.

- To prevent the baclofen supply from running out, the pump contains a programmable alarm that sounds whenever the reservoir need to be refilled, the battery is low, or the pump is malfunctioning in some way. In the event that the alarm sounds, you should contact your physician immediately.

PRECAUTIONS

- As with any surgical procedure, the implantation of the pump carries with it the risk of infection, and the risks associated with general anesthesia. There is an additional risk of spinal fluid leakage.

- Your doctor should check your progress at regular visits, especially during the first few weeks of treatment with this medicine. During this time, the amount of medicine you are using may have to be changed often to meet your individual needs.

- Make sure to keep all appointments to refill the pump. If the pump is not refilled on time, you may experience return of your muscle tightness and early withdrawal symptoms that might include: itching of the skin, decreased blood pressure (blurred vision*; confusion; dizziness; faintness or lightheadedness when rising from a lying or sitting position; sweating; unusual tiredness or weakness*); burning, crawling, itching, numbness, prickling, “pins and needles,” or tingling feelings*; seizures.

- Abruptly stopping intrathecal baclofen can result in serious medical problems and in rare cases has been fatal.

POSSIBLE SIDE EFFECTS

- Side effects that typically go away as your body adjusts to the medication and do not require medical attention unless they continue for several weeks or are bothersome: drowsiness or unusual tiredness*; increased weakness*; dizziness or lightheadedness; confusion; unusual constipation*; new or unusual bladder symptoms*; trouble sleeping; unusual unsteadiness or clumsiness*.
Unusual side effects that require immediate medical attention: high fever; altered mental status; spasticity that is worse than was experienced prior to starting ITB Therapy; muscle rigidity.

Symptoms of overdose: drowsiness; lightheadedness; sudden onset of blurred or double vision*; shortness of breath or troubled breathing; vomiting; seizures; loss of consciousness; coma.

BISACODYL

CHEMICAL NAME

- bisacodyl (bis-a-KOE-dill)

BRAND NAME

- Dulcolax — tablet or suppository (U.S.)

GENERIC AVAILABLE

- Yes

DESCRIPTION

- Bisacodyl is an over-the-counter stimulant laxative that can be used in either oral or suppository form. Stimulant laxatives encourage bowel movements by increasing the muscle contractions in the intestinal wall that propel the stool mass.
- Although stimulant laxatives are popular for self-treatment, they are more likely to cause side effects than other types of laxatives.

PROPER USAGE

- Laxatives are to be used to provide short-term relief only, unless otherwise directed by the nurse or physician who is helping you to manage your bowel symptoms. A regimen that includes a healthy diet containing roughage (whole grain breads and cereals, bran, fruit, and green, leafy vegetables), six to eight full glasses of liquids each day, and some form of daily exercise is most important in stimulating healthy bowel function.
- If your physician has recommended this laxative for management of constipation, follow his or her recommendations for its use. If you are treating yourself for constipation, follow the directions on the package insert.
- The tablet form of this laxative is usually taken on an empty stomach in order to speed results. The tablets are coated to allow them to work properly without causing stomach irritation or upset. Do not chew or crush the tablets or take them within an hour of drinking milk or taking an antacid.
- A bedtime dose usually produces results the following morning. Be sure to consult your physician if you experience problems or do not get relief within a week.
PRECAUTIONS

- Do not take any laxative if you have signs of appendicitis or inflamed bowel (e.g., stomach or lower abdominal pain, cramping, bloating, soreness, nausea, or vomiting). Check with your physician as soon as possible.

- Do not take any laxative for more than one week unless you have been told to do so by your physician. Many people tend to overuse laxatives, which often leads to dependence on the laxative action to produce a bowel movement. Discuss the use of laxatives with your health care professional in order to ensure that the laxative is used effectively as part of a comprehensive, healthy bowel management regimen.

- Do not take any laxative within two hours of taking other medication because the desired effectiveness of the other medication may be reduced.

- If you are pregnant, discuss with your physician the most appropriate type of laxative for you to use.

- Some laxatives pass into breast milk. Although it is unlikely to cause problems for a nursing infant, be sure to let your physician know if you are using a laxative and breast-feeding at the same time.

POSSIBLE SIDE EFFECTS

- Side effects that may go away as your body adjusts to the medication and do not require medical attention unless they persist or are bothersome: belching; cramping; diarrhea; nausea.

- Unusual side effects that should be reported to your physician as soon as possible: confusion; irregular heartbeat; muscle cramps; skin rash; unusual tiredness or weakness.

BUPROPION

CHEMICAL NAME

- bupropion (byoo-PROE-pee-on)

BRAND NAME

- Wellbutrin (U.S. and Canada)

GENERIC AVAILABLE

- No

DESCRIPTION

- Bupropion is used to relieve mental depression.
**PROPER USAGE**

- To lessen stomach upset, take this medication with food unless your physician has told you to take it on an empty stomach.

- Before taking bupropion you should tell your physician if you use alcohol or take any of the following: antipsychotics; fluoxetine (Prozac); lithium (Lithane); trazodone (Desyrel); tricyclic antidepressants (these drugs in combination with bupropion may increase risk of seizures); monoamine oxidase inhibitors.

- Before taking bupropion you should tell your physician if you have any of the following conditions: anorexia nervosa; brain tumor; bulimia; head injury; seizure disorder; bipolar disorder (manic-depression); heart disease; kidney disease; liver disease.

**PRECAUTIONS**

- Do not stop taking bupropion without consulting your physician. The physician may want you to reduce the amount you are taking gradually in order to reduce the possibility of side effects.

- Bupropion may cause drowsiness, dizziness, or a false sense of well being. Be sure you know how you react to bupropion before driving or using machinery.

- Bupropion has not been studied in pregnant women. Birth defects have not been reported in animal studies.

- Bupropion passes into breast milk. It should not be used during breastfeeding.

**POSSIBLE SIDE EFFECTS**

- Side effects that may go away as your body adjusts to the medication and do not require medical attention unless they persist for more than two weeks or are bothersome:
  - More common: constipation; loss of appetite; dizziness; dryness of mouth; increased sweating; nausea; vomiting; tremor*; weight loss.
  - Less common: blurred vision*; difficulty concentrating; drowsiness; fever or chills; hostility or anger; tiredness*; sleeping disturbances; euphoria.

- Side effects that should be reported to your physician as soon as possible:
  - Common: agitation; anxiety; confusion; fast or irregular heartbeat; headache; restlessness; sleep disturbances.
  - Less common: hallucinations; skin rash.
  - Rare: fainting; seizures.
CARBAMAZEPINE

CHEMICAL NAME

- carbamazepine (kar-ba-MAZE-e-teen)

BRAND NAME

- Tegretol (U.S. and Canada)

GENERIC AVAILABLE

- Yes

DESCRIPTION

- Carbamazepine is used to relieve shock-like pain, such as the facial pain caused by trigeminal neuralgia (tic douloureux).

PROPER USAGE

- It is very important that you take this medicine exactly as directed by your physician in order to obtain the best results and lessen the chance of serious side effects.
- Carbamazepine is not an ordinary pain reliever. It should be used only when your physician prescribes it for certain types of pain. Do not take this medication for other aches or pains.
- If you miss a dose of this medication, take it as soon as possible. If it is almost time for your next dose, skip the missed dose and go back to your regular dosing schedule. Do not double dose. If you miss more than one dose in a day, check with your physician.
- It is very important that your physician check your progress at regular intervals. Your physician may want to have certain tests done to see if you are receiving the correct amount of medication or to check for certain side effects of which you might be unaware.

PRECAUTIONS

- Carbamazepine adds to the effects of alcohol and other central nervous system depressants that may cause drowsiness (e.g., antihistamines, sedatives, tranquilizers, prescription pain medications, seizure medications, muscle relaxants). Be sure that your physician knows if you are taking these or other medications.
- Some people who take carbamazepine may become more sensitive to sunlight than they are normally. Exposure to sunlight, even for brief periods of time, may cause a skin rash, itching, redness or other discoloration of the skin, or severe sunburn.
Oral contraceptives (birth control pills) that contain estrogen may not work properly while you are taking carbamazepine. You should use an additional or alternative form of birth control while taking this drug.

Carbamazepine affects the urine sugar levels of diabetic patients. If you notice a change in the results of your urine sugar tests, check with your physician.

Before having any medical tests or any kind of surgical, dental, or emergency treatment, be sure to let the health care professional know that you are taking this medication.

Carbamazepine has not been studied in pregnant women. There have been reports of babies having low birth weight, small head size, skull and facial defects, underdeveloped fingernails, and delays in growth when their mothers had taken carbamazepine in high doses during pregnancy. Studies in animals have shown that carbamazepine causes birth defects when given in large doses.

Carbamazepine passes into breast milk, and the baby may receive enough of it to cause unwanted effects. In animal studies, carbamazepine has affected the growth and appearance of nursing babies.

**POSSIBLE SIDE EFFECTS**

Side effects that typically go away as your body adjusts to the medication and do not require medical attention unless they continue for several weeks or are bothersome: clumsiness or unsteadiness*; mild dizziness*; mild drowsiness*; lightheadedness; mild nausea or vomiting; aching joints or muscles; constipation*; diarrhea; dryness of mouth; skin sensitivity to sunlight; irritation of mouth or tongue; loss or appetite; loss of hair; muscle or abdominal cramps; sexual problems in males*.

Check with your physician as soon as possible if any of the following side effects occur: blurred or double vision*; confusion; agitation; severe diarrhea, nausea, or vomiting; skin rash or hives; unusual drowsiness; chest pain; difficulty speaking or slurred speech*; fainting; frequent urination*; unusual heartbeat; mental depression or other mood or emotional changes; unusual numbness, tingling, pain, or weakness in hands or feet*; ringing or buzzing in ears; sudden decrease in urination; swelling of face, hands, feet, or lower legs; trembling; uncontrolled body movements; visual hallucinations.

Check with your physician immediately if any of the following occur: black tarry stools or blood in urine or stools; bone or joint pain; cough or hoarseness; darkening of urine; nosebleeds or other unusual bleeding or bruising; painful or difficult urination; tenderness, swelling, or bluish color in leg or foot; pale stools; pinpoint red spots on skin; shortness of breath or cough; sores, ulcers, or white spots on lips or in the mouth; sore throat, chills, and fever; swollen glands; unusual tiredness or weakness*; wheezing, tightness in chest; yellow eyes or skin.

Symptoms of overdose that require immediate attention: unusual clumsiness or unsteadiness*; severe dizziness or fainting; fast or irregular heartbeat; unusually high or low blood pressure; irregular or shallow breathing; severe nausea or vomiting; trembling, twitching, and abnormal body movements.
CIPROFLOXACIN

CHEMICAL NAME
- ciprofloxacin (sip-roe-FLOX-a-sin) combination

BRAND NAME
- Cipro (U.S. and Canada)

GENERIC AVAILABLE
- Yes

DESCRIPTION
- Ciprofloxacin is one of a group of antibiotics (fluoroquinolones) used to kill bacterial infection in many parts of the body. It is used in multiple sclerosis primarily to treat urinary tract infections.

PROPER USAGE
- This medication is best taken with a full glass (eight ounces) of water. Additional water should be taken each day to help prevent some unwanted effects.
- Ciprofloxacin may be taken with meals or on an empty stomach.
- Finish the full course of treatment prescribed by your physician. Even if your symptoms disappear after a few days, stopping this medication prematurely may result in a return of the symptoms.
- This medication works most effectively when it is maintained at a constant level in your blood or urine. To help keep the amount constant, do not miss a dose. It is best to take the doses at evenly spaced times during the day and night.

PRECAUTIONS
- This medication may cause some people to become dizzy, lightheaded, drowsy, or less alert.
- If you are taking antacids that contain aluminum or magnesium, be sure to take them at least two hours before or after you take ciprofloxacin. These antacids may prevent the ciprofloxacin from working properly.
- This medication may cause your skin to become more sensitive to sunlight. Stay out of direct sunlight during the midday hours, wear protective clothing, and apply a sun block product that has a skin protection factor (SPF) of at least 15.
Studies of birth defects have not been done in humans. This medication is not recommended during pregnancy since antibiotics of this type have been reported to cause bone development problems in young animals.

Some of the antibiotics in this group are known to pass into human breast milk. Since they have been reported to cause bone development problems in young animals, breast-feeding is not recommended during treatment with this medication.

POSSIBLE SIDE EFFECTS

- Side effects that may go away as your body adjusts to the medication and do not require medical attention unless they continue or are bothersome: abdominal or stomach pain; diarrhea; dizziness; drowsiness*; headache; lightheadedness; nausea or vomiting; nervousness; trouble sleeping.
- Rare side effects that should be reported to your physician immediately: agitation; confusion; fever; hallucinations; peeling of the skin; shakiness or tremors*; shortness of breath; skin rash; itching; swelling of face or neck.

CLONAZEPAM

CHEMICAL NAME

- clonazepam (kloe-NA-ze-pam)

BRAND NAME

- Klonopin (U.S.)

GENERIC AVAILABLE

- No

DESCRIPTION

- Clonazepam is a benzodiazepine that belongs to the group of medications called central nervous system (CNS) depressants, which slow down the nervous system. Although clonazepam is used for a variety of medical conditions, it is used in multiple sclerosis primarily for the treatment of tremor, pain, and spasticity.

PROPER USAGE

- Keep this medication out of the reach of children. An overdose of this medication may be especially dangerous for children.
PRECAUTIONS

- During the first few months taking clonazepam, your physician should check your progress at regular visits to make sure that this medicine does not cause unwanted effects.
- Take this medication only as directed by your physician; do not increase the dose without a prescription to do so.
- Clonazepam adds to the effects of alcohol and other CNS depressants (e.g., antihistamines, sedatives, tranquilizers, prescription pain medications, seizure medications, muscle relaxants, sleeping medications). Consult your physician before taking any of these CNS depressants while you are taking clonazepam. Taking an overdose of this medication or taking it with alcohol or other CNS depressants may lead to unconsciousness and possibly death.
- Stopping this medication suddenly may cause withdrawal side effects. Reduce the amount gradually before stopping completely.
- Clonazepam frequently causes people to become drowsy, dizzy, lightheaded, clumsy, or unsteady. Even if taken at bedtime, it may cause some people to feel drowsy or less alert on awakening.
- Studies in animals have shown that clonazepam can cause birth defects or other problems, including death of the animal fetus.
- Overuse of clonazepam during pregnancy may cause the baby to become dependent on it, leading to withdrawal side effects after birth. The use of clonazepam, especially during the last weeks of pregnancy, may cause breathing problems, muscle weakness, difficulty in feeding, and body temperature problems in the newborn infant.
- Clonazepam may pass into breast milk and cause drowsiness, slow heartbeat, shortness of breath, or troubled breathing in nursing babies.

POSSIBLE SIDE EFFECTS

- Side effects that may go away during treatment as your body adjusts to the medication and do not require medical attention unless they continue for several weeks or are bothersome: drowsiness or tiredness; clumsiness or unsteadiness*; dizziness or lightheadedness; slurred speech*; abdominal cramps or pain; blurred vision or other changes in vision*; changes in sexual drive or performance*; gastrointestinal changes, including constipation* or diarrhea; dryness of mouth; fast or pounding heart beat; muscle spasm*; trouble with urination*; trembling.
- Unusual side effects that should be discussed as soon as possible with your physician: behavior problems, including difficulty concentrating and outbursts of anger; confusion or mental depression; convulsions; hallucinations; low blood pressure; muscle weakness; skin rash or itching; sore throat, fever, chills; unusual bleeding or bruising; unusual excitement or irritability.
- Symptoms of overdose that require immediate emergency help: continuing confusion; severe drowsiness; shakiness; slowed heartbeat; shortness of breath; slow reflexes; continuing slurred speech*; staggering*; unusual severe weakness*.
DALFAMPRIDINE

CHEMICAL NAME
- dalfampridine

BRAND NAME
- Ampyra (U.S.)

GENERIC AVAILABLE
- No

DESCRIPTION
- Dalfampridine blocks tiny pores, or potassium channels, on the surface of nerve fibers, which may improve the conduction of nerve signals in along nerve fibers whose insulating myelin coating has been damaged by MS. In two phase III clinical trials of the drug, a significantly greater proportion of people on therapy had a consistent improvement in walking speed compared to those in the placebo group. In the first trial, involving 301 people with any type of MS, walking speed increased by 25% compared with placebo. Results from the second phase III study, involving 240 people with MS, confirmed the benefits seen in the first trial. Among those taking dalfampridine who improved in walking speed, there was also a statistically significant improvement in leg strength. Approval by the U.S. Food and Drug Administration (FDA)

APPROVAL BY THE U.S. FOOD AND DRUG ADMINISTRATION (FDA)
- Dalfampridine is approved to improve walking in patients with multiple sclerosis.

PROPER USAGE
- Keep this medication out of the reach of children.
- Take dalfampridine exactly as your doctor tells you to take it. Do not change your dose or take more than 2 dalfampridine tablets in a 24-hour period.
- This medication is released into your system slowly over time. Do not break, crush, chew or dissolve the dalfampridine tablet before swallowing it because that may cause the medication to be released too quickly, which may increase your risk of having a seizure. If you cannot swallow the tablet whole, tell your doctor.
- This medication can be taken with or without food.
- If you miss a dose of dalfampridine, do not make up the missed dose or take 2 doses at the same time. Take your next dose at your regular scheduled time.
If you take too much dalfampridine, call your doctor or go to the nearest hospital emergency room right away.

Avonex is given as a once-a-week intramuscular (IM) injection, usually in the large muscles of the thigh, upper arm, or hip.

**PRECAUTIONS**

- Do not take dalfampridine if you have ever had a seizure. Dalfampridine can cause seizures and the risk of a seizure increases with increasing doses of medication.
- People with certain types of kidney problems should not take dalfampridine because the level of medication in the body may become too high, leading to increased risk of seizures. Before taking this medication, let your physician know if you have a history of kidney problems.
- Do not take dalfampridine together with other aminopyridine medications, including compounded 4-AP (sometimes called 4-aminopyridine, fampridine).
- Before taking dalfampridine, tell your doctor if you are pregnant or planning to become pregnant. The effect of dalfampridine on pregnancy or an unborn child is not known.
- Before taking dalfampridine, tell your doctor if you are breast-feeding or plan to breast-feed. It is not known if fampridine passes into breast milk.
- It is not known whether dalfampridine is safe or effective in children less than 18 years of age.

**POSSIBLE SIDE EFFECTS**

- Common side effects of dalfampridine include urinary tract infection, difficulty sleeping, dizziness*, headache, nausea, weakness*, back pain, problems with balance*, MS relapse, burning, tingling or itching of the skin*, irritation of the nose and throat, constipation*, indigestion, throat pain.

**DANTROLENE**

**CHEMICAL NAME**

- dantrolene (DAN-troe-leen)

**BRAND NAME**

- Dantrium (U.S.)

**GENERIC AVAILABLE**

- Yes
DESCRIPTION

- Dantrolene is a muscle relaxant for relief of cramping, spasms, and tightness of muscles caused by multiple sclerosis among other conditions. It acts directly on the muscles.

PROPER USAGE

- Dantrolene may be taken with or without food. If your physician tells you to take it in a certain way it should be taken exactly as directed.
- Do not take more dantrolene or take it more often than directed. Overdosing may cause liver damage.

PRECAUTIONS

- Dantrolene has been shown to cause cancer and noncancerous tumors in animals that were given high doses over a long period of time. You should discuss this with your physician.
- Dantrolene has not been shown to cause birth defects in humans.
- Dantrolene is not recommended during breast feeding.
- Be sure to tell your physician if you are taking any of the following: acetaminophen; amiodarone; anabolic steroids; androgens (male hormones); antibiotics; thyroid agents; carbamazepine; carmustine; central nervous system depressants; chloroquine; daunorubicin; disulfiram; divalproex; estrogens (female hormones); etretinate; gold salts; hydroxychloroquine; mercaptopurine; methotrexate; methylprednisolone; naltrexone; oral contraceptives; phenothiazines; phenytoin; plicamycin; tricyclic antidepressants; valproic acid.
- Tell your physician if you have any of the following: emphysema; asthma; bronchitis; heart disease; liver disease.
- Dantrolene will greatly add to the effects of alcohol and other central nervous system depressants. Do not drink alcohol while taking dantrolene.
- Dantrolene may cause drowsiness, dizziness, vision problems or weakness in some people. Be sure you are familiar with dantrolene’s effects before you drive or operate machinery.
- Since dantrolene can cause liver damage it is important to have blood tests to evaluate liver function on a regular basis.

POSSIBLE SIDE EFFECTS

- Side effects that usually go away as your body adjusts to the medication and do not require medical attention unless they persist or are bothersome: diarrhea; dizziness; drowsiness; weakness*; nausea; unusual tiredness*; abdominal cramps; blurred or double vision; chills and fever; constipation; frequent urination; headache; loss of appetite; speech difficulties; sleep difficulties; nervousness.
- Side effects that should be reported to your physician as soon as possible: seizures; pain; tenderness; changes in skin color; swelling; shortness of breath; dark urine; chest pain; confusion; severe constipation; difficult urination; skin rash; itching; yellow color in eyes or skin.
DESMOPRESSIN (NASAL SPRAY)

CHEMICAL NAME
- desmopressin (des-moe-PRESS-in)

BRAND NAME
- DDAVP Nasal Spray (U.S. and Canada)

GENERIC AVAILABLE
- No

DESCRIPTION
- Desmopressin is a hormone used as a nasal spray. The hormone works on the kidneys to control frequent urination.

PROPER USAGE
- Keep this medication in the refrigerator but do not allow it to freeze.

PRECAUTIONS
- Let your physician know if you have heart disease, blood vessel disease, or high blood pressure. Desmopressin can cause an increase in blood pressure.
- Studies have not been done in pregnant women. It has been used before and during pregnancy to treat diabetes mellitus and has not been shown to cause birth defects.
- Desmopressin passes into breast milk but has not been reported to cause problems in nursing infants.

POSSIBLE SIDE EFFECTS
- Side effects that typically go away as your body adjusts to the medication and do not require medical attention unless they continue for several weeks or are bothersome: runny or stuffy nose; abdominal or stomach cramps; flushing of the skin; headache; nausea; pain in the vulva.
- Unusual side effects that require immediate medical attention: confusion; convulsions; unusual drowsiness*; continuing headache; rapid weight gain; markedly decreased urination.
DESMOPRESSIN ACETATE (TABLETS)

CHEMICAL NAME
- desmopressin acetate (des-moe-PRESS-in)

BRAND NAME
- DDAVP Tablets (U.S. and Canada)

GENERIC AVAILABLE
- No

DESCRIPTION
- Desmopressin is a synthetic analogue of the natural pituitary hormone 8-arginine vasopression (ADH), that works on the kidneys to control urination. It is used in MS to block the kidney’s production of urine for brief periods of time, e.g., to treat nocturia by reducing nighttime awakening to urinate.

PROPER USAGE
- Keep this medication in the refrigerator but do not allow it to freeze.

PRECAUTIONS
- Let your physician know if you have heart disease, blood vessel disease, or high blood pressure. Desmopressin can cause an increase in blood pressure.
- Studies have not been done in pregnant women. It has been used before and during pregnancy to treat diabetes mellitus and has not been shown to cause birth defects.
- It is not known whether desmopressin passes into breast milk and should therefore be used with caution by women who are breastfeeding.

POSSIBLE SIDE EFFECTS
- Side effects that typically go away as your body adjusts to the medication and do not require medical attention unless they continue for several weeks or are bothersome: runny or stuffy nose; abdominal or stomach cramps; flushing of the skin; headache; nausea; pain in the vulva.
- Unusual side effects that require immediate medical attention: confusion; convulsions; unusual drowsiness*; continuing headache; rapid weight gain; markedly decreased urination.

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DEXAMETHASONE

CHEMICAL NAME
- dexamethasone (dex-a-METH-oh-zone)

BRAND NAME
- Decadron (U.S. and Canada)

GENERIC AVAILABLE
- Yes

DESCRIPTION
- Dexamethasone is one of a group of corticosteroids (cortisone-like medicines) that are used to relieve inflammation in different parts of the body. Corticosteroids are used in MS for the management of acute exacerbations because they have the capacity to close the damaged blood-brain barrier and reduce inflammation in the central nervous system. Although dexamethasone is among the most commonly used corticosteroids in MS, it is only one of several possibilities. Other commonly used corticosteroids include, prednisone, betamethasone, and prednisolone. The following information pertains to all of the various corticosteroids.

PROPER USAGE
- Most neurologists treating MS believe that high-dose corticosteroids given intravenously are the most effective treatment for an MS exacerbation, although the exact protocol for the drug’s use may differ somewhat from one treating physician to another. Patients generally receive a four-day course of treatment (either in the hospital or as an out-patient), with doses of the medication spread throughout the day (see methylprednisolone). The high-dose, intravenous dose is typically followed by a gradually tapering dose of an oral corticosteroid (usually ranging in length from ten days to five or six weeks). Dexamethasone is commonly used for this oral taper. Oral dexamethasone may also be used instead of the high-dose, intravenous treatment if the intravenous treatment is not desired or is medically contraindicated.

PRECAUTIONS
- This medication can cause indigestion and stomach discomfort. Always take it with a meal and/or a glass of milk. Your physician may prescribe an antacid for you to take with this medication.
- Take this medication exactly as prescribed by your physician. Do not stop taking it abruptly; your physician will give you a schedule that gradually tapers the dose before you stop it completely.
- Since corticosteroids can stimulate the appetite and increase water retention, it is advisable to follow a low-salt and/or a potassium-rich diet and watch your caloric intake.
Corticosteroids can lower your resistance to infection and make any infection that you get more difficult to treat. Contact your physician if you notice any sign of infection, such as sore throat, fever, coughing, or sneezing.

Avoid close contact with anyone who has chicken pox or measles. Tell your physician immediately if you think you have been exposed to either of these illnesses. Do not have any immunizations after you stop taking this medication until you have consulted your physician. People living in your home should not have the oral polio vaccine while you are being treated with corticosteroids since they might pass the polio virus on to you.

Corticosteroids may affect the blood sugar levels of diabetic patients. If you notice a change in your blood or urine sugar tests, be sure to discuss it with your physician.

The risk of birth defects in women taking corticosteroids during pregnancy has not been studied. Overuse of corticosteroids during pregnancy may slow the growth of the infant after birth. Animal studies have demonstrated that corticosteroids cause birth defects.

Corticosteroids pass into breast milk and may slow the infant’s growth. If you are nursing or plan to nurse, be sure to discuss this with your physician. It may be necessary for you to stop nursing while taking this medication.

Corticosteroids can produce mood changes and/or mood swings of varying intensity. These mood alterations can vary from relatively mild to extremely intense, and can vary in a single individual from one course of treatment to another. Neither the patient nor the physician can predict with any certainty whether the corticosteroids are likely to precipitate these mood alterations. If you have a history of mood disorders (depression or bipolar disorder, for example), be sure to share this information with your physician. If you begin to experience unmanageable mood changes or swings while taking corticosteroids, contact your physician so that a decision can be made whether or not you need an additional medication to help you until the mood alterations subside.

**POSSIBLE SIDE EFFECTS**

- Side effects that may go away as your body adjusts to the medication and do not require medical attention unless they continue or are bothersome: increased appetite; indigestion; nervousness or restlessness; trouble sleeping; headache; increased sweating; unusual increase in hair growth on body or face.

- Less common side effects that should be reported as soon as possible to your physician: severe mood changes or mood swings; decreased or blurred vision*; frequent urination*.

- Additional side effects that can result from the prolonged use of corticosteroids and should be reported to your physician: acne or other skin problems; swelling of the face; swelling of the feet or lower legs; rapid weight gain; pain in the hips or other joints (caused by bone cell degeneration); bloody or black, tarry stools; elevated blood pressure; markedly increased thirst (with increased urination indicative of diabetes mellitus); menstrual irregularities; unusual bruising of the skin; thin, shiny skin; hair loss; muscle cramps or pain. Once you stop this medication after taking it for a long period of time, it may take several months for your body to readjust.
DIAZEPAM

CHEMICAL NAME

- diazepam (dye-AZ-e-pam)

BRAND NAME

- Valium (U.S. and Canada)

GENERIC AVAILABLE

- Yes

DESCRIPTION

- Diazepam is a benzodiazepine that belongs to the group of medicines called central nervous system (CNS) depressants, which slow down the nervous system. Although diazepam is used for a variety of medical conditions, it is used in multiple sclerosis primarily for the relief of muscle spasms and spasticity.

PROPER USAGE

- Keep this medication out of the reach of children. An overdose of this medication may be especially dangerous for children.

PRECAUTIONS

- Your physician should check your progress at regular visits to make sure that this medication does not cause unwanted effects.
- Take diazepam only as directed by your physician; do not increase the dose without a prescription to do so.
- Diazepam adds to the effects of alcohol and other CNS depressants (e.g., antihistamines, sedatives, tranquilizers, prescription pain medications, seizure medications, muscle relaxants, sleeping medications). Consult your physician before taking any of these CNS depressants while you are taking diazepam. Taking an overdose of this medication or taking it with alcohol or other CNS depressants may lead to unconsciousness and possibly death.
- Stopping this medication suddenly may cause withdrawal side effects. Reduce the amount gradually before stopping completely.
- Diazepam may cause some people to become drowsy, dizzy, lightheaded, clumsy, or unsteady. Even if taken at bedtime, it may cause some people to feel drowsy or less alert on awakening.
- The use of diazepam during the first three months of pregnancy has been reported to increase the chance of birth defects.
Overuse of diazepam during pregnancy may cause the baby to become dependent on the medicine, leading to withdrawal side effects after birth. The use of diazepam, especially during the last weeks of pregnancy, may cause breathing problems, muscle weakness, difficulty in feeding, and body temperature problems in the newborn infant. When diazepam is given in high doses (especially by injection) within fifteen hours before delivery, it may cause breathing problems, muscle weakness, difficulty in feeding, and body temperature problems in the newborn infant.

Diazepam may pass into breast milk and cause drowsiness, slow heartbeat, shortness of breath, or troubled breathing in nursing babies.

POSSIBLE SIDE EFFECTS

- Side effects that may go away during treatment as your body adjusts to the medication and do not require medical attention unless they continue for several weeks or are bothersome: clumsiness or unsteadiness*; dizziness or light-headedness; slurred speech*; abdominal cramps or pain; blurred vision or other changes in vision*; changes in sexual drive or performance*; constipation*; diarrhea; dryness of mouth; fast or pounding heartbeat; muscle spasm*; trouble with urination*; trembling*; unusual tiredness or weakness*.
- Unusual side effects that should be discussed with your physician as soon as possible: behavior problems, including difficulty concentrating and outbursts of anger; confusion or mental depression; convulsions; hallucinations; low blood pressure; muscle weakness*; skin rash or itching; sore throat, fever, chills; unusual bleeding or bruising; unusual excitement or irritability.
- Symptoms of overdose that require immediate emergency help: continuing confusion; unusually severe drowsiness; shakiness; slowed heartbeat; shortness of breath; slow reflexes; continuing slurred speech; staggering; unusually severe weakness*.

DOCUSATE

CHEMICAL NAME
- docusate (DOE-koo-sate)

BRAND NAME
- Colace (U.S. and Canada)

GENERIC AVAILABLE
- Yes (U.S. and Canada)

DESCRIPTION
- Docusate is an over-the-counter stool softener (emollient) that helps liquids to mix into dry, hardened stool, making the stool easier to pass.
**PROPER USAGE**

- Laxatives are to be used to provide short-term relief only, unless otherwise directed by the nurse or physician who is helping you to manage your bowel symptoms. A regimen that includes a healthy diet containing roughage (whole grain breads and cereals, bran, fruit, and green, leafy vegetables), six to eight full glasses of liquids each day, and some form of daily exercise is most important in stimulating healthy bowel function.

- If your physician has recommended this laxative for management of constipation, follow his or her recommendations for its use. If you are treating yourself for constipation, follow the directions on the package insert.

- Results usually occur one to two days after the first dose; some individuals may not get results for three to five days. Be sure to consult your physician if you experience problems or do not get relief within a week.

**PRECAUTIONS**

- Do not take any type of laxative if you have signs of appendicitis or inflamed bowel (e.g., stomach or lower abdominal pain, cramping, bloating, soreness, nausea, or vomiting). Check with your physician as soon as possible.

- Do not take any laxative for more than one week unless you have been told to do so by your physician. Many people tend to overuse laxatives, which often leads to dependence on the laxative action to produce a bowel movement. Discuss the use of laxatives with your health care professional in order to ensure that the laxative is used effectively as part of a comprehensive, healthy bowel management regimen.

- Do not take mineral oil within two hours of taking docusate. The docusate may increase the amount of mineral oil that is absorbed by the body.

- Do not take any laxative within two hours of taking another medication because the desired effectiveness of the other medication may be reduced.

- If you are pregnant, discuss with your physician the most appropriate type of laxative for you to use.

- Some laxatives pass into breast milk. Although it is unlikely to cause problems for a nursing infant, be sure to let your physician know if you are using a laxative and breast-feeding at the same time.

**POSSIBLE SIDE EFFECTS**

- Side effects that may go away as your body adjusts to the medication and do not require medical attention unless they persist or are bothersome: stomach and/or intestinal cramping.

- Unusual side effect that should be reported to your physician as soon as possible: skin rash.
DOCUSATE

CHEMICAL NAME
- docusate (DOE-koo-sate) stool softener laxative

BRAND NAME
- Enemeez Mini Enema (U.S.)

GENERIC AVAILABLE
- No

DESCRIPTION
- Enemeez is an over-the-counter stool softener (emollient) that comes in a small, plastic, single-dose tube for insertion into the rectum. It works to produce bowel movements in a short time by introducing liquid into the stool to soften dry, hardened stool, making the stool easier to pass. The small size of this enema makes it easy to use without compromising its effectiveness.

PROPER USAGE
- Laxatives are to be used to provide short-term relief only, unless otherwise directed by the nurse or physician who is helping you to manage your bowel symptoms. A regimen that includes a healthy diet containing roughage (whole grain breads and cereals, bran, fruit, and green, leafy vegetables), 6 to 8 full glasses of liquids each day, and some form of daily exercise, is most important in stimulating healthy bowel function.
- If your physician has recommended this laxative for management of constipation, follow his or her recommendations for its use. If you are treating yourself for constipation, follow the directions on the package insert.
- Results usually occur fifteen minutes to one hour after insertion. Be sure to consult your physician if you experience problems or do not get relief within a day or two.

PRECAUTIONS
- Do not take any type of laxative if you have signs of appendicitis or inflamed bowel (e.g., stomach or lower abdominal pain, cramping, bloating, soreness, nausea, or vomiting). Check with your physician as soon as possible.
- Do not take any laxative for more than one week unless you have been told to do so by your physician. Many people tend to overuse laxatives, which often leads to dependence on the laxative action to produce a bowel movement. Discuss the use of laxatives with your health care professional in order to ensure that the laxative is used effectively as part of a comprehensive, healthy bowel management regimen.
- If you are pregnant, discuss with your physician the most appropriate type of laxative for you to use.
POSSIBLE SIDE EFFECTS

- Side effect that may go away as your body adjusts to the medication and does not require medical attention unless it persists or is bothersome: skin irritation surrounding the rectal area.
- Less common side effects that should be reported to your physician: rectal bleeding, blistering, burning, itching, or pain.

DOCUSATE

CHEMICAL NAME

- docusate (DOE-koo-sate) mini enema

BRAND NAME

- Therevac Plus (U.S.)

GENERIC AVAILABLE

- No

DESCRIPTION

- Therevac Plus is an over-the-counter stool softener (emollient) that comes in a plastic, single-dose, two-inch ampule for insertion into the rectum. It works to produce bowel movements in a short time by helping liquids to mix into dry, hardened stool, making the stool easier to pass. The small size of this enema makes it easy to use without compromising its effectiveness.

PROPER USAGE

- Laxatives are to be used to provide short-term relief only, unless otherwise directed by the nurse or physician who is helping you to manage your bowel symptoms. A regimen that includes a healthy diet containing roughage (whole grain breads and cereals, bran, fruit, and green, leafy vegetables), six to eight full glasses of liquids each day, and some form of daily exercise is most important in stimulating healthy bowel function.
- If your physician has recommended this laxative for management of constipation, follow his or her recommendations for its use. If you are treating yourself for constipation, follow the directions on the package insert.
- Results usually occur fifteen minutes to one hour after insertion. Be sure to consult your physician if you experience problems or do not get relief within a day or two.

PRECAUTIONS

- Do not take any type of laxative if you have signs of appendicitis or inflamed bowel (e.g., stomach or lower abdominal pain, cramping, bloating, soreness, nausea, or vomiting). Check with your physician as soon as possible.
Do not take any laxative for more than one week unless you have been told to do so by your physician. Many people tend to overuse laxatives, which often leads to dependence on the laxative action to produce a bowel movement. Discuss the use of laxatives with your health care professional in order to ensure that the laxative is used effectively as part of a comprehensive, healthy bowel management regimen.

If you are pregnant, discuss with your physician the most appropriate type of laxative for you to use.

### POSSIBLE SIDE EFFECTS

- Side effect that may go away as your body adjusts to the medication and does not require medical attention unless it persists or is bothersome: skin irritation surrounding the rectal area.
- Less common side effects that should be reported to your physician: rectal bleeding, blistering, burning, itching, or pain.

### DULOXETINE HYDROCHLORIDE

#### CHEMICAL NAME
- duloxetine hydrochloride delayed-release (doo-LOX-uh-teen)

#### BRAND NAME
- Cymbalta (U.S. and Canada)

#### GENERIC AVAILABLE
- No

#### DESCRIPTION
- Duloxetine hydrochloride is used in MS to treat mental depression and neuropathic pain. It belongs to a group of medications known as selective serotonin and norepinephrine reuptake inhibitors (SSNRI).

#### PROPER USAGE
- Duloxetine should be swallowed whole and not chewed or crushed. The medication can be taken with or without food.

#### PRECAUTIONS
- While a person with a major depressive disorder may experience some relief in 1–4 weeks, the medication should be continued as directed by your physician.
- Your physician should monitor your progress at regularly scheduled visits in order to adjust the dose and help reduce any side effects.
- You and your family members should be alert to any abrupt emotional and/or behavioral changes (e.g., heightened anxiety, agitation, panic attacks, insomnia, irritability, hostility, impulsivity, undue excitement or hypomania, worsening of depression or suicidal ideation, etc.) and report them to your physician.
- You should not take this medication if you are taking or have recently taken a monamine oxidase inhibitor (MAOI), are taking thioridazine, or have uncontrolled narrow-angle glaucoma.
- Any drug of this type can impair judgment, thinking, or motor skills. Although duloxetine has not been shown in clinical studies to impair these functions, it can cause sedation. Do not drive or operate any hazardous machinery until you know that the medication does not interfere with ability to engage in these activities.
- In animal studies, duloxetine has been shown to have adverse effects on pre- and postnatal development. Studies have not been done in pregnant women. Be sure to notify your physician as soon as possible if you become pregnant or intend to become pregnant.
- It is not known whether duloxetine is excreted into breast milk, but nursing while on duloxetine is not recommended.

**POSSIBLE SIDE EFFECTS**

- Side effects that may go away as your body adjusts to the medication and do not require medical attention unless they continue for several weeks or are bothersome: nausea, dry mouth, constipation, decreased appetite, fatigue*, sleepiness*, and increased sweating, decreased sexual drive or ability*, urinary hesitation*.

**FLUOXETINE**

**CHEMICAL NAME**
- fluoxetine (floo-OX-uh-teen)

**BRAND NAME**
- Prozac (U.S. and Canada)

**GENERIC AVAILABLE**
- Yes

**DESCRIPTION**
- Fluoxetine is used to treat mental depression. It is also used occasionally to treat MS fatigue.
PROPER USAGE

- This medication should be taken in the morning when used to treat depression because it can interfere with sleep.
  If it upsets your stomach, you may take it with food.

PRECAUTIONS

- It may take four to six weeks for you to feel the beneficial effects of this medication.
- Your physician should monitor your progress at regularly scheduled visits in order to adjust the dose and help reduce any side effects.
- There have been suggestions that the use of fluoxetine may be related to increased thoughts about suicide in a very small number of individuals. More study is needed to determine if the medicine causes this effect. If you have concerns about this, be sure to discuss them with your physician.
- Fluoxetine adds to the effects of alcohol and other central nervous system depressants (e.g., antihistamines, sedatives, tranquilizers, sleeping medicine, prescription pain medicine, barbiturates, seizure medication, muscle relaxants). Be sure that your physician knows if you are taking these or any other medications.
- This medication affects the blood sugar levels of diabetic individuals. Check with your physician if you notice any changes in your blood or urine sugar tests.
- Dizziness or lightheadedness may occur, especially when you get up from a lying or sitting position. Change positions slowly to help alleviate this problem. If the problem continues or gets worse, consult your physician.
- Fluoxetine may cause dryness of the mouth. If your mouth continues to feel dry for more than two weeks, check with your physician or dentist. Continuing dryness of the mouth may increase the chance of dental disease.
- Studies have not been done in pregnant women. Fluoxetine has not been shown to cause birth defects or other problems in animal studies.
- Fluoxetine passes into breast milk and may cause unwanted effects, such as vomiting, watery stools, crying, and sleep problems in nursing babies. You may want to discuss alternative medications with your physician.

POSSIBLE SIDE EFFECTS

- Side effects that may go away as your body adjusts to the medication and do not require medical attention unless they continue for several weeks or are bothersome: decreased sexual drive or ability*; anxiety and nervousness; diarrhea; drowsiness*; headache; trouble sleeping; abnormal dreams; change in vision*; chest pain; decreased appetite; decrease in concentration; dizziness; dry mouth; fast or irregular heartbeat; frequent urination*; menstrual pain; tiredness or weakness*; tremor*; vomiting.
- Unusual side effects that should be discussed with your physician as soon as possible: chills or fever; joint or muscle pain; skin rash; hives or itching; trouble breathing.
- Symptoms of overdose that require immediate medical attention: agitation and restlessness; convulsions; severe nausea and vomiting; unusual excitement.
GABAPENTIN

CHEMICAL NAME
- gabapentin (ga-ba-PEN-tin)

BRAND NAME
- Neurontin (U.S. and Canada)

GENERIC AVAILABLE
- No

DESCRIPTION
- Gabapentin is an anti-epileptic used to control some types of seizures in epilepsy. It is used in multiple sclerosis to control dysesthesias (pain caused by MS lesions) and the pain caused by spasticity.

PROPER USAGE
- Gabapentin may be taken with or without food. You must wait two hours after taking an antacid to take gabapentin.
- If gabapentin is taken three times a day, do not allow more than 12 hours to elapse between any two doses.
- If you miss a dose of this medication, take it as soon as possible. However, if it is almost time for your next dose, skip the missed dose and go back to your regular dosing schedule. Do not double dose.

PRECAUTIONS
- This medicine will add to the effects of alcohol and other central nervous system depressants that may cause drowsiness (e.g., antihistamines, sedatives, tranquilizers, prescription pain medications, seizure medications, muscle relaxants). Be sure that your physician knows if you are taking these or any other medications.
- Before having any medical tests, or surgical, dental, or emergency treatment of any kind, be sure to let the health care professional know that you are taking this medication. Consult with your physician before stopping this medication since stopping abruptly may result in seizures. Depending on the dose you are taking, your physician may want you to decrease your dosage gradually in order to avoid seizures.
- Gabapentin has not been studied in pregnant women. However, animal studies have shown possible bone and kidney problems in offspring. If you are pregnant or planning to become pregnant, discuss this with your physician before starting this medication.
- It is not known whether gabapentin passes into the breast milk. Women who wish to breastfeed should consult with their physician.
POSSIBLE SIDE EFFECTS

- Side effects that typically go away as your body adjusts to the medication and do not require medical attention unless they continue for several weeks or are bothersome: blurred or double vision*; dizziness; drowsiness, muscle ache; swelling of hands or legs; tremor*; unusual tiredness*; weakness*; diarrhea, frequent urination*; indigestion; low blood pressure; slurred speech*; sleep difficulty; weakness*.
- Check with your doctor as soon as possible if any of the following side effects occur: clumsiness or unsteadiness*; continuous, uncontrolled eye movements; depression; mood changes; memory problems*; hoarseness; lower back pain; painful or difficult urination.
- Symptoms of overdose requiring immediate attention: double vision*; severe diarrhea, dizziness; drowsiness; slurred speech*.

GLATIRAMER ACETATE

CHEMICAL NAME

- glatiramer acetate (gla-TEER-a-mer ASS-i-tate) (formerly called Copolymer-1)

BRAND NAME

- Copaxone (U.S. and Canada)

GENERIC AVAILABLE

- No

DESCRIPTION

- Glatiramer acetate is a synthetic compound made up of four amino acids (the building blocks of proteins) that are found in myelin. This drug seems to block myelin-damaging T-cells through a mechanism that is not completely understood. In a two-year randomized, double-blind, controlled trial involving 251 ambulatory patients with relapsing-remitting MS, those taking the drug had a 29% reduction in annual relapse rate compared to control subjects who were given a placebo.
- Subsequent studies have confirmed the drug’s effectiveness in reducing the number and severity of exacerbations (also called attacks, relapses, or flares) and have also demonstrated its ability to reduce the number of new, gadolinium-enhancing brain lesions on MRI.
- Approval by the U.S. Food and Drug Administration (FDA): Glatiramer acetate is approved by the U.S. Food and Drug Administration (FDA) to reduce the frequency of relapses in patients with relapsing-remitting MS. It is also approved for use in individuals who have experienced a first clinical episode (clinically-isolated syndrome) and have MRI features that are consistent with multiple sclerosis.
PROPER USAGE

- Glatiramer acetate is injected subcutaneously (between the fat layer just under the skin and the muscles beneath) once a day. The physician or nurse will instruct you in the preparation of the medication for injection and the injection procedure itself, using a specially designed set of training materials. Do not attempt to inject yourself until you are sure that you understand the procedures.

- Glatiramer acetate should be kept refrigerated at all times. If refrigeration is not available, the drug may be safely stored at room temperature for up to seven days.

- Do not reuse needles or syringes. Dispose of the syringes as directed by your physician and keep them out of the reach of children.

- Because injection-site reactions (swelling, redness, discoloration, or pain) are relatively common, it is recommended that the sites be rotated according to a schedule provided for you by your physician. Do not use any one site more than once per week.

- Before you have a Papanicolaou (Pap) test, tell your doctor or nurse that you are taking this medication. The results of the test may be affected by glatiramer acetate.

PRECAUTIONS

- Do not change the dose or dosing schedule of this medication without consulting your physician.

- Glatiramer acetate has not been studied in pregnant women. Therefore, it should not be used during pregnancy or by any woman who is trying to become pregnant. If you are pregnant, or planning to become pregnant, discuss this with your physician before starting the medication. If you become pregnant while on the medication, inform your physician.

- It is not known whether glatiramer acetate passes into the breast milk. Nursing women should discuss the use of this medication with their physician.

POSSIBLE SIDE EFFECTS

- Side effects that generally resolve on their own and do not require medical attention unless they continue for several weeks or are bothersome: injection-site reactions (e.g., swelling, the development of a hardened lump, redness, tenderness, increased warmth of the skin, itching at the site of the injection); runny nose; tremor*; unusual tiredness or weakness*; weight gain.

- Unusual side effects that should be discussed as soon as possible with your doctor: Hives (an itchy, blotchy swelling of the skin) or severe pain at the injection site.

- Possible immediate postinjection reaction: Approximately 13% of individuals using Copaxone will experience, at one time or another, a transient (very temporary) reaction immediately after injecting glatiramer acetate. This reaction, which usually occurs only once, includes flushing or chest tightness with heart palpitations, anxiety, and difficulty breathing. During the clinical trials, these reactions occurred very rarely, usually within minutes of an injection. They lasted approximately 15 minutes and resolved without further problem.
GLYCERIN

CHEMICAL NAME

- glycerin (GLI-ser-in)

BRAND NAME

- Sani-Supp Suppository (U.S.)

GENERIC AVAILABLE

- Yes (U.S. and Canada)

DESCRIPTION

- A glycerin suppository is a hyperosmotic laxative that draws water into the bowel from surrounding body tissues. This water helps to soften the stool mass and promote bowel action.

PROPER USAGE

- Laxatives are to be used to provide short-term relief only, unless otherwise directed by the nurse or physician who is helping you to manage your bowel symptoms. A regimen that includes a healthy diet containing roughage (whole grain breads and cereals, bran, fruit, and green, leafy vegetables), six to eight full glasses of liquids each day, and some form of daily exercise is most important in stimulating healthy bowel function.
- If your physician has recommended this laxative for management of constipation, follow his or her recommendations for its use. If you are treating yourself for constipation, follow the directions on the package insert.
- If the suppository is too soft to insert, refrigerate it for thirty minutes or hold it under cold water before removing the foil wrapper.
- Glycerin suppositories often produce results within fifteen minutes to one hour. Be sure to consult your physician if you experience problems or do not get relief within a week.
PRECAUTIONS

- Do not take any type of laxative if you have signs of appendicitis or inflamed bowel (e.g., stomach or lower abdominal pain, cramping, bloating, soreness, nausea, or vomiting). Check with your physician as soon as possible.
- Do not take any laxative for more than one week unless you have been told to do so by your physician. Many people tend to overuse laxatives, which often leads to dependence on the laxative action to produce a bowel movement.
- Discuss the use of laxatives with your health care professional in order to ensure that the laxative is used effectively as part of a comprehensive, healthy bowel management regimen.
- If you are pregnant, discuss with your physician the most appropriate type of laxative for you to use.
- Use only water to moisten the suppository prior to insertion in the rectum. Do not lubricate the suppository with mineral oil or petroleum jelly, which might affect the way the suppository works.

POSSIBLE SIDE EFFECTS

- Side effects that may go away as your body adjusts to the medication and do not require medical attention unless they persist or are bothersome: skin irritation around the rectal area.
- Less common side effects that should be reported to your physician as soon as possible: rectal bleeding; blistering, or itching.

HYDROXYZINE

CHEMICAL NAME

- hydroxyzine (hye-DROX-I-zeen)

BRAND NAME

- Atarax

GENERIC AVAILABLE

- Yes

DESCRIPTION

- Hydroxyzine is an antihistamine used to relieve or prevent the symptoms of allergy. In MS it is used to relieve the symptoms of pruritis or paroxysmal itching — one of the sensory symptoms, or dysesthesias, which can be associated with MS.
PROPER USAGE

- Tell your physician if you are on a low-sodium, low-sugar or any other special diet before using hydroxyzine.
- Tell your physician if you have any of these medical problems: enlarged prostate; urinary difficulties; glaucoma; heart arrhythmias; low blood potassium levels; liver disease.
- Before taking hydroxyzine you should inform your physician if you are taking aspirin on a regular basis.

PRECAUTIONS

- Hydroxyzine will add to the effect of alcohol and other central nervous system depressants such as sedatives, tranquilizers, sleeping medications, prescription pain medications, barbiturates, seizure medications, muscle relaxants, and anesthetics including dental anesthetics.
- Hydroxyzine may cause drowsiness and make you less alert. You should be familiar with the effects of this drug before driving or using machinery.
- Hydroxyzine may cause dryness of the mouth, nose and throat. If dryness continues for more than two weeks check with your physician or dentist as prolonged dryness may cause dental disease.
- Hydroxyzine may cause nausea or vomiting, which may cover up the symptoms of overdose or appendicitis.
- Most antihistamines have not been studied in pregnant women; some animal studies have shown increased birth defects.
- Antihistamines pass into breast milk. They may also decrease the flow of breast milk in some patients. Babies may also be susceptible to side effects such as irritability or excitement.

POSSIBLE SIDE EFFECTS

- Side effects that usually go away as your body adjusts to the medication and do not require medical attention unless they persist or are bothersome: drowsiness; thickened mucus; blurred vision*; difficult urination*; dizziness; dry mouth; fast heartbeat; sensitivity to sun; appetite changes; nightmares; ringing or buzzing in the ears; skin rash; stomach upset; nervousness or restlessness.
- Side effects that should be discussed with your physician as soon as possible: fast or irregular heartbeat; sore throat and fever; unusual bleeding or bruising; unusual tiredness* or weakness*.
- Symptoms of overdose include: clumsiness or unsteadiness; seizures; severe drowsiness; feeling faint; flushing; hallucinations; shortness of breath; sleeping difficulties.
IMIPRAMINE

CHEMICAL NAME
- imipramine (im-IP-ra-meen)

BRAND NAME
- Tofranil (U.S. and Canada)

GENERIC AVAILABLE
- Yes (U.S. and Canada)

DESCRIPTION
- Imipramine is a tricyclic antidepressant used to treat mental depression. Its primary use in multiple sclerosis is to treat bladder symptoms, including urinary frequency and incontinence. Imipramine is also prescribed occasionally for the management of neurologic pain in MS.

PROPER USAGE
- To lessen stomach upset, take this medication with food, even for a daily bedtime dose, unless your physician has told you to take it on an empty stomach.

PRECAUTIONS
- Imipramine adds to the effects of alcohol and other central nervous system depressants (e.g., antihistamines, sedatives, tranquilizers, prescription pain medications, seizure medications, muscle relaxants, sleeping medications), possibly causing drowsiness. Be sure that your physician knows if you are taking these or any other medications.
- This medication causes dryness of the mouth. Because continuing dryness of the mouth can increase the risk of dental disease, alert your dentist if you are taking imipramine.
- Imipramine may cause your skin to be more sensitive to sunlight than it is normally. Even brief exposure to sunlight may cause a skin rash, itching, redness or other discoloration of the skin, or severe sunburn. Stay out of the sun during the midday hours. Wear protective clothing and a sun block that has a skin protection factor (SPF) of at least 15.
- This medication may affect blood sugar levels of diabetic individuals. If you notice a change in the results of your blood or urine sugar tests, check with your physician.
- Do not stop taking imipramine without consulting your physician. The physician may want you to reduce the amount you are taking gradually in order to reduce the possibility of withdrawal symptoms such as headache, nausea, and/or an overall feeling of discomfort.
Studies of imipramine have not been done in pregnant women. There have been reports of newborns suffering from muscle spasms and heart, breathing, and urinary problems when their mothers had taken tricyclic antidepressants immediately before delivery. Studies in animals have indicated the possibility of unwanted effects in the fetus.

Imipramine passes into breastmilk but has not been reported to have any effect on the nursing infant.

POSSIBLE SIDE EFFECTS

- Side effects that may go away as your body adjusts to the medication and do not require medical attention unless they continue for more than two weeks or are bothersome: dizziness; drowsiness*; headache; decreased sexual ability*; increased appetite; nausea; unusual tiredness or weakness*; unpleasant taste; diarrhea; heartburn; increased sweating; vomiting.

- Uncommon side effects that should be reported to your physician as soon as possible: blurred vision*; confusion or delirium; constipation*; difficulty speaking or swallowing; eye pain*; fainting; fast or irregular heartbeat; hallucinations; loss of balance control*; nervousness or restlessness; problems urinating*; shakiness or trembling; stiffness of arms and legs*.

- Rare side effects that should be reported to your physician as soon as possible: anxiety; breast enlargement in males and females; hair loss; inappropriate secretion of milk in females; increased sensitivity to sunlight; irritability; muscle twitching; red or brownish spots on the skin; buzzing or other unexplained sounds in the ears; skin rash; itching; sore throat and fever; swelling of face and tongue; weakness*; yellow skin.

- Symptoms of acute overdose: confusion; convulsions; severe drowsiness*; enlarged pupils; unusual heartbeat; fever; hallucinations; restlessness and agitation; shortness of breath; unusual tiredness or weakness*; vomiting.

INTERFERON BETA-1A

CHEMICAL NAME
- interferon (in-ter-FEER-on) beta-1a

BRAND NAME
- Avonex (U.S. and Canada)

GENERIC AVAILABLE
- No
DESCRIPTION

- Avonex is a medication manufactured by a biotechnological process from one of the naturally occurring interferons (a type of protein). It is made up of exactly the same amino acids (major components of proteins) as the interferon beta found in the human body. In controlled clinical trials in relapsing MS, those taking the medication had a reduced risk of disability progression, experienced fewer exacerbations, and showed a reduction in number and size of active lesions in the brain (as shown on MRI) when compared with the group taking a placebo. In a subsequent study of patients who had experienced a single demyelinating event in the optic nerve, spinal cord, or brainstem, and had lesions typical of MS on brain MRI, Avonex significantly delayed the time to a second exacerbation, and thus to a clinically definite diagnosis of MS.

- Approval by the U.S. Food and Drug Administration (FDA): Avonex is approved by the U.S. Food and Drug Administration (FDA) for the treatment of patients with relapsing forms of MS to slow the accumulation of physical disability and decrease the frequency of clinical exacerbations. Patients with MS in whom efficacy has been demonstrated include those who have experienced a first clinical episode and have MRI features consistent with MS.

PROPER USAGE

- Avonex is given as a once-a-week intramuscular (IM) injection, usually in the large muscles of the thigh, upper arm, or hip.

- You and your care partner will be instructed in safe and proper IM injection procedures. If you are unable to self-inject, and have no family member or friend available to do the injections, your physician or nurse will administer the injections. Do not attempt to inject yourself until you are sure that you understand the procedures.

- Avonex is available in two forms:
  - A powder form that comes in a single-use vial and requires reconstitution (mixing) prior to injection. The vials should be stored in the refrigerator, although storage at room temperature is permissible for up to 30 days. Once the medication has been mixed for use, it is recommended that you administer the injection as soon as possible — or within six hours if stored in the refrigerator.
  - A liquid form in a pre-filled syringe. Pre-filled syringes should be stored in the refrigerator, and allowed to come to room temperature (about 20 minutes) prior to injecting. Once removed from the refrigerator, the pre-filled syringe should be used within 12 hours.

- Do not expose the medication to high temperatures (in a glove compartment or on a window sill, for example) and do not allow it to freeze.

- Do not reuse the pre-filled syringes. Dispose of the syringes as directed by your physician and keep them out of the reach of children.

- Since flu-like symptoms are a fairly common side effect during the initial weeks of treatment, it is recommended that the injection be given at bedtime. Taking acetaminophen (Tylenol) or ibuprofen (Advil) immediately prior to each injection and during the 24 hours following the injection will also help to relieve the flu-like symptoms.
WARNINGS & PRECAUTIONS

- In response to post-marketing findings (events that have been reported by patients and doctors since Avonex was approved for use), the FDA has added warnings and precautions to the prescribing information for this medication:

DEPRESSION & SUICIDE

- It is recommended that individuals with a history of severe depressive disorder or other mental disorder be closely monitored while taking Avonex. The people receiving Avonex in the original clinical trial did not report an increase in depression. However, depression and suicidal thoughts are known to occur with some frequency in MS, and depression and suicidal thoughts have been reported with high doses of various interferon products. In addition, there have been post-marketing reports of depression, suicidal thoughts and/or development of new or worsening of other pre-existing psychiatric disorders, including psychosis. Some of these patients improved when they stopped the medication.

SEIZURES

- Avonex should be used with caution in individuals with a seizure disorder. A few individuals with no prior history of seizures have experienced seizures while on Avonex. Since seizures are known to occur somewhat more frequently in people with MS than in the general population, it is not known whether these seizures were related to the MS, to the medication, or to some combination of the two.

HEART PROBLEMS

- People with cardiac disease should be closely monitored for a worsening of their condition. While Avonex is not known to cause cardiac problems, there have been infrequent post-marketing reports of congestive heart failure and other cardiac problems in people with no prior history and no other factors predisposing them to heart problems.

LIVER PROBLEMS

- Avonex, like other interferon medications, can affect liver functions. In post-marketing studies, a few people have developed severe liver injury. Periodic blood tests to measure liver functions are recommended for any person taking an interferon medication.

ALLERGIC REACTIONS

- Some people taking Avonex have developed a severe allergic reaction that interferes with breathing. An allergic reaction can occur after the first dose, or not until after several doses. Less severe reactions — including itching, skin bumps, a rash, or swelling of the mouth and tongue can also occur. Anyone who develops any kind of allergic reaction should stop the medication immediately and contact his or her physician.

BLOOD PROBLEMS

- Avonex can cause a reduction in levels of infection-fighting blood cells, red blood cells, or cells that help to form blood clots. Severe changes of this kind can lessen a person’s ability to fight infections and cause tiredness. Periodic blood tests can identify changes in levels of these important types of cells.
PRIOR TO TAKING AVONEX, BE SURE TO TELL YOUR PHYSICIAN IF YOU HAVE EVER HAD ANY OF THE FOLLOWING MEDICAL PROBLEMS:

- Depression, anxiety, or trouble sleeping
- Problems with your thyroid gland
- Blood problems such as bleeding or bruising easily, anemia, low white cell count
- Seizures
- Heart problems
- Liver disease

Avonex should not be used during pregnancy or by any woman who is trying to become pregnant. Women taking Avonex should use birth control measures at all times. If you want to become pregnant while being treated with Avonex, discuss the matter with your physician. If you become pregnant while using Avonex, stop the treatment and contact your physician.

POSSIBLE SIDE EFFECTS

- Common side effects include flu-like symptoms (fatigue, chills, fever, muscle aches, and sweating). Most of these symptoms will tend to disappear after the initial few weeks of treatment. If they continue, become more severe, or cause you significant discomfort, be sure to talk them over with your physician.
- Symptoms of depression, including ongoing sadness, anxiety, loss of interest in daily activities, irritability, low self-esteem, guilt, poor concentration, indecisiveness, confusion, and eating and sleep disturbances, should be reported promptly to your doctor.

AVONEX SUPPORT PROGRAM

Avonex ActiveSource℠
1-800-456-2255
www.avonex.com
www.MSActiveSource.com

INTERFERON BETA-1A

CHEMICAL NAME

- interferon (in-ter-FEER-on) beta-1a

BRAND NAME

- Rebif (U.S. and Canada)
 GENERIC AVAILABLE

 No

 DESCRIPTION

 Rebif is a medication manufactured by a biotechnological process from one of the naturally-occurring interferons (a type of protein). It is made up of exactly the same amino acids (major components of proteins) as the interferon beta found in the human body. A controlled clinical trial in relapsing-remitting MS compared three groups — those receiving 22mcg three times per week, those receiving 44mcg three times a week, and those receiving placebo. Over the two-year study, the two experimental groups demonstrated a lower relapse rate, prolonged time to first relapse, a higher proportion of relapse-free patients, a lower number of active lesions on MRI, and delay in progression of disability, when compared to the placebo group. Rebif currently available at the 44mcg dose in pre-filled syringes ready for subcutaneous injection.

 APPROVAL BY THE U.S. FOOD & DRUG ADMINISTRATION (FDA)

 Rebif is approved for the treatment of patients with relapsing forms of MS to decrease the frequency of clinical exacerbations and delay the accumulation of physical disability.

 Reporting on the outcome of the EVIDENCE trial, which compared Rebif and Avonex (both interferon beta-1a), the FDA added the following information to the labeling of Rebif: “Patients treated with Rebif 44 mcg [micrograms] sc [delivered subcutaneously] tiw [3 times per week] were more likely to remain relapse-free at 24 and 48 weeks than were patients treated with Avonex 30 mcg im [delivered intramuscularly] qw [once per week].”

 PROPER USAGE

 Rebif is given three times a week subcutaneously (between the fat layer just under the skin and the muscles beneath). The physician or nurse will instruct you in the injection procedure, using a specially designed set of training materials. Do not attempt to inject yourself until you are sure that you understand the procedures.

 When beginning treatment, it is recommended that you start at 8.8 mcg three times a week and gradually increase over a 4-week period to the 44mcg dose in order to reduce the side effects. A starter kit with 22mcg syringes is available to facilitate the gradual increase in dose.

 Rebif should be administered at the same time of day, on the same days of the week, preferably in the late afternoon. Doses must be at least 48 hours apart.

 Rebif should be stored in the refrigerator. Storage at room temperature without exposure to heat or light is permissible for up to 30 days. Do not allow the medication to freeze.

 Do not reuse needles or syringes. Dispose of the syringes as directed by your physician and keep them out of the reach of children.

 Since flu-like symptoms are a fairly common side effect during the initial weeks of treatment, it is recommended that the injection be given at bedtime. Taking acetaminophen (Tylenol) or ibuprofen (Advil) immediately prior to each injection and during the 24 hours following the injection will also help to relieve the flu-like symptoms.
WARNINGS & PRECAUTIONS

In response to post-marketing findings (events that have been reported by patients and doctors since Rebif was approved for use), the FDA has added warnings and precautions to the prescribing information for this medication:

DEPRESSION & SUICIDE

- There was no increase in depression reported by people receiving Rebif in the clinical trial. However, some patients treated with interferons, including Rebif, have become seriously depressed or become suicidal, and depression and suicidal thoughts are known to occur with some frequency in MS. It is recommended that individuals with a history of severe depressive disorder be closely monitored while taking Rebif. Anyone who experiences significant feelings of sadness or helplessness, or feels like hurting him- or herself or others, should speak with a friend or family member right away and contact the physician as soon as possible.

LIVER PROBLEMS

- Rebif, like other interferon medications, can affect liver functions. In post-marketing studies, a few people have developed severe liver injury. Periodic blood tests to measure liver functions are recommended for any person taking an interferon medication.

ALLERGIC REACTIONS

- Some people taking Rebif have developed a severe allergic reaction that interferes with breathing. An allergic reaction can occur after the first dose, or not until after several doses. Less severe reactions — including itching, skin bumps, a rash, or swelling of the mouth and tongue can also occur. Anyone who develops any kind of allergic reaction should stop the medication immediately and contact his or her physician.

SEIZURES

- Rebif should be used with caution in individuals with a seizure disorder since seizures have been associated with the use of beta interferon medications.

MORE WARNINGS & PRECAUTIONS

- Because of the potential of Rebif to affect the levels of white blood cells, red blood cells, and platelets in a person’s system, blood tests are recommended at regular intervals. Thyroid function tests are recommended every 6 months in patients with a history of thyroid dysfunction.

- Rebif should not be used during pregnancy or breast-feeding, or by any woman who is trying to become pregnant. Women taking Rebif should use birth control measures at all times. If you want to become pregnant while being treated with Rebif, discuss the matter with your physician. If you become pregnant while using Rebif, stop the treatment and contact your physician.
POSSIBLE SIDE EFFECTS

- Common side effects include flu-like symptoms (fatigue, chills, fever, muscle aches, and sweating) and injection site reactions (swelling, redness, discoloration, and pain). Most of these symptoms tend to disappear over time. If they continue, become more severe, or cause significant discomfort, be sure to talk them over with your physician. Contact your physician if the injection sites become inflamed, hardened, or lumpy, and do not inject into any area that has become hardened or lumpy.

- Most of these symptoms will tend to disappear after the initial few weeks of treatment. If they continue, become more severe, or cause you significant discomfort, be sure to talk them over with your physician.

- Symptoms of depression, including ongoing sadness, anxiety, loss of interest in daily activities, irritability, low self-esteem, guilt, poor concentration, indecisiveness, confusion, and eating and sleep disturbances, should be reported promptly to your doctor.

REBIF SUPPORT PROGRAM

MS LifeLines
1-877-44-REBIF
www.rebif.com
www.MSLifeLines.com

INTERFERON BETA-1B

CHEMICAL NAME

- interferon (in-ter-FEER-on) beta-1b

BRAND NAME

- Betaseron; Extavia (U.S. and Canada)

GENERIC AVAILABLE

- No

DESCRIPTION

- Betaseron and Extavia are brand names for interferon beta 1b, a medication manufactured by a biotechnological process from one of the naturally occurring interferons (a type of protein). In a clinical trial of 372 ambulatory patients with relapsing-remitting MS, those taking the currently recommended dose of the medication experienced fewer exacerbations, a longer time between exacerbations, and exacerbations that were generally less severe than those of patients taking a lower dose of the medication or a placebo. Additionally, patients on interferon beta-1b had no increase in total lesion area, as shown on MRI, in contrast to the placebo group that had a significant increase.
APPROVAL BY THE U.S. FOOD & DRUG ADMINISTRATION (FDA)

- Betaseron and Extavia are approved by the FDA for the treatment of relapsing forms of MS to reduce the frequency of clinical exacerbations. Relapsing forms of MS include individuals with secondary-progressive MS who continue to experience relapses or acute attacks.
- Betaseron and Extavia are also approved for use in individuals who have experienced a first clinical episode (clinically-isolated syndrome) and have MRI features that are consistent with multiple sclerosis.

PROPER USAGE

- Interferon beta-1b (Betaseron and Extavia) is injected subcutaneously (between the fat layer just under the skin and the muscles beneath) every other day. The physician or nurse will instruct you in the injection procedure, using a specially designed set of training materials. Do not attempt to inject yourself until you are sure that you understand the procedures.
- Interferon beta-1b (Betaseron and Extavia) is supplied with a pre-filled diluant syringe to which the medication needs to be added prior to injection; no refrigeration is necessary.
- Do not reuse needles or syringes. Dispose of the syringes as directed by your physician and keep them out of the reach of children.
- Since flu-like symptoms are a common side effect associated with at least the initial weeks of taking interferon beta-1a (Betaseron and Extavia), it is recommended that the medication be taken at bedtime. Taking acetaminophen (Tylenol) or ibuprofen (Advil) thirty minutes before each injection will also help to relieve the flu-like symptoms.
- Because injection site reactions (swelling, redness, discoloration, or pain) are relatively common, it is recommended that the sites be rotated according to a schedule provided for you by your physician. Injection site necrosis [skin damage], which occurs in about 5% of patients during the first four months of therapy, has been reported in post-marketing studies even after a year of treatment. In order to avoid infection and other complications, you should report promptly any break in the skin, which may be associated with blue-black discoloration, swelling, or drainage of fluid from the injection site. Your physician will determine whether to continue treatment while the skin lesions are being treated.

WARNINGS & PRECAUTIONS

- In response to post-marketing findings (events that have been reported by patients and doctors since interferon beta-1b was approved for use), the FDA has added warnings and precautions to the prescribing information for this medication:

DEPRESSION & SUICIDE

- Interferon beta 1b (Betaseron; Extavia) should be used with caution in people who are depressed, a condition which is very common in MS. Depression, suicidal thoughts, and suicidal attempts have been reported in people receiving various interferon products. Anyone who experiences significant mood changes or suicidal thoughts should report them promptly to his or her physician.
LIVER PROBLEMS

- Interferon beta 1b (Betaseron; Extavia), like other interferon medications, can affect liver functions. In post-marketing studies of interferon beta-1b, a few people have developed severe liver injury. Periodic blood tests to measure liver functions are recommended for any person taking an interferon medication.

ALLERGIC REACTIONS

- Some people taking interferon beta-1b have developed a severe allergic reaction that interferes with breathing. An allergic reaction can occur after the first dose, or not until after several doses. Less severe reactions — including itching, skin bumps, a rash, or swelling of the mouth and tongue can also occur. Anyone who develops any kind of allergic reaction should stop the medication immediately and contact his or her physician.

SEIZURES

- Interferon beta-1b (Betaseron; Extavia) should be used with caution in individuals with a seizure disorder since seizures have been associated with the use of beta interferon medications.

MORE WARNINGS & PRECAUTIONS

- Because of the potential of interferon beta-1b (Betaseron; Extavia) to affect the thyroid gland, and to alter the levels of white blood cells, red blood cells, and platelets in a person’s system, blood tests are recommended at regular intervals.

- Interferon beta 1b (Betaseron; Extavia) should not be used during pregnancy or by any woman who is trying to become pregnant. Women taking Betaseron or Extavia should use birth control measures at all times.

POSSIBLE SIDE EFFECTS

- Common side effects include flu-like symptoms (fatigue, chills, fever, muscle aches, and sweating) and injection site reactions (swelling, redness, discoloration, and pain). Most of these symptoms tend to disappear over time. If they continue, become more severe, or cause significant discomfort, be sure to talk them over with your physician. Contact your physician if the injection sites become inflamed, hardened, or lumpy, and do not inject into any area that has become hardened or lumpy.

- Depression, including suicide attempts, has been reported by patients taking interferon beta-1b. Common symptoms of depression are sadness, anxiety, loss of interest in daily activities, irritability, low self-esteem, guilt, poor concentration, indecisiveness, confusion, and eating and sleep disturbances. If you experience any of these symptoms for longer than a day or two, contact your physician promptly.

BETASERON SUPPORT PROGRAM

BETAPLUS
1-800-788-1467
www.betaseron.com
www.betaplusonline.com

EXTAVIA SUPPORT PROGRAM
1-866-925-2333
MAGNESIUM HYDROXIDE

CHEMICAL NAME
- magnesium hydroxide (mag-nee-zhum hye-drox-ide)

BRAND NAME
- Phillips’ Milk of Magnesia (available in granule form in Canada, in wafer form in the U.S., and in liquid, powder or effervescent powder in the U.S. and Canada) is one of several brands of bulk-forming laxative that are available over-the-counter.

GENERIC AVAILABLE
- Yes

DESCRIPTION
- Magnesium hydroxide is an over-the-counter hyperosmotic laxative of the saline type that encourages bowel movements by drawing water into the bowel from surrounding body tissue. Saline hyperosmotic laxatives (often called “salts”) are used for rapid emptying of the lower intestine and bowel. They are not to be used for the long-term management of constipation.

PROPER USAGE
- Laxatives are to be used to provide short-term relief only, unless otherwise directed by the nurse or physician who is helping you to manage your bowel symptoms. A regimen that includes a healthy diet containing roughage (whole grain breads and cereals, bran, fruit, and green, leafy vegetables), six to eight full glasses of liquids each day, and some form of daily exercise is most important in stimulating healthy bowel function.

- If your physician has recommended this laxative for management of constipation, follow his or her recommendations for its use. If you are treating yourself for constipation, follow the directions on the package insert. Results are often obtained ninety minutes to three hours after taking a hyperosmotic laxative. Be sure to consult your physician if you experience problems or do not get relief within a week.

- Each dose should be taken with eight ounces or more of cold water or fruit juice. A second glass of water or juice with each dose is often recommended to prevent dehydration. If concerns about loss of bladder control keep you from drinking this amount of water, talk it over with the nurse or physician who is helping you manage your bowel and bladder symptoms.
**PRECAUTIONS**

- Do not take any type of laxative if you have signs of appendicitis or inflamed bowel (e.g., stomach or lower abdominal pain, cramping, bloating, soreness, nausea, or vomiting). Check with your physician as soon as possible.

- Do not take any laxative for more than one week unless you have been told to do so by your physician. Many people tend to overuse laxatives, which often leads to dependence on the laxative action to produce a bowel movement. Discuss the use of laxatives with your health care professional in order to ensure that the laxative is used effectively as part of a comprehensive, healthy bowel management regimen.

- Do not take any laxative within two hours of taking another medication because the desired effectiveness of the other medication may be reduced.

- Although laxatives are commonly used during pregnancy, some types are better than others. If you are pregnant, consult your physician about the best laxative for you to use.

- Some laxatives pass into breast milk. Although it is unlikely to cause problems for a nursing infant, be sure to let your physician know if you are using a laxative and breast-feeding at the same time.

**POSSIBLE SIDE EFFECTS**

- Side effects that may go away as your body adjusts to the medication and do not require medical attention unless they continue or are bothersome: cramping; diarrhea; gas; increased thirst.

- Unusual side effects that should be reported to your physician as soon as possible: confusion; dizziness; irregular heartbeat; muscle cramps, unusual tiredness or weakness.

**MECLIZINE**

**CHEMICAL NAME**

- meclizine (MEK-li-zeen)

**BRAND NAME**

- Antivert (U.S.)

**GENERIC AVAILABLE**

- Yes

**DESCRIPTION**

- Meclizine is used to prevent and treat nausea, vomiting, and dizziness.
PRECAUTIONS

- This drug adds to the effects of alcohol and other central nervous system depressants (e.g., antihistamines, sedatives, tranquilizers, prescriptions pain medications, seizure medications, muscle relaxants, sleeping medications), possibly causing drowsiness. Be sure that your physician knows if you are taking these or any other medications.

- Meclizine may cause dryness of the mouth. If dryness continues for more than two weeks, speak to your physician or dentist since continuing dryness of the mouth may increase the risk of dental disease.

- This medication has not been shown to cause birth defects or other problems in humans. Studies in animals have shown that meclizine given in doses many times the usual human dose causes birth defects such as cleft palate.

- Although meclizine passes into breast milk, it has not been reported to cause problems in nursing babies. However, since this medication tends to decrease bodily secretions, it is possible that the flow of breast milk may be reduced in some women.

POSSIBLE SIDE EFFECTS

- Side effects that typically go away as your body adjusts to the medication and do not require medical attention unless they continue for more than two weeks or are bothersome: drowsiness*; blurred vision*; constipation*; difficult or painful urination; dizziness; dryness of mouth, nose, and throat; fast heartbeat; headache; loss of appetite; nervousness or restlessness; trouble sleeping; skin rash; upset stomach.

METHENAMINE

CHEMICAL NAME

- methenamine (meth-EN-a-meen)

BRAND NAME

- Hiprex, Mandelamine (U.S.)

GENERIC AVAILABLE

- Yes

DESCRIPTION

- Methenamine is an anti-infective medication that is used to help prevent infections of the urinary tract. It is usually prescribed on a long-term basis for individuals with a history of repeated or chronic urinary tract infections.
PROPER USAGE

- Before you start taking this medication, check your urine with phenaphthazine paper or another test to see if it is acidic. Your urine must be acidic (pH 5.5 or below) for this medicine to work properly. Consult your health care professional about possible changes in your diet if necessary to increase the acidity of your urine (e.g., avoiding citrus fruits and juices, milk and other dairy products, antacids; eating more protein and foods such as cranberries and cranberry juice with added vitamin C, prunes, or plums).

PRECAUTIONS

- The effects of methenamine in pregnancy have not been studied in either humans or animals. Individual case reports have not shown that this medication causes birth defects or other problems in humans.
- Methenamine passes into breast milk but has not been reported to cause problems in nursing infants.

POSSIBLE SIDE EFFECTS

- Side effects that typically go away as your body adjusts to the medication and do not require medical attention unless they continue or are bothersome: nausea; vomiting.
- Unusual side effects that should be reported immediately to your physician: skin rash.

METHYLPREDNISOLONE

CHEMICAL NAME

- methylprednisolone (meth-ill-pred-NISS-oh-lone)

BRAND NAME

- Depo-Medrol (U.S. and Canada)

GENERIC AVAILABLE

- Yes (U.S. and Canada)

DESCRIPTION

- Methylprednisolone is one of a group of corticosteroids (cortisone-like medications) that is used to relieve inflammation in different parts of the body. Corticosteroids are used in MS for the management of acute exacerbations because they have the capacity to close the damaged blood-brain barrier and reduce inflammation in the central nervous system. Although methylprednisolone is among the most commonly used corticosteroids in MS, it is only one of several possibilities. Other commonly used corticosteroids include dexamethasone, prednisone, betamethasone, and prednisolone. The following information pertains to all of the various corticosteroids.
PROPER USAGE

- Most neurologists treating MS believe that high-dose corticosteroids given intravenously are the most effective treatment for an exacerbation, although the exact protocol for the drug’s use may differ somewhat from one treating physician to another. Patients generally receive a four-day course of treatment (either in the hospital or as an outpatient), with doses of the medication spread throughout the day. This high-dose, intravenous steroid treatment is then typically followed by a gradually tapering dose of an oral corticosteroid (see prednisone and dexamethasone).

PRECAUTIONS

- Since corticosteroids can stimulate the appetite and increase water retention, it is advisable to follow a low-salt and/or potassium-rich diet and watch your caloric intake. Your physician will make specific dietary recommendations for you.
- Corticosteroids can lower your resistance to infection and make any infection that you get more difficult to treat. Contact your physician if you notice any sign of infection, such as sore throat, fever, coughing, or sneezing.
- Avoid close contact with anyone who has chicken pox or measles. Tell your physician right away if you think you have been exposed to either of these illnesses. Do not have any immunizations after you stop taking this medication until you have consulted your physician. People living in your home should not have the oral polio vaccine while you are being treated with corticosteroids since they might pass the polio virus on to you.
- Corticosteroids may affect the blood sugar levels of diabetic patients. If you notice a change in your blood or urine sugar tests, be sure to speak to your physician.
- The risk of birth defects for women taking corticosteroids is not known. Overuse of corticosteroids during pregnancy may slow the growth of the infant after birth. Animal studies have demonstrated that corticosteroids cause birth defects.
- Corticosteroids pass into breast milk and may slow the infant’s growth. If you are nursing or plan to nurse, be sure to discuss this with your physician. It may be necessary for you to stop nursing while taking this medication.
- Corticosteroids may produce mood changes and/or mood swings of varying intensity. These mood alterations can vary from relatively mild to extremely intense, and can vary in a single individual from one course of treatment to another. Neither the patient nor the physician can predict with any certainty whether the corticosteroids are likely to precipitate these mood alterations. If you have a history of mood disorders (depression or bipolar disorder, for example), be sure to share this information with your physician. If you begin to experience mood changes or swings that feel unmanageable, contact your physician so that a decision can be made about whether or not you need an additional medication to help you until the mood alterations subside.

POSSIBLE SIDE EFFECTS

- Side effects that may go away as your body adjusts to the medication and do not require medical attention unless they continue or are bothersome: increased appetite; indigestion; nervousness or restlessness; trouble sleeping; headache; increased sweating; unusual increase in hair growth on body or face.
- Less common side effects that should be reported as soon as possible to your physician: severe mood changes or mood swings; decreased or blurred vision*; frequent urination*.
Additional side effects that can result from the prolonged use of corticosteroids and should be reported to your physician: acne or other skin problems; swelling of the face; swelling of the feet or lower legs; rapid weight gain; pain in the hips or other joints (caused by bone cell degeneration); bloody or black, tarry stools; elevated blood pressure; markedly increased thirst (with increased urination indicative of diabetes mellitus); menstrual irregularities; unusual bruising of the skin; thin, shiny skin; hair loss; muscle cramps or pain. Once you stop this medication after taking it for a long period of time, it may take several months for your body to readjust.

**MINERAL OIL**

**CHEMICAL NAME**
- mineral oil

**BRAND NAME**
- Mineral oil is available in a variety of brands in the U.S. and Canada.

**GENERIC AVAILABLE**
- Yes

**DESCRIPTION**
- Mineral oil is a lubricant laxative that is taken by mouth. It encourages bowel movements by coating the bowel and the stool with a waterproof film that helps to retain moisture in the stool.

**PROPER USAGE**
- Laxatives are to be used to provide short-term relief only, unless otherwise directed by the nurse or physician who is helping you to manage your bowel symptoms. A regimen that includes a healthy diet containing roughage (whole grain breads and cereals, bran, fruit, and green, leafy vegetables), six to eight full glasses of liquids each day, and some form of daily exercise is most important in stimulating healthy bowel function.
- If your physician has recommended this type of laxative for management of constipation, follow his or her recommendations for its use. If you are treating yourself for constipation, follow the directions on the package insert. Mineral oil is usually taken at bedtime because it takes six to eight hours to produce results. Be sure to consult your physician if you experience problems or do not get relief within a week.
- Mineral oil should not be taken within two hours of mealtime because the mineral oil may interfere with food digestion and the absorption of important nutrients.
- Mineral oil should not be taken within two hours of taking a stool softener (see docusate) because the stool softener may increase the amount of mineral oil that is absorbed by the body.
PRECAUTIONS

- Do not take any type of laxative if you have signs of appendicitis or inflamed bowel (e.g., stomach or lower abdominal pain, cramping, bloating, soreness, nausea, or vomiting). Check with your physician as soon as possible.
- Do not take any laxative for more than one week unless you have been told to do so by your physician. Many people tend to overuse laxative products, which often leads to dependence on the laxative action to produce a bowel movement. Discuss the use of laxatives with your health care professional in order to ensure that the laxative is used effectively as part of a comprehensive, healthy bowel management regimen.
- Mineral oil should not be used very often or for long periods of time. Its gradual build-up in body tissues can cause problems, and may interfere with the body’s absorption of important nutrients and vitamins A, D, E, and K.
- Do not take any laxative within two hours of taking another medication because the desired effectiveness of the other medication may be reduced.
- Mineral oil should not be used during pregnancy because it may interfere with absorption of nutrients in the mother and, if used for prolonged periods, cause severe bleeding in the newborn infant.
- Be sure to let your physician know if you are using a laxative and breast-feeding at the same time.

POSSIBLE SIDE EFFECTS

- Uncommon side effect that usually does not need medical attention: skin irritation around the rectal area.

MITOXANTRONE

CHEMICAL NAME

- mitoxantrone for injection concentrate (mye-toe-ZAN-trone)

BRAND NAME

- Novantrone (U.S. and Canada)

GENERIC AVAILABLE

- Yes

DESCRIPTION

- Novantrone belongs to the general group of medicines called antineoplastics. Prior to its approval for use in MS, it was used only to treat certain forms of cancer. It acts in MS by suppressing the activity of T cells, B cells, and macrophages that are thought to lead the attack on the myelin sheath.
The use of Novantrone for the treatment of MS has been evaluated in a series of European studies over a period of ten years. In a randomized, placebo-controlled, multi-center clinical trial involving patients with secondary-progressive or progressive-relapsing disease, participants received 12mg/m² of Novantrone by short IV infusion once every three months for 24 months. Novantrone was found to delay the time to first treated relapse and time to disability progression. It also reduced the number of treated relapses and number of new lesions detected by magnetic resonance imaging.

**APPROVAL BY THE U.S. FOOD & DRUG ADMINISTRATION (FDA)**

- Based on findings from these studies, the FDA approved Novantrone in 2000 for reducing neurologic disability and/or the frequency of clinical relapses (attacks) in:
  1. Patients with secondary progressive MS (disease that has changed from relapsing-remitting to progressive at a variable rate)
  2. Progressive-relapsing MS (disease characterized by gradual increase in disability from onset with clear, acute relapses along the way);
  3. Worsening relapsing-remitting MS (disease characterized by clinical attacks without complete remission, resulting in a step-wise worsening of disability).
- Novantrone has not been approved for the treatment of primary-progressive MS (characterized by progression from disease onset with no acute attacks or remissions).

**USAGE IN CANADA**

- Health Canada has not specifically approved Novantrone for use in multiple sclerosis, but it can be used at the discretion of a physician for people with worsening relapsing-remitting or secondary-progressive MS. This is known as “off label” use.

**PROPER USAGE**

- The drug should be used only in those with normal cardiac function, once every three months at a dose of 12mg/m².
- The lifetime cumulative dose is limited to 140 mg/m² (approximately 8–12 doses over two to three years) because of possible cardiac toxicity.
- Because Novantrone can increase the risk for infection by decreasing the number of protective white blood cells, blood counts and liver function should be evaluated prior to each dose.

**NOTE**

- In response to post-marketing findings, the FDA has added a black box warning to the prescribing information for Novantrone:
  - Prior to the start of treatment, a person should be carefully evaluated (by examination and medical history) for signs and symptoms of heart disease.
  - A baseline evaluation of left ventricular ejection fraction (LVEF) should be performed.
  - A person whose LVEF is lower than 50% should not be given Novantrone.
  - LVEF should be re-tested prior to each dose of Novantrone.
Any person whose LVEF changes significantly or drops below 50% should have no further Novantrone treatments.

The factors that are known to increase a person’s risk for cardiotoxicity with Novantrone are:

1. a current or prior history of heart disease;
2. the simultaneous use of other medications that can damage the heart;
3. previous therapy with certain kinds of chemotherapies (anthracyclines or anthracenediones).

In post-marketing data collection, secondary acute myelogenous leukemia (AML) — a type of cancer — has been reported in MS patients and cancer patients treated with Novantrone. In one group of MS patients treated with Novantrone, two out of 802 patients developed AML. This represents an elevated risk of 0.25%. The risk of leukemia following treatment with Novantrone is increased for patients who have been treated with other types of chemotherapies called anthracyclines. Because post-marketing data collection is not controlled in any way, it is not possible to determine the exact risk for a person with MS of developing AML following treatment with Novantrone. The Registry to Evaluate NOVANTRONE Effects in Worsening MS (RENEW) was established in 2001 to follow a group of 505 MS patients who had been treated with Novantrone. This observational study is scheduled to last five years.

**PRECAUTIONS**

- It is important that your doctor check your progress at regular intervals to make sure that this medicine is working properly and to check for unwanted effects.
- While being treated with this medication, and during the period following treatment, do not have any immunizations (vaccinations) with live virus vaccines without your doctor’s approval. Mitoxantrone may lower your body’s resistance to infection, making you susceptible to the infection that the immunization is designed to help you avoid. Neither you nor anyone in your household should take the oral polio vaccine.
- If possible, avoid people with infections. Contact your physician if you think you are getting an infection, or if you get a fever or chills, cough or hoarseness, lower back or side pain, or painful or difficult urination.
- When receiving Novantrone, it is important for your physician to know if you are taking any of the following:
  - amphotericin B by injection
  - antithyroid agents
  - azathioprine
  - chloramphenicol
  - colchicine
  - flucytosine
  - ganciclovir
  - plicamycin
  - pobecid
  - sulfinpyrazone
  - zidovudine
or if you have previously been treated with:
  – radiation
  – other cancer medications

The presence of other medical problems may affect the use of Novantrone. Let your doctor know if you have any of the following:
  – chicken pox or recent exposure to it
  – herpes zoster (shingles)
  – gout or history of gout
  – kidney stones
  – heart disease
  – liver disease

The fluid for infusion is dark blue and may cause your urine to become blue-green in color for a period of 24 hours after each administration. The whites of the eyes may also appear bluish in color.

Tell your doctor if you are pregnant or intending to have children. This medicine may cause birth defects if either the man or woman is receiving it at the time of conception. A pregnancy test is recommended prior to each treatment for women of child-bearing age. Many medications of this type can cause permanent sterility. Be sure you have discussed this with your physician before taking this medication.

Novantrone is excreted in human milk. Breast-feeding should be discontinued before a woman starts treatment.

A higher incidence of leukemia has been reported in cancer patients, previously treated with chemotherapy, who were then treated with higher doses of Novantrone than is prescribed for treating MS.

POSSIBLE SIDE EFFECTS

Side effects that may go away as your body adjusts to the medication and do not require medical attention unless they continue or are bothersome: nausea, temporary hair loss, and menstrual disorders in females.

Side effects that should be reported to your physician as soon as possible: fever or chills, lower back or side pain; painful or difficult urination; swelling of feet and lower legs; black, tarry stools, cough or shortness of breath; sores in mouth and on lips, stomach pain.

NOVANTRONE SUPPORT PROGRAM

MS LifeLines℠
1-800-456-2255
1-877-447-3243
www.mslifelines.com
MODAFINIL

CHEMICAL NAME

■ modafinil (moe-DAF-i-nil)

BRAND NAME

■ Provigil (U.S.)

GENERIC AVAILABLE

■ No

DESCRIPTION

■ Modafinil is a wakefulness-promoting agent approved for the treatment of narcolepsy. While it does not cure narcolepsy, it helps people stay awake during the day. In 2000, the manufacturer, Cephalon, conducted a study of modafinil in people with MS to evaluate it as a potential treatment for MS-related fatigue. Seventy-two people with different forms of MS took two different doses of modafinil and inactive placebo over nine weeks, and self-evaluated their fatigue levels using standard fatigue and sleepiness scales. Participants reported feeling least fatigued while taking a lower dose of modafinil, and there was a statistically significant difference in fatigue scores for the lower dose versus placebo. The higher dose of modafinil was not reported to be effective. In a subsequent, double-blind, placebo-controlled study in 2005, modafinil was not found to be effective in treating MS fatigue, although some benefit was experienced by a subset of patients with excessive daytime sleepiness.

PROPER USAGE

■ The usual dosage for the management of fatigue in MS is 100-200 mg daily, taken in the earlier part of the day in order to avoid sleep disturbance. If you miss a dose of modafinil and remember it before 12 noon the next day, take the missed dose as soon as possible. If you remember it after 12 noon, skip the missed dose so that the medication will not make it difficult for you to sleep at night.

PRECAUTIONS

■ The precautions listed here pertain to the use of this medication as a treatment for narcolepsy. Since modafinil has not been approved by the FDA for use in multiple sclerosis, there are no precautions specific to MS-related uses of the drug.
   – Tell your physician if you have ever had an unusual or allergic reaction to any other nervous system stimulant such as Ritalin or Dexedrine.
   – This medication may cause some people to become dizzy or confused, or to have blurred vision or difficulty controlling movements. Make sure you know how you react to this medication before driving a car or engaging in any other potentially dangerous activity.
– If you think that the modafinil is not working properly after you have taken it for a few weeks, speak to your physician. Do not increase the dose.

– If you are using a medication for birth control such as birth control pills or implants, it may not work effectively in combination with modafinil or for one month after you have stopped taking modafinil. During this time, an additional form of birth control should be used.

– Studies of the effects of modafinil in pregnancy have not been done in humans. Studies in animals, however, suggest that the use of modafinil may result in unsuccessful pregnancies or cause birth defects. Before taking this medication, make sure your physician knows if you are pregnant or planning to become pregnant.

– It is not known whether modafinil passes into breast milk. If you are taking modafinil and wish to breastfeed, you should discuss this with your physician.

– When taking modafinil, it is especially important for your physician to know if you are taking any of the following medications that may add to the stimulating effects of modafinil such as irritability, nervousness, trembling or shaking, insomnia:
  • amantadine
  • amphetamines
  • bupropion (e.g., Wellbutrin; Zyban)
  • medicine for asthma or other breathing problems
  • medicine for colds, sinus problems, hay fever (including nose drops or sprays)
  • methylphenidate (e.g., Ritalin)

or, any of the following drugs whose action or effectiveness might be affected by the modafinil:
  • cyclosporine
  • diazepam (e.g., Valium)
  • phenytoin (e.g., Dilantin)
  • propranolol (e.g., Inderal)
  • warfarin (e.g., Coumadin)

or, any of the following drugs that may cause problems when combined with modafinil:
  • monoamine oxidase (MAO) inhibitors
  • tricyclic antidepressants (e.g., Elavil; Anafranil; Tofranil; Aventyl)

or, any of the following substances that may add to the stimulating effects of modafinil:
  • Cocaine
POSSIBLE SIDE EFFECTS

The side effects listed here pertain to the use of modafinil as a treatment for narcolepsy. There are no reports at the present time of the side effects associated with the use of this drug in the treatment of MS-related fatigue.

- Side effects that may go away as your body adjusts to the medication and do not require medical attention unless they continue or are bothersome: anxiety; headache; nausea; nervousness; trouble sleeping; decrease in appetite; diarrhea; dryness of mouth; flushing or redness of skin; muscle stiffness*; stuffy or runny nose; tingling*; burning&; trembling or shaking*; vomiting.

- Rare side effects that should be reported as soon as possible to your physician: blurred vision* or other vision changes; chills or fever; clumsiness or unsteadiness*; confusion; dizziness or fainting; increased thirst and increased urination; depression; problems with memory*; rapidly changing moods; shortness of breath; difficulty with urination; uncontrolled movements in the face, mouth, or tongue.

NATALIZUMAB

CHEMICAL NAME

- natalizumab (na-ta-lie-zoo-mab)

BRAND NAME

- Tysabri (U.S.)

GENERIC AVAILABLE

- No

DESCRIPTION

- Tysabri is a laboratory-produced monoclonal antibody. It is designed to hamper movement of potentially damaging immune cells from the bloodstream, across the “blood-brain barrier” into the brain and spinal cord. Tysabri was evaluated in a pair of two-year, controlled clinical trials:
  - Study I compared Tysabri to placebo in patients who had not received any interferon-beta or glatiramer acetate for at least the previous six months.
  - Study II involved patients who had experienced one or more relapses while on treatment with Avonex. Half of the group took Tysabri in addition to their Avonex; half of the group took Avonex plus a placebo.
  - In both studies, those taking the medication had a reduced risk of disability progression and experienced fewer exacerbations (relapses) compared with the group taking a placebo. At the present time, safety and efficacy of treatment with Tysabri beyond two years are not known. Tysabri has not been studied in people with primary progressive MS or in children.
APPROVAL BY THE U.S. FOOD & DRUG ADMINISTRATION (FDA)

- Tysabri was approved by the U.S. Food and Drug Administration (FDA) in 2006 as a monotherapy (not to be used in combination with another disease-modifying therapy) for the treatment of patients with relapsing forms of MS to delay the accumulation of physical disability and reduce the frequency of clinical exacerbations. Because Tysabri increases the risk of PML, it is generally recommended for patients who have had an inadequate response to, or cannot tolerate, any of the other disease-modifying therapies that are available for treating MS (see Precautions).

PROPER USAGE

- Tysabri is given once every four weeks by intravenous infusion.
- Because of the risk of PML, Tysabri is available only through a special distribution program called the TOUCH™ Prescribing Program. Only physicians, infusion centers, and pharmacies associated with the infusion centers that are registered with the Program can prescribe or deliver the medication. And only those patients who are enrolled in, and meet all the conditions for the Program, can receive this medication.
- Before starting treatment with Tysabri, you will learn about the TOUCH program and be asked to sign the Prescriber/ Patient Enrollment Form.
- Prior to each infusion, you will be asked a series of questions by the doctor or nurse at the infusion center to confirm that Tysabri is still appropriate and safe for you.

WARNINGS & PRECAUTIONS

- The FDA prescribing information about Tysabri includes a black box warning about the risk of progressive multifocal leukoencephalopathy (PML), a viral infection of the brain that usually leads to death or severe disability.
  - The typical symptoms associated with PML progress over days to weeks, and can include clumsiness and progressive weakness on one side of the body, disturbances of vision, and changes in thinking, memory, and orientation leading to confusion and personality changes. Changes of this kind should be reported immediately to one’s physician.
  - Although the cases of PML that occurred in the clinical trials occurred only in patients who were also taking another immunomodulating or immunosuppressing medication, additional cases of PML in people who were not taking another immunomodulating or immunosuppressing medication at the same time have been reported in the post-marketing phase.
  - There are no interventions that are known to cure PML once it occurs, but a course of plasma exchange to remove Tysabri from the blood stream as quickly as possible may provide some benefit. Immune reconstitution inflammatory syndrome (IRIS) has been reported in some patients in the days or weeks following plasma exchange to treat PML. IRIS appears as an unanticipated worsening in the person’s condition — caused by inflammation — as immune function returns following the plasma exchange. Anyone receiving plasma exchange to treat PML needs to be monitored for IRIS and treated if it occurs.
  - The risk of developing PML increases with longer treatment duration. For patient treated for 24–36 months, the risk appears to be similar to that seen in the clinical trials — approximately 1 in 1000 patients taking Tysabri develop PML. In the initial two years of treatment, the risk seems to be somewhat lower; the risk for people taking Tysabri beyond 36 months is yet to be determined.
Based on post-marketing experience with Tysabri, the FDA added an additional warning to the product’s labeling information in February, 2008. Tysabri has been found to increase the risk of liver damage, even after a single dose. Any person experiencing symptoms of liver injury, including yellowing of the skin and eyes (jaundice) unusual darkening of the urine, nausea, feeling tired or weak, and vomiting, should contact his or her physician immediately. Blood tests can be done to check for liver damage. Treatment with Tysabri should be discontinued in anyone with jaundice or laboratory findings that indicate significant liver injury.

Tysabri can increase the risk for certain infections, including PML; it should not be used by any person who is taking medication(s) that can weaken the immune system, or anyone who has a medical condition that can weaken the immune system, such as HIV infection or AIDS, leukemia or lymphoma, an organ transplant, or others.

Allergic reactions can occur — including serious ones. Symptoms of an allergic reaction can include: hives, itching, trouble breathing, chest pain, dizziness, chills, rash, nausea, flushing of skin, low blood pressure. **Serious allergic reactions usually happen within 2 hours of the start of the infusion, but can happen any time after.** Contact your physician promptly about any of these symptoms.

Tysabri should not be used during pregnancy or by any woman who is trying to become pregnant. Women taking Tysabri should use birth control measures at all times. If you want to become pregnant while being treated with Tysabri, discuss the matter with your physician. If you become pregnant while using Tysabri, contact your physician.

No data are yet available on the effects of vaccination in patients receiving Tysabri.

**POSSIBLE SIDE EFFECTS**

- Side effects that may go away as your body adjusts to the medication and do not require medical attention unless they continue or are bothersome: headache, pain in your arms or legs*, feeling tired*, joint pain, depression*, diarrhea, pain in the stomach area.

- Allergic reactions can occur—including serious ones. Symptoms of an allergic reaction can include: hives, itching, trouble breathing, chest pain, dizziness, chills, rash, nausea, flushing of skin, low blood pressure. **Serious allergic reactions usually happen within 2 hours of the start of the infusion, but can happen any time after.** Contact your physician promptly about any of these symptoms.

- Because Tysabri affects your immune system, it can increase your chance of getting an unusual or serious infection, such as pneumonia, serious urinary tract infection, gastroenteritis, vaginal infection, tooth infection, and others. Contact your physician promptly about any problems of this kind.

**ADDITIONAL INFORMATION ABOUT TYSABRI IS AVAILABLE FROM:**

Biogen Idec, Inc
1-800-456-2255
www.Tysabri.com
NITROFURANTOIN

CHEMICAL NAME
- nitrofurantoin (nye-troe-fyoor-AN-toyn)

BRAND NAME
- Macrodantin (U.S. and Canada)

GENERIC AVAILABLE
- Yes

DESCRIPTION
- Nitrofurantoin is an anti-infective that is used primarily to treat urinary tract infections.

PROPER USAGE
- Nitrofurantoin should be taken with food or milk to lessen stomach upset and to promote your body’s absorption of the medication.
- Finish the full course of treatment prescribed by your doctor, and avoid missing doses. Even if your symptoms disappear after a few days, stopping this medication prematurely may result in a return of the symptoms.
- If you miss a dose of this medication, take it as soon as possible. If, however, it is almost time for your next dose, skip the missed dose and go back to your regular dosing schedule. Do not double dose.
- The use of nitrofurantoin may cause your urine to become rust-yellow or brownish. This change does not require medical treatment and does not need to be reported to your physician.

PRECAUTIONS
- Nitrofurantoin can interact with, or alter the action of, a variety of other medications you may be taking. It is very important to let your physician know about all the medications you are taking so that necessary substitutions or dosage adjustments can be made.
- If you will be taking this medication over an extended period of time, your doctor will need to check your progress at regular visits. If your symptoms do not improve within a few days, or become worse, consult your physician.
- Individuals with diabetes may find that this medication alters the results of some urine sugar tests. Consult with your physician before changing your diet or the dosage of your diabetes medicine.
- Certain medical conditions can affect the use of nitrofurantoin. Be sure to alert your physician about any medical conditions you have, especially glucose-6-phosphate dehydrogenase (G6PD) deficiency, kidney disease, or lung disease.
Because nitrofurantoin can cause problems in infants, it should not be used by a woman who is within a week or two of her delivery date, or during labor and delivery.

Nitrofurantoin passes into the breast milk in small amounts and may cause problems in nursing babies (especially those with glucose-6-phosphate dehydrogenase (G6PD) deficiency).

**POSSIBLE SIDE EFFECTS**

- Side effects that may go away as your body adjusts to the medication and do not require medical attention unless they continue or are bothersome: abdominal or stomach pain, diarrhea, loss of appetite, nausea or vomiting.
- Rare side effects that should be reported to your doctor immediately: chest pain; chills; cough; fever; trouble breathing; dizziness; headache; numbness, tingling, or burning of face or mouth*; unusual weakness or tiredness*; itching; joint pain; skin rash; yellow eyes or skin.

**NORTRIPTYLINE**

**CHEMICAL NAME**

- nortriptyline (nor-TRIP-ti-leen)

**BRAND NAME**

- Pamelor (U.S.)

**GENERIC AVAILABLE**

- Yes

**DESCRIPTION**

- Nortriptyline is a tricyclic antidepressant used to treat mental depression. In multiple sclerosis, it is frequently used to treat painful paraesthesias in the arms and legs (e.g., burning sensations, pins and needles, stabbing pains) caused by damage to the pain regulating pathways of the brain and spinal cord.

**NOTE**

- Other tricyclic antidepressants also used for the management of neurological pain symptoms are: amitriptyline (Elavil — U.S. and Canada), clomipramine (Anafranil — U.S. and Canada), desipramine (Norpramin — U.S. and Canada), doxepin, imipramine (Tofranil — U.S. and Canada), trimipramine (U.S. and Canada). While each of these medications is given in different dosage levels, the precautions and side effects listed below for nortriptyline apply to these other tricyclic medications.
PRECAUTIONS

- Nortriptyline will add to the effects of alcohol and other central nervous system depressants (e.g., antihistamines, sedatives, tranquilizers, prescription pain medications, seizure medications, muscle relaxants, sleeping medications), possibly causing drowsiness. Be sure that your physician knows if you are taking these or any other medications.

- This medication causes dryness of the mouth. Because continuing dryness of the mouth may increase the risk of dental disease, alert your dentist that you are taking nortriptyline.

- This medication may cause your skin to be more sensitive to sunlight than it is normally. Even brief exposure to sunlight may cause a skin rash, itching, redness or other discoloration of the skin, or severe sunburn. This medication may affect blood sugar levels of diabetic individuals. If you notice a change in the results of your blood or urine sugar tests, check with your doctor.

- Do not stop taking this medication without consulting your doctor. The doctor may want you to reduce the amount you are taking gradually in order to reduce the possibility of withdrawal symptoms such as headache, nausea, and/or an overall feeling of discomfort.

- Studies of nortriptyline have not been done in pregnant women. However, there have been reports of newborns suffering from muscle spasms and heart, breathing, and urinary problems when their mothers had taken tricyclic antidepressants immediately before delivery. Studies in animals have indicated the possibility of unwanted effects in the fetus.

- Tricyclics pass into the breast milk. Only doxepin (Sinequan) has been reported to cause drowsiness in the nursing baby.

POSSIBLE SIDE EFFECTS

- Side effects that may go away as your body adjusts to the medication and do not require medical attention unless they continue for more than two weeks or are bothersome: dryness of mouth; constipation*; increased appetite and weight gain; dizziness; drowsiness*; decreased sexual ability*; headache; nausea; unusual tiredness or weakness*; unpleasant taste; diarrhea; heartburn; increased sweating; vomiting.

- Uncommon side effects which should be reported to the doctor as soon as possible: blurred vision*; confusion or delirium; difficulty speaking or swallowing*; eye pain*; fainting; hallucinations; loss of balance control*; nervousness or restlessness; problems urinating*; shakiness or trembling; stiffness of arms and legs*.

- Rare side effects which should be reported to the doctor as soon as possible: anxiety; breast enlargement in males and females; hair loss; inappropriate secretion of milk in females; increased sensitivity to sunlight; irritability; muscle twitching; red or brownish spots on the skin; buzzing or other unexplained sounds in the ears; skin rash, itching; sore throat and fever; swelling of face and tongue; weakness*; yellow skin.

- Symptoms of acute overdose: confusion; convulsions; severe drowsiness*; enlarged pupils; unusual heartbeat; fever; hallucinations; restlessness and agitation; shortness of breath; unusual tiredness or weakness; vomiting.
OXYBUTYNIN

CHEMICAL NAME
- oxybutynin (ox-i-BYOO-ti-nin)

BRAND NAME
- Ditropan (U.S. and Canada)

GENERIC AVAILABLE
- Yes

DESCRIPTION
- Oxybutynin is an antispasmodic that helps decrease muscle spasms of the bladder and the frequent urge to urinate caused by these spasms.

PROPER USAGE
- This medication is usually taken with water on an empty stomach, but your physician may want you to take it with food or milk to lessen stomach upset.

PRECAUTIONS
- This medication adds to the effects of alcohol and other central nervous system depressants (such as antihistamines, sedatives, tranquilizers, prescription pain medications, seizure medications, muscle relaxants). Be sure that your physician knows if you are taking these or any other medications.
- This medication may cause your eyes to become more sensitive to light.
- Oxybutynin may cause drying of the mouth. Since continuing dryness of the mouth can increase the risk of dental disease, alert your dentist if you are taking oxybutynin.
- Oxybutynin has not been studied in pregnant women. It has not been shown to cause birth defects or other problems in animal studies.
- This medication has not been reported to cause problems in nursing babies. However, since it tends to decrease body secretions, oxybutynin may reduce the flow of breast milk.
POSSIBLE SIDE EFFECTS

- Side effects that typically go away as your body adjusts to the medication and do not require medical attention unless they continue for a few weeks or are bothersome: constipation*; decreased sweating; unusual drowsiness*; dryness of mouth, nose, throat; blurred vision*; decreased flow of breast milk; decreased sexual ability*; difficulty swallowing*; headache; increased light sensitivity; nausea or vomiting; trouble sleeping; unusual tiredness or weakness*.
- Less common side effects that should be reported to your physician immediately: difficulty in urination*.

OXYBUTYNNIN CHLORIDE — EXTENDED RELEASE

CHEMICAL NAME

- oxybutynin (ox-i-BYOO-ti-nin) chloride — extended release

BRAND NAME

- Ditropan XL (U.S. and Canada)

GENERIC AVAILABLE

- No

DESCRIPTION

- This form of oxybutynin is an extended-release antispasmodic that is formulated to help decrease muscle spasms of the bladder and the frequent urge to urinate caused by these spasms.

PROPER USAGE

- The tablet is to be swallowed whole, once a day, with liquids. It can be taken with or without food. Because the medication is contained within a nonabsorbable shell that is designed to release the drug at a controlled rate, the tablet should not be chewed, crushed, or divided. The shell is routinely eliminated from the body in the stool.

PRECAUTIONS

- This medication adds to the effects of alcohol and other central nervous system depressants (such as antihistamines, sedatives, tranquilizers, prescription pain medications, seizure medications, muscle relaxants). Be sure that your physician knows if you are taking these or any other medications.
Oxybutynin, like all anticholinergic medications, can induce drowsiness and/or blurred vision.

Oxybutynin, like all anticholinergic medications, can cause heat prostration (fever and heat stroke due to decreased sweating) when taken in very hot weather.

Oxybutynin may cause drying of the mouth. Since continuing dryness of the mouth can increase the risk of dental disease, alert your dentist if you are taking oxybutynin.

Oxybutynin has not been studied in pregnant women. It has not been shown to cause birth defects or other problems in animal studies. Do not take this medication while pregnant unless specifically instructed to do so by your physician.

This medication has not been reported to cause problems in nursing babies. However, since it tends to decrease body secretions, oxybutynin may reduce the flow of breast milk. Do not take this medication while nursing without discussing it with your physician.

POSSIBLE SIDE EFFECTS

- Side effects that typically go away as your body adjusts to the medication and do not require medical attention unless they continue for a few weeks or are bothersome: constipation*; decreased sweating; unusual drowsiness*; dryness of mouth, nose, throat; blurred vision*; decreased flow of breast milk; difficulty swallowing*; headache; increased light sensitivity; nausea or vomiting; unusual tiredness or weakness*.

- Less common side effects that should be reported immediately to your physician include: urinary retention*, dehydration, cardiac arrhythmia.

OXYBUTYNIN

CHEMICAL NAME

- oxybutynin (ox-i-BYOO-ti-nin)

BRAND NAME

- Oxytrol (Oxybutynin Transdermal System) (U.S.)

GENERIC AVAILABLE

- No
DESCRIPTION

- Oxybutynin is an antispasmodic that helps decrease muscle spasms of the bladder and the frequent urge to urinate caused by these spasms. Oxytrol is a skin patch that delivers the active ingredient, oxybutynin, through your skin and into your bloodstream.

PROPER USAGE

- A new patch is applied two times per week (every 3–4 days), with each patch worn until it is time to replace it with the next one. Only one patch is worn at a time.
- The patch is placed on clean, dry, and smooth area of the abdomen, hips, or buttocks.
- The patch should not be put at the waistline, where it will be rubbed by tight clothing, or on areas of skin that have been treated with creams or oils that will prevent the patch from sticking.

PRECAUTIONS

- This medication adds to the effects of alcohol and other central nervous system depressants (such as antihistamines, sedatives, tranquilizers, prescription pain medications, seizure medications, muscle relaxants). Be sure that your physician knows if you are taking these or any other medications.
- This medication may cause your eyes to become more sensitive to light.
- Oxybutynin may cause drying of the mouth. Since continuing dryness of the mouth can increase the risk of dental disease, alert your dentist if you are taking oxybutynin.
- Oxybutynin has not been studied in pregnant women. It has not been shown to cause birth defects or other problems in animal studies. Any woman who wishes to become pregnant while using this medication should discuss it with her physician.
- It is not known whether oxybutynin is excreted in breast milk. Since it tends to decrease body secretions, oxybutynin may reduce the flow of breast milk. Any woman who wishes to breastfeed while using this medication should discuss it with her physician.

POSSIBLE SIDE EFFECTS

- Side effects that typically go away as your body adjusts to the medication and do not require medical attention unless they continue for a few weeks or are bothersome: constipation*; decreased sweating; unusual drowsiness*; dryness of mouth, nose, throat; blurred vision*; decreased flow of breast milk; decreased sexual ability*; difficulty swallowing*; headache; increased light sensitivity; nausea or vomiting; trouble sleeping; unusual tiredness or weakness*.
- Less common side effects that should be reported to your physician immediately: difficulty in urination*.
PAPAVERINE

CHEMICAL NAME

- papaverine (pa-PAV-er-een)

BRAND NAME

- None

GENERIC AVAILABLE

- Yes

DESCRIPTION

- Papaverine belongs to a group of medicines called vasodilators, which cause blood vessels to expand, thereby increasing blood flow. Papaverine is used in MS to treat erectile dysfunction. When papaverine is injected into the penis, it produces an erection by increasing blood flow to the penis.

PROPER USAGE

- Papaverine should never be used as a sexual aid by men who are not impotent. If improperly used, this medication can cause permanent damage to the penis.
- Papaverine is available by prescription and should be used only as directed by your physician, who will instruct you in the proper way to give yourself an injection so that it is simple and essentially pain-free.

PRECAUTIONS

- Do not use more of this medication or use it more often than it has been prescribed for you. Using too much of this medicine will result in a condition called priapism, in which the erection lasts too long and does not resolve when it should. Permanent damage to the penis can occur if blood flow to the penis is cut off for too long a period of time.
- Examine your penis regularly for possible lumps near the injection sites or for curvature of the penis. These may be signs that unwanted tissue is growing (called fibrosis), which should be examined by your physician.

POSSIBLE SIDE EFFECTS

- Side effects that you should report to your physician so that he or she can adjust the dosage or change the medication: bruising at the injection site; mild burning along the penis; difficulty ejaculating; swelling at the injection site.
- Rare side effects that require immediate treatment: erection continuing for more than four hours. If you cannot be seen immediately by your physician, you should go to the emergency room for prompt treatment.
**PAROXETINE**

**CHEMICAL NAME**
- paroxetine (pa-ROX-uh-teen)

**BRAND NAME**
- Paxil (U.S. and Canada)

**GENERIC AVAILABLE**
- Yes

**DESCRIPTION**
- Paroxetine is used to treat mental depression.

**PROPER USAGE**
- Paroxetine may be taken with or without food, on an empty or full stomach.

**PRECAUTIONS**
- It may take up to four weeks or longer for you to feel the beneficial effects of this medication.
- Your physician should monitor your progress at regularly scheduled visits in order to adjust the dose and help reduce any side effects.
- This medication could add to the effects of alcohol and other central nervous system depressants (e.g., antihistamines, sedatives, tranquilizers, sleeping medicine, prescription pain medicine, barbiturates, seizure medication, muscle relaxants). Be sure that your physician knows if you are taking these or any other medications.
- Paroxetine may cause dryness of the mouth. If your mouth continues to feel dry for more than two weeks, check with your physician or dentist. Continuing dryness of the mouth may increase the risk of dental disease.
- This medication may cause you to become drowsy.
- Studies have not been done in pregnant women. Studies in animals have shown that paroxetine may cause miscarriages and decreased survival rates when given in doses that are many times higher than the human dose.
- Paroxetine passes into breast milk but has not been shown to cause any problems in nursing infants.
POSSIBLE SIDE EFFECTS

- Side effects that typically go away as your body adjusts to the medication and do not require medical attention unless they continue for several weeks or are bothersome: decrease in sexual drive or ability*; headache; nausea; problems urinating*; decreased or increased tiredness or weakness*; tremor*; trouble sleeping; anxiety; agitation; nervousness or restlessness; changes in vision, including blurred vision*; fast or irregular heartbeat; tingling, burning, or prickly sensations*; vomiting.

- Unusual side effects that should be discussed with your physician as soon as possible: agitation; lightheadedness or fainting; muscle pain or weakness; skin rash; mood or behavior changes.

PHENAZOPYRIDINE

CHEMICAL NAME

- phenazopyridine (fen-AZ-oh-PEER-i-deen)

BRAND NAME

- Pyridium (U.S. and Canada)

Generic Available

- Yes (U.S.)

DESCRIPTION

- Phenazopyridine is used to relieve the pain, burning, and discomfort caused by urinary tract infections. It is not an antibiotic and will not cure the infection itself. This medication is available in the U.S. only with a prescription; it is available in Canada without a prescription. The medication comes in tablet form.

PRECAUTIONS

- The medication causes the urine to turn reddish orange. This effect is harmless and goes away after you stop taking phenazopyridine.

- It is best not to wear soft contact lenses while taking this medication; phenazopyridine may cause permanent discoloration or staining of soft lenses.

- Check with your physician if symptoms such as bloody urine, difficult or painful urination, frequent urge to urinate, or sudden decrease in the amount of urine appear or become worse while you are taking this medication.

- Phenazopyridine has not been studied in pregnant women. It has not been shown to cause birth defects in animal studies.

- It is not known whether this medication passes into breast milk. It has not been reported to cause problems in nursing babies.
POSSIBLE SIDE EFFECTS

- Uncommon side effects that typically go away as your body adjusts to the medication and do not require medical attention unless they continue or are bothersome: dizziness; headache; indigestion; stomach cramps or pain.
- Unusual side effects that should be reported to your physician: blue or blue-purple color of skin; fever and confusion; shortness of breath; skin rash; sudden decrease in amount of urine; swelling of face, fingers, feet and/or lower legs; unusual weakness or tiredness*; weight gain; yellow eyes or skin.

PHENYTOIN

CHEMICAL NAME

- phenytoin (FEN-i-toyn)

BRAND NAME

- Dilantin (U.S. and Canada)

GENERIC AVAILABLE

- Yes

DESCRIPTION

- Phenytoin is one of a group of hydantoin anticonvulsants that are used most commonly in the management of seizures in epilepsy. It is used in MS to manage painful dysesthesias (most commonly trigeminal neuralgia) caused by abnormalities in the sensory pathways in the brain and spinal cord.

PRECAUTIONS

- This drug may interact with the effects of alcohol and other central nervous system depressants (e.g., antihistamines, sedatives, tranquilizers, certain prescription pain medications, seizure medications, muscle relaxants, sleeping medications). Be sure your physician knows if you are taking these or any other medications.
- Oral contraceptives (birth control pills) that contain estrogen may not be as effective if taken in conjunction with phenytoin. Consult with your physician about using a different or additional form of birth control to avoid unplanned pregnancies.
- This medication may affect the blood sugar levels of diabetic individuals. Check with your physician if you notice any change in the results of your blood or urine sugar level tests while taking phenytoin.
- Antacids or medicines for diarrhea can reduce the effectiveness of phenytoin. Do not take any of these medications within two to three hours of the phenytoin.
Before having any type of dental treatment or surgery, be sure to inform your physician or dentist if you are taking phenytoin. Medications commonly used during surgical and dental treatments can increase the side effects of phenytoin.

There have been reports of increased birth defects when hydantoin anticonvulsants were used for seizure control during pregnancy. It is not definitely known whether these medications were the cause of the problem. Be sure to tell your physician if you are pregnant or considering becoming pregnant.

Phenytoin passes into breast milk in small amounts.

**POSSIBLE SIDE EFFECTS**

- Side effects that may go away as your body adjusts to the medication and do not require medical attention unless they continue or are bothersome: constipation*; mild dizziness*; mild drowsiness*.

- Side effects that should be reported to your physician: bleeding or enlarged gums; confusion; enlarged glands in the neck or underarms; mood or mental changes*; muscle weakness or pain*; skin rash or itching; slurred speech or stuttering; trembling; unusual nervousness or irritability.

- Symptoms of overdose that require immediate attention: sudden blurred or double vision*; sudden severe clumsiness or unsteadiness*; sudden severe dizziness or drowsiness*; staggering walk*; severe confusion or disorientation.

**PRAZOSIN**

**CHEMICAL NAME**

- prazosin (PRA-zoe-sin)

**BRAND NAME**

- Minipress (U.S. and Canada)

**GENERIC AVAILABLE**

- Yes

**DESCRIPTION**

- Prazosin belongs to the general class of medicines called anti-hypertensives, which are used to treat high blood pressure. It is used in MS help promote the flow of urine through the sphincter.

**PROPER USAGE**

- Use as directed by your physician.
P RECAUTIONS

- This medication may cause you to feel dizzy, lightheaded, or faint, especially when you get up from a sitting or lying position. While these effects are most likely to occur after the initial dose, they can happen at any time. You can reduce this problem by taking the medication at bedtime, but take special care if you need to get up in the middle of the night.

- Dizziness, lightheadedness, or fainting are more likely to occur if you drink alcohol, stand for too long, or become overheated.

- This medication can cause you to feel drowsy or less alert. Make sure you know how you react to this medication before driving.

- Elderly individuals tend to be more sensitive to the effects of prazosin, and are therefore more likely to experience dizziness, lightheadedness, or fainting.

- No birth defects have been reported in pregnant woman using this drug to control high blood pressure. While animal studies using significantly higher doses than those used in humans have not resulted in any birth defects, lower birth weights have been reported.

- Prazosin passes into the breast milk in small amounts, but has not been reported to causes problems in nursing infants.

- Be sure that your physician knows if you have any other medical problems, particularly angina (chest pain), severe heart disease, kidney disease.

P OSSIBLE SIDE EFFECTS

- Side effects that typically go away as your body adjusts to the medication and do not require medical attention unless they continue for several weeks or are bothersome: drowsiness; headache; lack of energy*.

- Side effects that should be reported to your physician as soon as possible include: dizziness or lightheadedness, especially when getting up from a lying or sitting position; fainting; loss of bladder control*; pounding heartbeat; swelling of feet or lower legs.

PREDNISONE

CHEMICAL NAME

- prednisone (PRED-ni-sone)

BRAND NAME

- Deltasone (U.S. and Canada)

GENERIC AVAILABLE

- Yes
DESCRIPTION

- Prednisone is one of a group of corticosteroids (cortisone-like medicines) that are used to relieve inflammation in different parts of the body. Corticosteroids are used in MS for the management of acute exacerbations because they have the capacity to close the damaged blood-brain barrier and reduce inflammation in the central nervous system. Although prednisone is among the most commonly used corticosteroids in MS, it is only one of several different possibilities. Other commonly used corticosteroids include dexamethasone; prednisone; betamethasone; and prednisolone. The following information pertains to all of the various corticosteroids.

PROPER USAGE

- Most neurologists treating MS believe that high-dose corticosteroids given intravenously are the most effective treatment for an MS exacerbation, although the exact protocol for the drug’s use may differ somewhat from one treating physician to another. Patients generally receive a four-day course of treatment (either in the hospital or as an out-patient), with doses of the medication spread throughout the day (see Methylprednisolone). The high-dose, intravenous dose is typically followed by a gradually tapering dose of an oral corticosteroid (usually ranging in length from ten days to five or six weeks). Prednisone is commonly used for this oral taper. Oral prednisone may also be used instead of the high-dose, intravenous treatment if the intravenous treatment is not desired or is medically contraindicated.

PRECAUTIONS

- This medication can cause indigestion and stomach discomfort. Always take it with a meal and/or a glass of milk. Your physician may prescribe an antacid for you to take with this medication.

- Take this medication exactly as prescribed by your physician. Do not stop taking it abruptly; your physician will give you a schedule that gradually tapers the dose before you stop it completely.

- Since corticosteroids can stimulate the appetite and increase water retention, it is advisable to follow a low-salt and/or a potassium-rich diet and watch your caloric intake.

- Corticosteroids can lower your resistance to infection and make any infection that you get more difficult to treat. Contact your physician if you notice any sign of infection, such as sore throat, fever, coughing, or sneezing.

- Avoid close contact with anyone who has chicken pox or measles. Tell your physician immediately if you think you have been exposed to either of these illnesses. Do not have any immunizations after you stop taking this medication until you have consulted your physician. People living in your home should not have the oral polio vaccine while you are being treated with corticosteroids since they might pass the polio virus on to you.

- Corticosteroids may affect the blood sugar levels of diabetic patients. If you notice a change in your blood or urine sugar tests, be sure to discuss it with your physician.

- The risk of birth defects in women taking corticosteroids during pregnancy has not been studied. Overuse of corticosteroids during pregnancy may slow the growth of the infant after birth. Animal studies have demonstrated that corticosteroids cause birth defects.

- Corticosteroids pass into breast milk and may slow the infant’s growth. If you are nursing or plan to nurse, be sure to discuss this with your physician. It may be necessary for you to stop nursing while taking this medication.
Corticosteroids can produce mood changes and/or mood swings of varying intensity. These mood alterations can vary from relatively mild to extremely intense, and can vary in a single individual from one course of treatment to another. Neither the patient nor the physician can predict with any certainty whether the corticosteroids are likely to precipitate these mood alterations. If you have a history of mood disorders (depression or bipolar disorder, for example), be sure to share this information with your physician. If you begin to experience unmanageable mood changes or swings while taking corticosteroids, contact your physician so that a decision can be made whether or not you need an additional medication to help you until the mood alterations subside.

POSSIBLE SIDE EFFECTS

- Side effects that may go away as your body adjusts to the medication and do not require medical attention unless they continue or are bothersome: increased appetite; indigestion; nervousness or restlessness; trouble sleeping; headache; increased sweating; unusual increase in hair growth on body or face.
- Less common side effects that should be reported as soon as possible to your physician: severe mood changes or mood swings; decreased or blurred vision*; frequent urination*.
- Additional side effects that can result from the prolonged use of corticosteroids and should be reported to your physician: acne or other skin problems; swelling of the face; swelling of the feet or lower legs; rapid weight gain; pain in the hips or other joints (caused by bone cell degeneration); bloody or black, tarry stools; elevated blood pressure; markedly increased thirst (with increased urination indicative of diabetes mellitus); menstrual irregularities; unusual bruising of the skin; thin, shiny skin; hair loss; muscle cramps or pain. Once you stop this medication after taking it for a long period of time, it may take several months for your body to readjust.

PROPANTHELINE

CHEMICAL NAME

- propantheline (proe-PAN-the-leen) bromide

BRAND NAME

- Pro-Banthine (U.S. and Canada)

GENERIC AVAILABLE

- Yes

DESCRIPTION

- Propantheline is one of a group of antispasmodic/anticholinergic medications used to relieve cramps or spasms of the stomach, intestines, and bladder. Propantheline is used in the management of neurogenic bladder symptoms to control urination.
PROPER USAGE

- Take this medicine thirty minutes to one hour before meals unless otherwise directed by your physician.

PRECAUTIONS

- Do not stop this medication abruptly. Stop gradually to avoid possible vomiting, sweating, and dizziness.
- Anticholinergic medications such as propantheline can cause blurred vision and light sensitivity. Make sure you know how you react to this medication before driving.
- Anticholinergic medications may cause dryness of the mouth. If your mouth continues to feel dry for more than two weeks, check with your dentist. Continuing dryness of the mouth may increase the chance of dental disease.
- No studies of the effects of this drug in pregnancy have been done in either humans or animals.
- Anticholinergic medications have not been reported to cause problems in nursing babies. The flow of breast milk may be reduced in some women.
- Be sure that your physician knows if you are taking a tricyclic antidepressant or any other anticholinergic medication. Taking propantheline with any of these may increase the anticholinergic effects, resulting in urinary retention.

POSSIBLE SIDE EFFECTS

- Side effects that typically go away as your body adjusts to the medication and do not require medical attention unless they continue for several weeks or are bothersome: constipation*; decreased sweating; dryness of mouth, nose, and throat; bloated feeling; blurred vision*; difficulty swallowing.
- Unusual side effects that require immediate medical attention: inability to urinate; confusion; dizziness*; eye pain*; skin rash or hives.
- Symptoms of overdose that require immediate emergency attention: unusual blurred vision*; unusual clumsiness or unsteadiness*; unusual dizziness; unusually severe drowsiness*; seizures; hallucinations; confusion; shortness of breath; unusual slurred speech*; nervousness; unusual warmth, dryness, and flushing of skin.

PSYLLIUM HYDROPHILIC MUCILLOID

CHEMICAL NAME

- psyllium hydrophilic mucilloid (SILL-i-yum hye-droe-FILL-ik MYOO-sill-oid)

BRAND NAME

- Metamucil (available in granule form in Canada, in wafer form in the U.S., and in powder or effervescent powder in the U.S. and Canada) is one of several available brands of bulk-forming laxative.
**DESCRIPTION**

- Psyllium hydrophilic mucilloid is a bulk-forming oral laxative. This type of laxative is not digested by the body; it absorbs liquids from the intestines and swells to form a soft, bulky stool. The bowel is then stimulated normally by the presence of the bulky stool.

**PROPER USAGE**

- Laxatives are to be used to provide short-term relief only, unless otherwise directed by the nurse or physician who is helping you to manage your bowel symptoms. A regimen that includes a healthy diet containing roughage (whole grain breads and cereals, bran, fruit, and green, leafy vegetables), six to eight full glasses of liquids each day, and some form of daily exercise is most important in stimulating healthy bowel function.

- If your physician has recommended this laxative for management of constipation, follow his or her recommendations for its use. If you are treating yourself for constipation, follow the directions on the package insert. Results are often obtained in twelve hours but may take as long as two or three days. Be sure to consult your physician if you experience problems or do not get relief within a week.

- In order for this type of bulk-forming laxative to work effectively without causing intestinal blockage, it is advisable to drink six to eight glasses (eight ounces) of water each day. Each dose of the laxative should be taken with eight ounces of cold water or fruit juice. If concerns about loss of bladder control keep you from drinking this amount of water, discuss it with the nurse or physician who is helping you manage your bowel and bladder symptoms.

**PRECAUTIONS**

- Do not take any type of laxative if you have signs of appendicitis or inflamed bowel (e.g., stomach or lower abdominal pain, cramping, bloating, soreness, nausea, or vomiting). Check with your physician as soon as possible.

- Do not take any laxative for more than one week unless you have been told to do so by your physician. Many people tend to overuse laxatives, which often leads to dependence on the laxative action to produce a bowel movement. Discuss the use of laxatives with your health care professional in order to ensure that the laxative is used effectively as part of a comprehensive, healthy bowel management regimen.

- Do not take any laxative within two hours of taking another medication because the desired effectiveness of the other medication may be reduced.

- Bulk-forming laxatives are commonly used during pregnancy. Some of them contain a large amount of sodium or sugars, which may have possible unwanted effects such as increasing blood pressure or causing fluid retention. Look for those that contain lower sodium and sugar.

- Some laxatives pass into breast milk. Although it is unlikely to cause problems for a nursing infant, be sure to let your physician know if you are using a laxative and breastfeeding at the same time.
POSSIBLE SIDE EFFECTS

- Check with your physician as soon as possible if you experience any of the following: difficulty breathing; intestinal blockage; skin rash or itching; swallowing difficulty (feelings of lump in the throat).

SERTRALINE

CHEMICAL NAME

- sertraline (SER-tra-leen)

BRAND NAME

- Zoloft (U.S. and Canada)

GENERIC AVAILABLE

- Yes

DESCRIPTION

- Sertraline is used to treat mental depression.

PROPER USAGE

- This medication should always be taken at the same time in relation to meals and snacks to make sure that it is absorbed in the same way. Because sertraline may be given to different individuals at different times of the day, you and your physician should discuss what to do about any missed doses.

PRECAUTIONS

- It may take four to six weeks for you to feel the beneficial effects of this medication.
- Your physician should monitor your progress at regularly scheduled visits in order to adjust the dose and help reduce any side effects.
- This medication could add to the effects of alcohol and other central nervous system depressants (e.g., antihistamines, sedatives, tranquilizers, sleeping medicine, prescription pain medicine, barbiturates, seizure medication, muscle relaxants). Be sure that your physician knows if you are taking these or any other medications.
- Sertraline may cause dryness of the mouth. If your mouth continues to feel dry for more than two weeks, check with your physician or dentist. Continuing dryness of the mouth may increase the risk of dental disease.
- This medication may cause drowsiness.
Studies have not been done in pregnant women. Studies in animals have shown that sertraline may cause delayed development and decreased survival rates of offspring when given in doses many times the usual human dose.

It is not known if sertraline passes into breast milk.

POSSIBLE SIDE EFFECTS

Side effects that typically go away as your body adjusts to the medication and do not require medical attention unless they continue for several weeks or are bothersome: decreased appetite or weight loss; decrease sexual drive or ability*; drowsiness*; dryness of mouth; headache; nausea; stomach or abdominal cramps; tiredness or weakness*; tremor*; trouble sleeping; anxiety; agitation; nervousness or restlessness; changes in vision including blurred vision*; constipation*; fast or irregular heartbeat; flushing of skin; increased appetite; vomiting.

Unusual side effects that should be discussed with your physician as soon as possible: fast talking and excited feelings or actions that are out of control; fever; skin rash; hives; itching.

SILDENAFIL

CHEMICAL NAME

- sildenafil (sil-DEN-a-fil)

BRAND NAME

- Viagra (U.S. and Canada)

GENERIC AVAILABLE

- No

DESCRIPTION

Sildenafil belongs to a group of medicines that delay the action of enzymes called phosphodiesterases that can interfere with erectile function. Sildenafil is used to treat men with erectile dysfunction (also called sexual impotence) because it helps to maintain an erection that is produced when the penis is stroked. Without physical stimulation of the penis, sildenafil will not work to cause an erection. Sildenafil is not indicated for use in women.

PROPER USAGE

- Sildenafil begins to work approximately 30 minutes after it is taken. The medication continues to work for up to four hours, although the effect is usually less after two hours.
- Sildenafil is available by prescription and should be used only as directed by your physician. The dose of this medication will be different for different patients. Do not take more of this medication than has been prescribed for you.
PRECAUTIONS

- Sildenafil can interact with, or interfere with the action of, other medications you may be taking. Be sure to inform your physician of all other medications you are taking so that appropriate substitutions or dosage adjustments can be made. Sildenafil should not be used by men who are using nitrates such as nitroglycerin (e.g., Nitrostat or Transderm-Nitro) to lower their blood pressure; sildenafil can cause the blood pressure to drop too far.

- The presence of certain medical problems can interfere with the use of sildenafil. Be sure to inform your doctor if you have any of the following medical problems: an abnormality of the penis (including a curved penis or birth defect); bleeding problems; retinitis pigmentosa; any conditions causing thickened blood or slower blood flow (e.g., leukemia, multiple myeloma, polycythemia, sickle cell disease, or thrombocytopenia); a history of priapism (erection lasting longer than six hours); heart or blood disease; severe kidney problems; severe liver problems.

- Sildenafil has not been studied in combination with other medications that are used in the treatment of erectile dysfunction. At the present time, it is not recommended that these drugs be used together.

POSSIBLE SIDE EFFECTS

- Side effects that you should report to your physician so that he or she can adjust the dosage or change the medication: flushing; headache; nasal congestion, stomach discomfort after meals; diarrhea.

- Rare side effects that should be discussed with your physician: abnormal vision (e.g., blurred vision*, seeing shades of colors differently than before, sensitivity to light); bladder pain; cloudy or bloody urine; dizziness, increased frequency of urination; painful urination.

- Note: There are a variety of other possible side effects that have not yet been definitely shown to be caused by sildenafil. Therefore, if you notice any other effects that cause you concern, be sure to talk them over with your doctor.

SODIUM PHOSPHATE

CHEMICAL NAME

- sodium phosphate

BRAND NAME

- Fleet Enema (U.S. and Canada)

GENERIC AVAILABLE

- Yes
DESCRIPTION

- Sodium phosphate enemas are available over-the-counter.

PROPER USAGE

- Rectal enemas are to be used to provide short-term relief only, unless otherwise directed by the nurse or physician who is helping you to manage your bowel symptoms. A regimen that includes a healthy diet containing roughage (whole grain breads and cereals, bran, fruit, and green, leafy vegetables), six to eight full glasses of liquids each day, and some form of daily exercise is most important in stimulating healthy bowel function.
- If your physician has recommended this rectal laxative for management of constipation, follow his or her recommendations for its use. If you are treating yourself for constipation, follow the directions on the package insert.
- Results usually occur within two to five minutes. Be sure to consult your physician if you notice rectal bleeding, blistering, pain, burning, itching, or other signs of irritation that were not present before you began using a sodium phosphate enema.

PRECAUTIONS

- Do not use any type of laxative if you have signs of appendicitis or inflamed bowel (e.g., stomach or lower abdominal pain, cramping, bloating, soreness, nausea, or vomiting). Check with your physician as soon as possible.
- Do not use any laxative for more than one week unless you have been told to do so by your physician. Many people tend to overuse laxatives, which often leads to dependence on the laxative action to produce a bowel movement. Discuss the use of laxatives with your health care professional in order to ensure that the laxative is used effectively as part of a comprehensive, healthy bowel management regimen.
- If you are pregnant, discuss with your physician the most appropriate type of laxative for you to use.

POSSIBLE SIDE EFFECTS

- Side effect that may go away as your body adjusts to the medication and does not require medical attention unless it persists or is bothersome: skin irritation in the rectal area.
- Unusual side effects that should be reported to your physician as soon as possible: rectal bleeding, blistering, burning, itching.

SOLIFENACIN SUCCINATE

CHEMICAL NAME

- solifenacin succinate (sol-i-FEN-ah-sin SUC-sin-ate)

BRAND NAME

- Vesicare (U.S. and Canada)
**GENERIC AVAILABLE**

- No

**DESCRIPTION**

- Solifenacin succinate is an antimuscarinic medication used to treat an overactive bladder causing symptoms of frequency, urgency, or urge incontinence.

**PROPER USAGE**

- This medication should be taken with liquids and swallowed whole. It may be taken with or without food.
- Take only the amount prescribed by your doctor; taking more can cause adverse effects.
- If you miss a dose, begin taking it again the next day. Do not take two doses in the same day.

**PRECAUTIONS**

- Individuals with any of the following should not take this medication: urinary retention, gastric retention or narrow angle glaucoma, severe kidney problems. Solifenacin succinate can aggravate these conditions.
- Solifenacin succinate may cause blurred vision; do not engage in potentially dangerous activities such as driving until you know the effect.
- This medication, like all anticholinergics, may cause drying of the mouth. Since it can increase the risk of dental disease, alert your dentist if you are taking this medication.
- Like all anticholinergics, solifenacin succinate can cause constipation.
- Because of decreased sweating, this medication can cause heat prostration when used in a very hot environment.
- This medication has not been studied in pregnant women. However, animal studies show impact on pre- and post-natal development. If you are pregnant, do not start this medication before consulting your physician.
- It is not known whether solifenacin succinate passes into breast milk. Women who are taking this medication and wish to breastfeed should discuss it with their physician.

**POSSIBLE SIDE EFFECTS**

- Side effects expected with this type of medication: dry mouth; dry eyes; constipation*, blurred vision*, difficult urination*
- Less common side effects to report: severe abdominal pain
Symptoms of overdose: severe central anticholinergic effects, including blurred vision; clumsiness or unsteadiness*; confusion; seizures; severe diarrhea, excessive watering of the mouth; increasing muscle weakness (especially in the arms, neck, shoulders, and tongue); muscle cramps or twitching; severe nausea or vomiting; shortness of breath, slow heartbeat; slurred speech; unusual irritability, nervousness, or restlessness; unusual tiredness or weakness*.

SULFAMETHOXAZOLE & TRIMETHOPRIM COMBINATION

CHEMICAL NAME

- sulfamethoxazole (SUL-fa-meth-OX-a-zole) and trimethoprim (try-METH-oh-prim) combination

BRAND NAME

- Bactrim; Septra (U.S. and Canada)

GENERIC AVAILABLE

- Yes

DESCRIPTION

- Sulfamethoxazole and trimethoprim combination is used in multiple sclerosis to treat (and sometimes to prevent) urinary tract infections.

PROPER USAGE

- This medication is best taken with a full glass (eight ounces) of water. Additional water should be taken each day to help prevent unwanted effects.
- Finish the full course of treatment prescribed by your physician. Even if your symptoms disappear after a few days, stopping this medication prematurely may result in a return of the symptoms.
- This medication works most effectively when it is maintained at a constant level in your blood or urine. To help keep the amount constant, do not miss any doses. It is best to take the doses at evenly spaced times during the day and night. For maximum effectiveness, four doses per day would be spaced at six-hour intervals.

PRECAUTIONS

- This medication may cause dizziness.
- If taken for a long time, sulfamethoxazole and trimethoprim combination may cause blood problems. It is very important that your physician monitor your progress at regular visits.
- This medication can cause changes in the blood, possibly resulting in a greater chance of certain infections, slow healing, and bleeding of the gums. Be careful with the use of your toothbrush, dental floss, and toothpicks. Delay dental work until your blood counts are completely normal. Check with your dentist if you have questions about oral hygiene during treatment.

- This medication may cause your skin to become more sensitive to sunlight. Stay out of direct sunlight during the midday hours, wear protective clothing, and apply a sun block product that has a skin protection factor (SPF) of at least 15.

- Sulfamethoxazole and trimethoprim combination has not been reported to cause birth defects or other problems in humans. Studies in mice, rats, and rabbits have shown that some sulfonamides cause birth defects, including cleft palate and bone problems. Studies in rabbits have also shown that trimethoprim causes birth defects, as well as a decrease in the number of successful pregnancies.

- Sulfamethoxazole and trimethoprim pass into breast milk. This medication is not recommended for use during breastfeeding. It may cause liver problems, anemia, and other problems in nursing babies.

POSSIBLE SIDE EFFECTS

- Side effects that may go away as your body adjusts to the medication and do not require medical attention unless they continue or are bothersome: diarrhea; dizziness; headache; loss of appetite; nausea or vomiting.

- Less common side effects that should be reported to your physician immediately: itching; skin rash; aching of muscles and joints; difficulty in swallowing; pale skin; redness, blistering, peeling, or loosening of skin; sore throat and fever; unusual bleeding or bruising; unusual tiredness or weakness*; yellow eyes or skin.

TADALAFIL

CHEMICAL NAME

- tadalafil (tah-DAL-a-fil)

BRAND NAME

- Cialis (U.S. and Canada)

GENERIC AVAILABLE

- No

DESCRIPTION

- Tadalafil belongs to a group of medicines that delay the action of enzymes called phosphodiesterases that can interfere with erectile function. Tadalafil is used to treat men with erectile dysfunction (also called sexual impotence) because it helps to maintain an erection that has been created by stimulation. Tadalafil will not cause an erection without stimulation of the penis. Tadalafil is not indicated for use in women.
PROPER USAGE

- Tadalafil, which may be taken up to once per day by most men, remains effective for up to 36 hours.
- Tadalafil is available by prescription and should be used only as directed by your physician. The dose of this medication will be different for different patients. Do not take more of this medication than has been prescribed for you.
- If you are older than 65 or have liver problems, your doctor may start you on a lower dose of this medication.

PRECAUTIONS

- Tadalafil can interact with, or interfere with the action of, other medications you may be taking. Be sure to inform your physician of all other medications you are taking so that appropriate substitutions or dosage adjustments can be made. Tadalafil should not be used by men who are using: nitrates such as nitroglycerin (e.g., Nitrostat or Transderm-Nitro) to lower blood pressure; alpha blockers (e.g., Hytrin, Flomax, or Cardura) to treat prostate problems or high blood pressure. Tadalafil in combination with these medications can cause the blood pressure to drop too far.
- The presence of certain medical problems can interfere with the use of tadalafil. Be sure to inform your doctor if you have any of the following medical problems: an abnormality of the penis (including a curved penis or birth defect); bleeding problems; retinitis pigmentosa; any conditions causing thickened blood or slower blood flow (e.g., leukemia, multiple myeloma, polycythemia, sickle cell disease, or thrombocytopenia); a history of priapism (erection lasting longer than six hours); heart or blood disease; severe kidney problems; severe liver problems.
- Tadalafil has not been studied in combination with other medications that are used in the treatment of erectile dysfunction. At the present time, it is not recommended that these drugs be used together.

POSSIBLE SIDE EFFECTS

- Side effects that you should report to your physician so that he or she can adjust the dosage or change the medication: flushing; headache; nasal congestion, stomach discomfort after meals; diarrhea.
- Rare side effects that should be discussed with your physician: abnormal vision (e.g., blurred vision, seeing shades of colors differently than before, sensitivity to light); bladder pain; cloudy or bloody urine; dizziness, increased frequency of urination*; painful urination.

TAMSULOSIN

CHEMICAL NAME

- tamsulosin (tam-soo-LOH-sin)

BRAND NAME

- Flomax (U.S. and Canada)
Tamsulosin is generally used to treat the signs and symptoms of benign enlargement of the prostate. It helps to relax the muscles in the prostate and bladder, and is used in MS to promote the flow of urine.

Swallow the capsules whole; do not crush, chew, or open them unless otherwise directed by your physician.

This medication may cause you to feel dizzy, lightheaded, or faint, especially when you get up from a sitting or lying position. While these effects are most likely to occur after the initial dose, they can happen at any time. You can reduce this problem by taking the medication at bedtime, but take special care if you need to get up in the middle of the night.

Dizziness, lightheadedness, or fainting are more likely to occur if you drink alcohol, stand for too long, or become overheated.

This medication can cause you to feel drowsy or less alert. Make sure you know how you react to this medication before driving.

Elderly individuals tend to be more sensitive to the effects of tamsulosin, and are therefore more likely to experience dizziness, lightheadedness, or fainting.

Pregnancy studies have not been done in humans. Women who are taking this medication and wish to become pregnant should discuss it with their physician.

It is not known whether tamsulosin passes into the breast milk.

Be sure that your physician knows if you have any other medical problems, particularly angina (chest pain), severe heart disease, kidney disease.

Side effects that typically go away as your body adjusts to the medication and do not require medical attention unless they continue for several weeks or are bothersome: abnormal ejaculation; back pain; diarrhea; dizziness; headache; stuffy nose; unusual weakness.

Side effects that should be reported to your physician as soon as possible include: chest pain; dizziness or lightheadedness, especially when getting up from a lying or sitting position; drowsiness; nausea.
TERAZOSIN

CHEMICAL NAME

- terazosin (ter-AY-zoe-sin)

BRAND NAME

- Hytrin (U.S. and Canada)

GENERIC AVAILABLE

- No

DESCRIPTION

- Terazosin belongs to the general class of medicines called anti-hypertensives, which are used to treat high blood pressure. It also helps relax the muscles of the prostate and the bladder. In MS, it is used to help promote the flow of urine through the urinary sphincter.

PROPER USAGE

- Use as directed by your physician.

PRECAUTIONS

- This medication may cause you to feel dizzy, lightheaded, or faint, especially when you get up from a sitting or lying position. While these effects are most likely to occur after the initial dose, they can happen at any time. You can reduce this problem by taking the medication at bedtime, but take special care if you need to get up in the middle of the night.
- Dizziness, lightheadedness, or fainting are more likely to occur if you drink alcohol, stand for too long, or become overheated.
- This medication can cause you to feel drowsy or less alert. Make sure you know how you react to this medication before driving.
- Elderly individuals tend to be more sensitive to the effects of terazosin, and are therefore more likely to experience dizziness, lightheadedness, or fainting.
- Studies have not been done in humans. In animal studies using terazosin at doses many times higher than those used in humans, no birth defects have been found. A decrease in successful pregnancies in these studies, however, has been found.
- It is not known whether terazosin passes into the breast milk. Women who are taking this medication and wish to become pregnant should discuss it with their physician.
- Be sure that your physician knows if you have any other medical problems, particularly angina (chest pain), severe heart disease, kidney disease.
POSSIBLE SIDE EFFECTS

- Side effects that typically go away as your body adjusts to the medication and do not require medical attention unless they continue for several weeks or are bothersome: headache; unusual tiredness or weakness; blurred vision; nausea.
- Side effects that should be reported to your physician as soon as possible include: chest pain; dizziness or lightheadedness, especially when getting up from a lying or sitting position; fainting; pounding heartbeat; shortness of breath; swelling of feet or lower legs.

TIZANIDINE HYDROCHLORIDE

CHEMICAL NAME

- tizanidine hydrochloride (tye-ZAN-i-deen)

BRAND NAME

- Zanaflex (U.S. and Canada)

GENERIC AVAILABLE

- Yes

DESCRIPTION

- Tizanidine is used in multiple sclerosis to treat the increased muscle tone associated with spasticity. While it does not provide a cure for the problem, it is designed to relieve the spasms, cramping, and tightness of muscles.

PROPER USAGE

- Tizanidine is a short-acting drug for the management of spasticity. Its peak effectiveness occurs one to two hours after dosing, and is finished between three to six hours after dosing. Therefore, your physician will prescribe a dosing schedule that provides maximal relief during activities and periods of time of greatest importance to you.
- In order to minimize unwanted side effects with this medication, your physician will start you on a low dose and gradually raise it until a well-tolerated and effective level is reached.
- Studies of tizanidine have not been done in pregnant women. Animal studies, using doses significantly higher than those prescribed for humans, have resulted in damage to the offspring. If you are pregnant or planning to become pregnant, discuss this with your physician before starting this medication.
- It is not known whether tizanidine passes into the breast milk. Women should not take this medication while nursing unless told to do so by their physician.
PRECAUTIONS

- This drug will add to the effects of alcohol and other central nervous system (CNS) depressants (such as antihistamines, sedatives, tranquilizers, prescription pain medications, seizure medications, other muscle relaxants), possibly causing drowsiness. Be sure that your physician knows if you are taking these or any other medications. Zanaflex Capsules are not interchangeable with tizanidine or Zanaflex tablets. If your physician has prescribed Zanaflex Capsules it is important to know that switching from the capsule to a tablet may increase the risk of certain side effects. Please consult with your prescribing physician before allowing a switch from Zanaflex Capsules to a tablet formation.

- Oral contraceptives (birth control pills) may slow the release of tizanidine from the body; women using birth control pills should inform their physician so that the dose level of tizanidine can be reduced accordingly.

- This medication may cause blurred vision*, dizziness, or drowsiness in some people.

POSSIBLE SIDE EFFECTS

- Common side effects that may go away as your body adjusts to the medication and do not require medical attention unless they continue for more than two weeks or are bothersome: dryness of mouth; sleepiness or sedation; weakness*, fatigue*, and or tiredness*; dizziness or lightheadedness, especially when getting up from a sitting or lying position; increase in muscle spasms, cramps, or tightness; back pain.

- Common side effects that should be reported to the doctor as soon as possible: burning, prickling, or tingling sensation*; diarrhea; fainting; fever; loss of appetite; nausea; nervousness; pain or burning during urination; sores on skin; stomach pain; vomiting; yellow eyes or skin; blurred vision*.

TOLTERODINE

CHEMICAL NAME

- tolterodine (tole-TARE-oh-deen)

BRAND NAME

- Detrol (U.S.)

GENERIC AVAILABLE

- No

DESCRIPTION

- Tolterodine is an antispasmodic that is used to treat bladder spasms causing urinary frequency, urgency, or urge incontinence.
PROPER USAGE

- Take only the amount of this medication that has been prescribed for you by your doctor; taking more than the prescribed amount can cause adverse effects.
- If you miss a dose of this medication, take it as soon as possible. If, however, it is almost time for your next dose, skip the missed dose and go back to your regular schedule. Do not double dose.

PRECAUTIONS

- Individuals with any of the following medical problems should not take this medication: gastric retention, urinary retention, or narrow angle or uncontrolled glaucoma. Tolterodine can aggravate each of these conditions.
- Tolterodine may cause dizziness or drowsiness; use caution when driving or doing any activities that require alertness.
- Tolterodine may cause drying of the mouth. Since continued dryness of the mouth can increase the risk of dental disease, alert your dentist if you are taking this medication.
- This medication may interact with fluoxetine (Prozac) in such a way as to increase the effect of the tolterodine. If you are taking fluoxetine, your physician may start you at a lower dose of tolterodine, gradually raising it to the standard dose if necessary.
- This medication has not been studied in pregnant women. However, it has been shown in animal studies to result in increased embryo deaths, reduced birth weight, and increased incidence of fetal abnormalities. If you are pregnant, or planning to become pregnant, do not start this medication before you have discussed it with your physician.
- It is not known whether tolterodine passes into breast milk. Since tolterodine is known to pass into the milk of nursing animals, causing temporary reduction in weight gain in the offspring, women should stop taking this drug as long as they are nursing.

POSSIBLE SIDE EFFECTS

- Side effects that will typically go away as your body adjusts to the medication and do not require medical attention unless they continue for a few weeks or are bothersome: dry mouth; dizziness; headache; fatigue*; gastrointestinal symptoms, including abdominal pain, constipation*, or diarrhea; difficult urination.
- Less common side effects that should be reported to your physician immediately: abnormal vision, including difficulty adjusting to distances; urinary tract infection.
- Symptoms of overdose: severe central anticholinergic effects, including blurred vision*; clumsiness or unsteadiness*; confusion; seizures; severe diarrhea, excessive watering of the mouth; increasing muscle weakness (especially in the arms, neck, shoulders, and tongue); muscle cramps or twitching; severe nausea or vomiting; shortness of breath, slow heartbeat; slurred speech*; unusual irritability, nervousness, or restlessness; unusual tiredness or weakness*. 
TROPIUM CHLORIDE

CHEMICAL NAME
- trospium chloride (TROES-pee-oom chloride)

BRAND NAME
- Sanctura (U.S.)

GENERIC AVAILABLE
- No

DESCRIPTION
- Trospium chloride an antispasmodic, antimuscarinic medication that is used to treat an overactive bladder causing symptoms of frequency, urgency, or urge incontinence.

PROPER USAGE
- This medication should be taken one hour before meals or on an empty stomach.
- Take only the amount of this medication that has been prescribed for you by your doctor; taking more than the prescribed amount can cause adverse effects.
- If you miss a dose of this medication, take it as soon as possible. If, however, it is almost time for your next dose, skip the missed dose and go back to your regular schedule. Do not double dose.

PRECAUTIONS
- Individuals with any of the following medical problems should not take this medication: urinary retention, gastric retention or narrow angle or uncontrolled glaucoma, severe kidney problems. Trospium chloride can aggravate each of these conditions.
- Trospium chloride may cause dizziness or drowsiness; use caution when driving or doing any activities that require alertness.
- This medication, like all anticholinergic medications, may cause drying of the mouth. Since continued dryness of the mouth can increase the risk of dental disease, alert your dentist if you are taking this medication.
- Like all anticholinergic medications, trospium chloride can cause or worsen constipation.
- This medication has not been studied in pregnant women. However, it has been shown in animal studies to result in decreased fetal survival. If you are pregnant, or planning to become pregnant, do not start this medication before you have discussed it with your physician.
- It is not known whether trospium chloride passes into breast milk. Women who are taking this medication and wish to breastfeed should discuss it with their physician.
POSSIBLE SIDE EFFECTS

- Side effects that will typically go away as your body adjusts to the medication and do not require medical attention unless they continue for a few weeks or are bothersome: dry mouth; dry eyes; dizziness; headache; fatigue*; gastrointestinal symptoms, including abdominal pain, constipation*, or diarrhea; difficult urination.

- Less common side effects that should be reported to your physician immediately: abnormal vision, including difficulty adjusting to distances; urinary tract infection.

- Symptoms of overdose: severe central anticholinergic effects, including blurred vision; clumsiness or unsteadiness; confusion; seizures; severe diarrhea, excessive watering of the mouth; increasing muscle weakness (especially in the arms, neck, shoulders, and tongue); muscle cramps or twitching; severe nausea or vomiting; shortness of breath, slow heartbeat; slurred speech; unusual irritability, nervousness, or restlessness; unusual tiredness or weakness.

VARDENAFIL

CHEMICAL NAME

- vardenafil (var-DEN-a-fil)

BRAND NAME

- Levitra (U.S.)

GENERIC AVAILABLE

- No

DESCRIPTION

- Vardenafil belongs to a group of medicines that delay the action of enzymes called phosphodiesterases that can interfere with erectile function. Vardenafil is used to treat men with erectile dysfunction (also called sexual impotence) because it helps to maintain an erection that is produced when the penis is stroked. Without physical stimulation of the penis, vardenafil will not work to cause an erection. Vardenafil is not indicated for use in women.

PROPER USAGE

- Vardenafil should be taken approximately 60 minutes before sexual activity.

- Vardenafil is available by prescription and should be used only as directed by your physician. The dose of this medication will be different for different patients. Do not take more of this medication than has been prescribed for you.

- If you are older than 65 or have liver problems, your doctor may start you on a lower dose of this medication.
PRECAUTIONS

- Vardenafil can interact with, or interfere with the action of, other medications you may be taking. Be sure to inform your physician of all other medications you are taking so that appropriate substitutions or dosage adjustments can be made. Vardenafil should not be used by men who are using: nitrates such as nitroglycerin (e.g., Nitrostat or Transderm-Nitro) to lower blood pressure; alpha blockers (e.g., Hytrin, Flomax, or Cardura) to treat prostate problems or high blood pressure. Vardenafil in combination with these medications can cause the blood pressure to drop too far.

- The presence of certain medical problems can interfere with the use of Vardenafil. Be sure to inform your doctor if you have any of the following medical problems: an abnormality of the penis (including a curved penis or birth defect); bleeding problems; retinitis pigmentosa; any conditions causing thickened blood or slower blood flow (e.g., leukemia, multiple myeloma, polycythemia, sickle cell disease, or thrombocytopenia); a history of priapism (erection lasting longer than six hours); heart or blood disease; severe kidney problems; severe liver problems.

- Vardenafil has not been studied in combination with other medications that are used in the treatment of erectile dysfunction. At the present time, it is not recommended that these drugs be used together.

POSSIBLE SIDE EFFECTS

- Side effects that you should report to your physician so that he or she can adjust the dosage or change the medication: flushing; headache; nasal congestion, stomach discomfort after meals; diarrhea.

- Rare side effects that should be discussed with your physician: abnormal vision (e.g., blurred vision*, seeing shades of colors differently than before, sensitivity to light); bladder pain; cloudy or bloody urine; dizziness, increased frequency of urination; painful urination.

VENLAFAXINE

CHEMICAL NAME

- venlafaxine (ven-la-FAX-een)

BRAND NAME

- Effexor (U.S. and Canada)

GENERIC AVAILABLE

- Yes

DESCRIPTION

- Venlafaxine is used to treat mental depression.
PROPER USAGE

- Unless your physician has instructed otherwise, this medication should be taken with food or on a full stomach to reduce the chances of stomach upset.
- If you miss a dose of this medication, take it as soon as possible. If, however, it is within two hours of your next dose, skip the missed dose and return to your regular schedule. Do not double dose.

PRECAUTIONS

- It may take 4–6 weeks for you to feel the beneficial effects of this medication.
- Your physician should monitor your progress at regularly scheduled visits in order to adjust the dose and help reduce any side effects.
- Do not stop taking this medication without consulting your physician. The doctor may want you to reduce the amount you are taking gradually in order to decrease unwanted side effects.
- This medication could add to the effects of alcohol and other central nervous system depressants (e.g., antihistamines, sedatives, tranquilizers, sleeping medicine, prescription pain medicine, barbiturates, seizure medication, muscle relaxants). Be sure that you doctor knows if you are taking these or any other medications.
- Venlafaxine may cause dryness of the mouth. If your mouth continues to feel dry for more than two weeks, check with your physician or dentist. Continuing dryness of the mouth may increase the risk of dental disease.
- This medication may cause you to become drowsy or to have double vision.
- Venlafaxine may cause dizziness, lightheadedness, or fainting, especially when you stand from a sitting or lying position. If rising slowly from a sitting or lying position does not relieve the problem, consult your physician.
- Studies have not been done in pregnant women. However, studies in animals have shown that venlafaxine may cause decreased survival rates of offspring when given in doses that are many times the usual dose for humans. If you are pregnant, or planning to become pregnant, do not start this medication before you have discussed it with your physician.
- It is not known whether venlafaxine passes into breast milk. Mothers who are taking this medication and wish to breastfeed should discuss this with their doctor.

POSSIBLE SIDE EFFECTS

- Side effects that will typically go away as your body adjusts to the medication and do not require medical attention unless they continue for several weeks or are bothersome: abnormal dreams; anxiety or nervousness; constipation*, dizziness, drowsiness*, dryness of mouth, tingling or burning sensations*, decreased appetite, nausea, stomach or abdominal cramps; trouble sleeping; tiredness*; tremor*.
- Unusual side effects which should be discussed with the doctor as soon as possible: changes in vision or double vision*; changes in sexual desire or ability*; headache, chest pain; fast heartbeat; itching or skin rash; mood or mental changes; problems with urination*; menstrual changes; uncontrolled excitability; high blood pressure.
APPENDIX C:
COMPLEMENTARY & ALTERNATIVE MEDICINE (CAM)

CLASSIFICATION OF CAM THERAPIES

THE WIDESPREAD USE OF CAM

THE SCARCITY OF ACCURATE INFORMATION FOR CONSUMERS WITH MS

WHEN THE PRIORITIES OF PHYSICIANS & PATIENTS DIFFER

EDUCATING CONSUMERS ABOUT THE USE OF CAM

BRIEF OVERVIEW OF CAM INTERVENTIONS

CLASSIFICATION OF CAM THERAPIES

- Biologically based therapies: diets, herbs, vitamins, other supplements, bee venom therapy, hyperbaric oxygen
- Alternative medical systems: acupuncture, Ayurveda, homeopathy
- Lifestyle and disease prevention
- Mind-body medicine: relaxation methods, biofeedback
- Manipulative and body-based systems: chiropractic, massage, reflexology
- Energy medicine: magnets, therapeutic touch

THE WIDESPREAD USE OF CAM

Complementary and alternative medicine (CAM) is widely used in the United States. According to a study by Eisenberg and his colleagues in 1997, approximately 42 percent of people were using some form of CAM. They estimated that more visits were made to CAM practitioners (629,000,000) during the study year than to primary care physicians. Nevertheless, most of the people using CAM were doing so without the supervision of a physician or CAM practitioner. As many as 60 percent were not discussing CAM use with their physicians.

The 1997 study by Eisenberg found a high use of CAM by people with chronic conditions. Subsequent studies in MS have demonstrated that approximately two-thirds of people with MS use some form of CAM. In a 1999 study, Schwartz and her colleagues found that CAM use among
people with MS was higher than in the general population, and that visits to CAM practitioners were approximately 40 percent more frequent among people with MS than in the general population. The vast majority of these individuals were using CAM as a complement to their conventional MS treatments, while only a small percentage used CAM as an alternative to conventional medicine. In a survey conducted by Berkman et al. in the 1990s, people with MS indicated that they used CAM for a variety of reasons including: 1) They had heard from another individual about the benefits of a particular therapy and wanted to try it for themselves. 2) Mainstream medicine was not able to relieve their symptoms. 3) Mainstream medicine did not have a cure for MS.

More recent studies (Barnes et al., 2002; Kessler et al., 2001) have indicated that 50 percent of the U.S. population have used some form of CAM and that some CAM therapies are being used on a long-term basis. CAM use is higher among younger adults, women, and people who have chronic, unpredictable conditions (such as MS) that are associated with discomfort, pain, and side effects from prescription medications.

THE SCARCITY OF ACCURATE INFORMATION FOR CONSUMERS WITH MS

IN BOOKS ABOUT CAM WRITTEN FOR LAY AUDIENCES

- MS is often confused with muscular dystrophy.
- MS is often described as an immune disorder best treated by additional stimulation for the immune system.
- Numerous CAM treatments are recommended for people with MS but the specific recommendations vary significantly from one book to another.

IN MARKETING MATERIALS FROM CAM PRACTITIONERS & VENDORS

- Claims about product benefit are often exaggerated.
- CAM practitioners and vendors often have limited understanding of MS.

FROM PHYSICIANS & OTHER MAIN-STREAM HEALTH CARE PROVIDERS

- Mainstream providers tend to have little or no knowledge or experience with CAM, and are often reluctant to become involved in discussions about it.
- The availability of valid and objective information about CAM is of variable quality.

WHEN THE PRIORITIES OF PHYSICIANS & PATIENTS DIFFER

- Physicians rely on the controlled clinical trial to indicate which therapies are safe and effective; people with a chronic disease like MS may be ready to try any treatment that has been touted as a possible treatment or cure.
- Physicians see disease-modifying therapies that have been found to be 30–40 percent effective as a major breakthrough in MS treatment; some people with MS see these therapies as being 60–70 percent away from a cure.
In clinical trials, researchers subtract the placebo effect from the effect of the experimental drug in order to determine the true value of the experimental drug. A drug that is not better than placebo is deemed ineffective. Some CAM practitioners, on the other hand, may work to harness the placebo effect by fostering the practitioner-patient relationship, and value the patient’s improvement regardless of its source. The top priority for CAM users is to feel better.

**Educating Consumers About the Use of CAM**

- People with MS should be alerted to the warning signs of an unreliable CAM:
  - Heavy reliance on testimonials or anecdotal evidence rather than objective data on efficacy, safety, and cost
  - Promotional hype that makes use of exaggerated claims for "miraculous" results
  - Promises for wide-ranging relief from a variety of symptoms
  - Products with "secret" ingredients
  - An anti-medical emphasis that shuns conventional medicine
  - Expensive, highly-invasive treatments with no supporting data or scientific rationale

- People with MS should be encouraged to consider conventional treatments that have demonstrated their safety and effectiveness in controlled trials and/or clinical practice.

- People with MS should be encouraged to be open with their physicians, nurses, and pharmacists about their use of CAM so that they can be alerted about possible dangers associated with the CAM treatment(s) themselves or with the interactions between their CAM and conventional treatments.

- “More” is not necessarily “better.” As with prescription medications, higher supplement doses are not necessarily more effective than lower doses, and the additive effects of multiple supplements may actually be harmful.

- The interactions between conventional therapies and various types of CAM have not been evaluated.

- An interactive website devoted to CAM and MS at the Rocky Mountain Multiple Sclerosis Center ([www.ms-cam.org](http://www.ms-cam.org)) was created to serve a worldwide community of people interested in CAM and MS. The site is updated on a regular basis to provide accurate and unbiased information while allowing users to share their experiences. Periodic surveys are conducted to gather information about CAM usage.
BRIEF OVERVIEW OF CAM INTERVENTIONS

ACUPUNCTURE
Acupuncture is usually well tolerated, but there are rare adverse side effects. In small and preliminary studies, MS symptoms that have responded to acupuncture include: anxiety, depression, dizziness, pain, bladder difficulties, and weakness.

AROMATHERAPY
Aromatherapy is of low risk and reasonable cost. Several small clinical studies suggest benefit for anxiety and depression but further research is needed.

ASPARTAME
Given the available evidence, there is no reason for people with MS to avoid aspartame. There is no evidence that aspartame worsens MS or provokes MS-associated symptoms.

BEE VENOM THERAPY
There are no well-documented benefits of bee venom therapy and other bee products for people with MS. This type of therapy produced rare, but potentially serious adverse effects, including severe allergic reactions and death with bee venom therapy, and allergic reactions and worsening of asthma with other bee products.

BIOFEEDBACK
Biofeedback is a low-risk, moderate-cost therapy that may be beneficial for some MS-associated conditions, particularly those in which conventional medical approaches are not fully effective or produce side effects: anxiety, insomnia, pain, urinary incontinence, fecal incontinence, muscle stiffness.

CHELATION THERAPY
There are no well-documented clinical or scientific studies that indicate that chelation therapy is an effective treatment in MS. It is very expensive, and may rarely produce serious side effects.

CHIROPRACTIC
There is no strong published evidence that chiropractic therapy is beneficial for MS attacks or altering the course of the disease. Low back pain, which may occur in MS, responds positively to chiropractic manipulation. There is less evidence that it is useful for neck pain or headaches. Users of chiropractic therapy should be aware of the rare side effects, including stroke, and should rely on physicians for diagnosis and treatment of potentially serious conditions.

COOLING
Limited research studies have found that cooling produces improvement in multiple MS-associated symptoms, including weakness, fatigue, spasticity, walking difficulties, urinary difficulties, speech disorders, visual difficulties, sexual problems, incoordination, and cognitive difficulties. Cooling therapy may make the transition from unconventional to conventional medicine in the future.
**DENTAL AMALGAM REMOVAL**

Based on available evidence, there is no strong indication that dental amalgam removal has a beneficial effect in MS. Amalgam removal is usually well tolerated, but may be very expensive.

**DIETS & FATTY ACID SUPPLEMENTS**

Study results are not conclusive at this time.

- A moderate, unconventional approach to diet in MS would recommend a balanced diet that is low in saturated fats, high in fiber and polyunsaturated fatty acids, and includes supplements of omega-six, omega-three, and vitamin E.

- A more aggressive unconventional approach would involve a much stricter low-fat diet (e.g., Swank), and supplements of omega-six, omega-three, and vitamin E.

**EXERCISE**

Exercise is a simple, safe, low-cost approach that may produce many health benefits. In addition to its positive effects on general health, exercise may have a variety of beneficial effects on MS-associated symptoms, including weakness, walking difficulties, muscle stiffness, osteoporosis, low back pain, bladder difficulties, bowel problems, fatigue, insomnia, depression, anxiety, and anger.

**HERBS**

Herbs should be used with caution by people with MS. There are many herbs with no well-documented benefits that may potentially worsen MS or interact with MS medications. The message concerning herbs and MS is similar to that for unconventional medicine and MS as a whole: some of the therapies may be beneficial, some may be harmful, and nearly all are not fully understood.

**HERBS THAT MAY BE OF BENEFIT FOR CERTAIN MS-SPECIFIC SYMPTOMS**

Valerian for insomnia, cranberry for prevention of urinary tract infection, and psyllium for constipation.

**HERBS THAT MAY STIMULATE THE IMMUNE SYSTEM**

Alfalfa, arnica, astragalus, boneset, calendula, cat’s claw, celandine, drosera, echinacea, garlic, ginseng — Asian, ginseng — Siberian, licorice, mistletoe, reishi mushroom, saw palmetto, shiitake mushroom, stinging nettle.

**HERBS THAT MAY IRRITATE THE URINARY TRACT**

Asiatic dogwood, asparagus, buchu, celery, cinnamon, coffee, cola nut, copaiba oleoresin, cubeb, dill seed, eucalyptus, fragrant sumach, guarana, horseradish, juniper berries, lovage, maté, myrrh gum, parsley, pennyroyal, pine needles, rue, sandalwood, sassafras tea, thyme, watercress, yellow cedar, yerba mensa.

**HERBS THAT MAY INTERACT WITH STEROIDS**

Aloe, bayberry, buckthorn, cascara sagrada, devil’s claw, elecampane, ephedra (ma huang), fenugreek, figwort, ginseng-Asian, gotu kola, licorice, lily-of-the-valley, pheasant’s eye, senna, squill.
HERBS THAT MAY INTERACT WITH ANTIDEPRESSANTS MEDICATIONS

When taking the tricyclic antidepressants Elavil or Pamelor (often used in MS for treatment of depression and pain), it is important to avoid St. John’s wort, belladonna, henbane, mistletoe, and scopolia. St. John’s wort should not be taken with the SSRI antidepressants such as Prozac, Zoloft, and Paxil.

HIPPOThERAPy & THERAPEuTIC HORSEBACK RIDING

Hippotherapy and therapeutic horseback riding are low-risk, moderate-cost therapies that offer possible benefits for walking difficulties, spasticity, weakness, bladder and bowel problems, and depression.

HOMEOPATHY

Homeopathy is a low-risk, low-to-moderate cost therapy with unproven effectiveness in MS. It should not be used in place of conventional medications for controlling disease activity.

HYPERBARIC OXYGEN

There is no evidence to support the use of hyperbaric oxygen in MS. Many studies have shown that it is not an effective treatment for MS. It is very expensive, requires much time and effort, and occasionally produces serious side effects.

HYPNOSIS & GUIDED IMAGERY

Neither hypnosis nor guided imagery has been fully investigated. Both are well-tolerated, low-to-moderate cost therapies that may relieve anxiety and pain.

MAGNETS & ELECTROMAGNETIC THERAPY

The use of low-intensity magnets and pulsing electromagnetic fields is usually well tolerated. Several studies suggest that pulsing electromagnetic fields may improve MS symptoms such as spasticity and bladder problems. Other symptoms that may benefit from this therapy are fatigue, pain, cognitive problems, and walking. Further studies are needed to determine the efficacy and safety of this therapy.

MARIJUANA

Research studies suggest that marijuana may decrease MS-associated spasticity. However, the use of marijuana is associated with significant side effects, and the possible interactions of marijuana with prescription medications are not well understood. Further research is needed on the use of marijuana and marijuana-related chemicals.

MASSAGE

Massage is a relatively safe, low-to-moderate cost therapy that may have several benefits. Although it has not been extensively studied in MS, limited studies in other conditions suggest that it may be helpful for anxiety, depression, spasticity, low back pain, and other types of pain.

PILATES & THE PHYSICAlMIND METHOD

These methods are low-risk, moderate-cost forms of bodywork. These therapies are claimed to improve strength and flexibility, but there are few published studies that have evaluated their effectiveness.
PRAYER & SPIRITUALITY

Prayer and spirituality are low risk and inexpensive. The health effects of these approaches have not been established. Some studies suggest that prayer may be beneficial for anxiety, and that spirituality may be helpful for anxiety and depression. Research is currently underway to evaluate the effect of prayer in MS.

PROKARIN (FORMERLY CALLED PROCARIN)

There is limited information about the safety and effectiveness of this expensive treatment. A recent trial indicated that it may be useful for the treatment of MS-related fatigue. Because it contains histamine, Prokarin should be avoided by people with asthma.

T’AI CHI

T’ai chi is a low-risk, low-to-moderate cost therapy. It may increase walking ability, decrease stiffness, and improve social and emotional functioning. Studies on other conditions indicate that t’ai chi increases strength and may improve fatigue, depression, and anxiety.

THERAPEUTIC TOUCH

Therapeutic touch is a low-risk, low-to-moderate expense technique. It has not been studied in MS, and the effects of therapeutic touch on other conditions are largely unknown. Suggestive positive results have been reported for anxiety, depression, and pain, but further research is needed.

VITAMINS & OTHER SUPPLEMENTS

People with MS should be cautious in their use of supplements.

- Among vitamins, vitamin D is probably underutilized for osteoporosis.
- Antioxidant vitamins (A, C, and E) pose possible benefits (by decreasing the harmful effects of free radicals that are involved in the damage to myelin and axons) and possible risks (by stimulating the already overactive immune system).

VITAMIN C does not appear to be effective for the prevention or treatment of urinary tract infection.

- A small subgroup of people with MS may have a vitamin B12 deficiency and should be treated with vitamin B12 supplements.
- Calcium EAP is expensive and has no well-documented benefits for MS.
- Selenium, zinc, DHEA, and melatonin may activate the immune system and should thus be used in low doses or not at all.

YOGA

Yoga is relatively inexpensive and safe. One recent well-controlled clinical trial found that yoga decreased MS-related fatigue. Although it has not been rigorously investigated in other conditions, yoga may lessen anxiety, pain, and spasticity.
APPENDIX D:
RECOMMENDED RESOURCES

READINGS

JOURNAL ARTICLES


BOOKS FROM DEMOS MEDICAL PUBLISHING
tel: 1-800-532-8663; website: demosmedpub.com


— Harrington CB. (2008). *Barrier-Free Travel: A Nuts and Bolts Guide for Wheelers and Slow Walkers* (3rd ed.).

— Schapiro RT. (2007). Symptom Management in Multiple Sclerosis (5th ed.).

ADDITIONAL RECOMMENDATIONS

INFORMATION FROM THE NATIONAL MS SOCIETY

MATERIALS FOR HEALTHCARE PROFESSIONALS

Available from the PRC: healthprof_info@nmss.org

RESOURCE GUIDE FOR CLINICIANS

A practical guide to the wide range of Society materials and services available to support clinicians serving people with MS.

PAMELLA CAVALLO PROFESSIONAL EDUCATION SERIES

- Multiple Sclerosis: A Focus on Rehabilitation
- Multiple Sclerosis: A Model of Psychosocial Support
- Multiple Sclerosis: The Nursing Perspective
- Multiple Sclerosis: Medication Management

TALKING WITH YOUR MS PATIENT ABOUT DIFFICULT TOPICS

nationalMSociety.org/PRCPublications

- Talking about the Diagnosis of Multiple Sclerosis
- Talking about Progressive Disease
- Talking about Elimination Problems
- Talking about Sexual Dysfunction
- Talking about Depression and Other Emotional Changes
- Talking about Cognitive Dysfunction
- Talking about Initiating and Adhering to Treatment with Injectable Disease-Modifying Agents
- Talking about Family Issues
- Talking about Life Planning
- Talking about the Role of Rehabilitation
- Talking about Stress
- Talking about Reproductive Issues
- Talking about Primary Progressive MS
- Talking about Palliative Care, Hospice, and Dying

CLINICAL BULLETINS

nationalMSociety.org/ClinicalBulletins

- Overview of MS
- Primary Care in MS
- Reproductive Issues in Persons with Multiple Sclerosis
- The Role of Hormones in MS
- Bladder Dysfunction in Multiple Sclerosis
- Surgical Management of Bladder Dysfunction in Multiple Sclerosis
- Bowel Management in Multiple Sclerosis
- Cognitive Loss in Multiple Sclerosis
- Management of Fatigue in Multiple Sclerosis
- Emotional Issues of the Person with MS
- Pain in Multiple Sclerosis
- Spasticity
- Diagnosis and Management of Vision Problems in Multiple Sclerosis
- Occupational Therapy in Multiple Sclerosis Rehabilitation
- Complementary and Alternative Medicine in Multiple Sclerosis
- Improving Adherence to Therapy with Immunomodulating Agents
- Public Policy Awareness
- Aging with Multiple Sclerosis
- Dysarthria in Multiple Sclerosis
- Assessment and Treatment of Sexual Dysfunction in Multiple Sclerosis
- Swallowing Disorders and Their Management in Patients with Multiple Sclerosis
- Vitamin D and MS: Implications for Clinical Practice

**EXPERT OPINION PAPERS**


- Disease Management Consensus Statement
- Management of MS-Related Fatigue
- Changing Therapy in Relapsing Multiple Sclerosis: Considerations and Recommendations
- Rehabilitation: Recommendations for Persons with Multiple Sclerosis
- The Goldman Consensus Statement on Depression in Multiple Sclerosis (not available on Web)
- Recommendations Regarding Cannabis in Multiple Sclerosis
- Recommendations Regarding Corticosteroids in the Management of Multiple Sclerosis
- Patient Access to Tysabri

**HEALTH INSURANCE APPEALS LETTERS: A TOOLKIT FOR CLINICIANS**

[www.nationalMSsociety.org/for-professionals/healthcare-professionals/resources-for-clinicians/index.aspx](http://www.nationalMSsociety.org/for-professionals/healthcare-professionals/resources-for-clinicians/index.aspx)

- A guide designed to aid in the dialog between MS clinicians and health insurance plans when disputes over coverage arise.

**LONG-TERM CARE GUIDELINES & RECOMMENDATIONS**

[www.nationalMSsociety.org/PRCPublications](http://www.nationalMSsociety.org/PRCPublications)

- Nursing Home Care
- Adult Day Programs
- Assisted Living
- Home Care
- Caring for Loved Ones with Advanced MD

**BOOKLETS FOR LAY READERS**

Available by calling 1-800-344-4867 or online at [www.nationalMSsociety.org/library](http://www.nationalMSsociety.org/library)

**INFORMATION IN ENGLISH**

- ADA and People with MS
- At Home with MS
- Bowel Problems: Basic Facts
- “But You Look So Good!”
- Choosing the Right Health-Care Provider
- Clear Thinking about Alternative Therapies
- Comparing the Disease-Modifying Drugs
- Controlling Bladder Problems
- Depression and Multiple Sclerosis
- Diagnosis: Basic Facts
- Disclosure: Basic Facts
- Exercise as Part of Everyday Life
- Fatigue: What You Should Know
- Food for Thought
- Gait or Walking Problems: Basic Facts
- Genetics: Basic Facts
- A Guide for Caregivers
- Hiring Help at Home: Basic Facts
- The History of Multiple Sclerosis
- Hormones: Basic Facts
- Information for Employers
- Just the Facts 2003–2004
- Living with MS
- Managing MS through Rehabilitation
- MS and Intimacy
- MS and the Mind
- MS and Your Emotions
- MS and Pregnancy
- Pain: Basic Facts
- A Place in the Workforce
- PLAIN TALK: A Booklet about MS for Families
- Preventive Care Recommendations for Adults with MS
- Putting the Brakes on MS
- Research Directions in MS
- Should I Work?
- Sleep Disorders and MS: Basic Facts
- So You Have Progressive MS?
- Solving Cognitive Problems
- Someone You Know Has MS
- Spasticity: Basic Facts
- Speech and Swallowing: Basic Facts
- Stretching for People with MS
- Stretching with a Helper
- Taming Stress in Multiple Sclerosis
- Tremor: Basic Facts
- Urinary Dysfunction and MS
- Vision Problems: Basic Facts
- Vitamins, Minerals, & Herbs in MS: An Introduction
- What Everyone Should Know About Multiple Sclerosis
- What Is Multiple Sclerosis?
- When a Parent Has MS: Teen Guide
- The Win-Win Approach to Reasonable Accommodations

INFORMACIÓN EN ESPAÑOL
- Comparación de los Medicamentos Modificadores de la Enfermedad
- Controlando los Problemas de la Vejiga en la Esclerosis Multiple
- Debo Trabajar? Información para Empleados
- Diagnóstico: Hechos Básicos
- Ejercicios Prácticos de Estiramiento
- Ejercicios Prácticos de Estiramiento con un Ayudante
- La Fatiga: Lo que Usted Debe Saber
- Información para Empleadores
- Lo que Todo el Mundo Debe Saber sobre la Esclerosis Múltiple
- ¿Qué es la Esclerosis Múltiple?
- Sobre los Problemas Sexuales

OTHER NATIONAL MS SOCIETY PUBLICATIONS
Available at 1-800-344-4867, and on the website at nationalmsociety.org/library
- Momentum — A magazine for people living with MS
- Knowledge Is Power — A series of articles for individuals newly diagnosed with MS
- Keep S’myelin — A print and online newsletter for young children who have a parent with MS.

WEBSITES
Note: Please be aware that website URLs are subject to change without notice.
- ABLEDATA
  Information on Assistive Technology
  abledata.com
- Allsup, Inc — Assists Individuals Applying for Social Security Disability Benefits
  allsupinc.com
- Can Do Multiple Sclerosis (formerly The Heuga Center) — A provider of innovative lifestyle empowerment programs for people with MS and their support partners
  MSCanDo.org
- CenterWatch Clinical Trials
Listing Service AA
centerwatch.com

- CLAMS: Computer Literate Advocates for Multiple Sclerosis
clams.org
- Consortium of Multiple Sclerosis Centers
mscare.org
- IBM Accessibility Center
ibm.com/able
- International Journal of MS Care
mscare.com
- Medicare Information
medicare.com
- Microsoft Accessibility Technology for Everyone
microsoft.com/enable
- Multiple Sclerosis Information Gateway — Schering AG, Berlin, Germany
ms-gateway.com
- Multiple Sclerosis International Federation
msif.org
- Multiple Sclerosis Rehabilitation Research and Training Center — George H. Kraft, MD
msrrtc.washington.edu
- The Multiple Sclerosis Society of Canada
mssociety.ca
- The Myelin Project
myelin.org

- MyMSMyWay —
  A free resource (developed by The Technology Collaborative) dedicated to connecting people with Multiple Sclerosis to accessible technologies that can help them live their lives better
MyMSMyWay.com
- The National Family Caregivers Association
rfcacares.org
- The National Institute of Neurological Disorders and Stroke
ninds.nih.gov
- The National Library of Medicine
.nlm.nih.gov
- The National Multiple Sclerosis Society
nationalMSsociety.org
- The National Organization for Rare Disorders
rarediseases.org
- NARIC — The National Rehabilitation Information Center
naric.com
- Rocky Mountain MS Center Website on alternative/complementary medicine (CAM)
ms-cam.org
APPENDIX E: 
ORGANIZATIONS OF NOTE

CAN DO MULTIPLE SCLEROSIS

*Formerly The Heuga Center for Multiple Sclerosis*

27 Main Street, Suite 303
Edwards, CO 81632
tel: 800-367-3101
website: mscando.org

Can Do MS is a national, non-profit organization that provides unique lifestyle empowerment programs for people living with MS and their support partners. Programs focus on giving people the knowledge, skills, tools and confidence to adopt healthy life-style behaviors, actively co-manage their disease and live their best lives.

CONSORTIUM OF MULTIPLE SCLEROSIS CENTERS (CMSC)

359 Main Street, Suite A
Hackensack, NJ 07601
tel: 201-678-2290
website: mscare.org

The CMSC is made up of numerous MS centers throughout the United States and Canada. The Consortium’s mission is to disseminate information to clinicians, increase resources and opportunities for research, and advance the standard of care for multiple sclerosis. The CMSC is a multidisciplinary organization, bringing together health care professionals from many fields involved in MS patient care.

DEPARTMENT OF VETERANS AFFAIRS (VA)

810 Vermont Avenue, N.W.
Washington, DC 20420
tel: 202-273-5400
website: va.org

The VA provides a wide range of benefits and services to those who have served in the armed forces, their dependents, beneficiaries of deceased veterans, and dependent children of veterans with severe disabilities.
The EEOC is responsible for monitoring the section of the ADA on employment regulations. Copies of the regulations are available.

**Handicapped Organized Women (HOW)**

P.O. Box 35481
Charlotte, NC 28235
tel: 704-376-4735

HOW strives to build self-esteem and confidence among disabled women by encouraging volunteer community involvement. HOW seeks to train disabled women for leadership positions and works in conjunction with the National Organization of Women (NOW).

**Health Resource Center for Women with Disabilities**

Rehabilitation Institute of Chicago
345 East Superior Street
Chicago, IL 60611
tel: 312-908-7997
website: rehabchicago.org

The Center is a project run by and for women with disabilities. It publishes a free newsletter, “Resourceful Women,” and offers support groups and educational seminars addressing issues from a disabled woman’s perspective. Among its many educational resources, the Center has developed a video on mothering with a disability.

**International Organization of MS Nurses (IOMSN)**

359 Main Street, Suite A
Hackensack, NJ 07601
tel: 201-487-1050
website: iomsn.org

An organization of licensed nurses whose professional interests and activities are related to the care of people living with multiple sclerosis either through direct practice, research, education, or administration.

**Multiple Sclerosis Association of America (MSAA)**

706 Haddonfield Road
Cherry Hill, NJ 08002
tel: 800-532-7667
website: msassociation.org

MSAA is a non-profit organization that offers programs and services aimed at providing individualized assistance to people living with MS, their families, and their care partners.
MULTIPLE SCLEROSIS COALITION

359 Main Street, Suite A
Hackensack, NJ 07601
tel: 201-487-1050, ext. 104
website: multiplesclerosis-coalition.org

The Coalition is an affiliation of independent MS organizations dedicated to the enhancement of the quality of life for all those affected by MS. Its mission is to increase opportunities for cooperation and provide greater opportunity to leverage the effective use of resources for the benefit of the MS community. Coalition members: Accelerated Cure Project for Multiple Sclerosis; Can Do Multiple Sclerosis; Consortium of MS Centers; International Organization of MS Nurses; Multiple Sclerosis Association of America; Multiple Sclerosis Foundation; National Multiple Sclerosis Society; United Spinal Association; Vision Works Foundation, Inc/MS Friends Initiative.

MULTIPLE SCLEROSIS FOUNDATION (MSF)

6350 North Andrews Avenue
Fort Lauderdale, Florida 33309
tel: 888-MS-FOCUS
website: msfocus.org

MSF is a service-based, non-profit organization that provides programming and support to help people remain self-sufficient and safe in their homes, and educational programs to heighten public awareness and promote understanding about the disease.

MULTIPLE SCLEROSIS SOCIETY OF CANADA

250 Bloor Street East #1000
Toronto, Ontario
M4W 3P9, Canada
tel: 416-922-6065
in Canada: 1-800-268-7582
website: mssoc.ca

A national organization that funds research, promotes public education, and produces publications in both English and French. They provide an “ASK MS Information System” database of articles on a wide variety of topics including treatment, research, and social services. Regional divisions and chapters are located throughout Canada.

NATIONAL COUNCIL ON DISABILITY (NCD)

1331 F Street, N.W., Suite 1050
Washington, DC 20004
tel: 202-272-2004
website: ncl.gov

The Council is an independent federal agency whose role is to study and make recommendations about public policy for people with disabilities. Publishes a free newsletter, “Focus.”

NATIONAL FAMILY CAREGIVERS ASSOCIATION (NFCA)

10605 Concord Street
Kensington, MD 20895
tel: 301-942-6430
website: nfcacares.org

NFCA is dedicated to improving the quality of life of America’s 18,000,000 caregivers. It publishes a quarterly newsletter and has a resource guide, an information clearinghouse, and a toll-free hotline: 1-800-896-3650.
The National MS Society is the largest nonprofit organization in the United States supporting research for the treatment, prevention and cure of multiple sclerosis. Through its 50-state network of chapter and the combined efforts of volunteers, donors, researchers and health professionals, the Society provides significant outreach, education and support to individuals and families who are impacted by the disease.

OFFICE ON THE AMERICANS WITH DISABILITIES ACT

Department of Justice, Civil Rights Division

P.O. Box 66118
Washington, DC 20035
tel: 202-514-0301

This office is responsible for enforcing the ADA. To order copies of its regulations, call 202-514-6193.

PARALYZED VETERANS OF AMERICA (PVA)

801 Eighteenth Street N.W.
Washington, DC 20006
tel: 1-800-424-8200
website: pva.org

PVA is a national information and advocacy agency working to restore function and quality of life for veterans with spinal cord dysfunction. It supports and funds education and research and has a national advocacy program that focuses on accessibility issues. PVA publishes brochures on many issues related to rehabilitation.

SOCIAL SECURITY ADMINISTRATION

6401 Security Boulevard
Baltimore, MD 21235
tel: 1-800-772-1213
website: ssa.gov

To apply for social security benefits based on disability, call this office or visit your local social security branch office. The Office of Disability within the Social Security Administration publishes a free brochure entitled “Social Security Regulations: Rules for Determining Disability and Blindness.”

THROUGH THE LOOKING GLASS

National Research and Training Center on Families of Adults with Disabilities

2198 Sixth Street, Suite 100
Berkeley, CA 94710
tel: 510-848-4445 and 1-800-644-2666
website: lookingglass.org
UNITED SPINAL ASSOCIATION

Formerly the Eastern Paralyzed Veterans Association

75-20 Astoria Boulevard
Jackson Heights, NY 11370
tel: 718-803-3782
e-mail: info@unitedspinal.org
website: unitedspinal.org

United Spinal is a membership organization that was incorporated in New York in 1947 under the name Eastern Paralyzed Veterans Association (Eastern). In January of 2004, EPVA became the United Spinal Association, with the expanded mission of advocacy for all individuals with a spinal cord injury or disease, regardless of their age, gender, or veteran status. United Spinal offers a wide range of benefits, including hospital liaison, sports and recreation, wheelchair repair, adaptive architectural consultations, research and educational services, communications, and library and information services, as well as publications on a variety of subjects.

WELL SPOUSE FOUNDATION

610 Lexington Avenue
New York, NY 10022-6005
tel: 212-644-1241 and 1-800-838-0879

An emotional support network for people married to or living with a chronically ill partner. Advocacy for home health and long-term care and a newsletter are among the services offered.
APPENDIX F:
CONTINUING EDUCATION

The CE Solutions Group
A Division of VGM Education
1111 W San Marnan Dr
Waterloo, IA 50701
Toll-Free Telephone: 1-866-650-3400

It is our pleasure to provide you with the self-study course, “Multiple Sclerosis: The Nursing Perspective”, in partnership with the National Multiple Sclerosis Society.

Completing the course is as simple as 1-2-3!
1. Read the course material.
2. Complete the test for self-assessment.
3. Correct your answers by using the answer key provided.

It’s that easy! When complete, return the corrected test along with your evaluation, personal record, and a check or money order for $25.00 in the envelope provided. Once we have received your materials, we will mail your Certificate of Completion.

Providership information is indicated below.

We invite you to visit us on the web at: http://www.HealthCE.com

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Your Personal Record Form

(Thank you for completing the information below. This will become a part of your personal record – information that is required that we keep by the various State Boards of Nursing.

Email will be utilized only to inform you of important information regarding your self-study purchase, i.e., pass/fail, date certificate is mailed, etc. Email addresses will NEVER be sold to third parties).

Name______________________________________________________________
(as you would like it to appear on your certificate – please print legibly)

Address___________________________________________________________

City, ST, ZIP________________________________________ Telephone:____________________

SSN_____________________________ Email Address:______________________________

Professional License # & State:_________________________ Profession:____________________

FOR OFFICE USE ONLY:
Course #:_______ Start Date:_____/_____/____ End Date:_____/_____/____ Cust.#_______
Multiple Sclerosis: The Nursing Perspective

Description:

Multiple sclerosis (abbreviated MS) is thought to be an immune-mediated (most likely autoimmune) disease that primarily affects the central nervous system (CNS) – the brain, spinal cord, and optic nerves. Random attacks of inflammation (also called relapses or exacerbations) damage the myelin sheath (the fatty insulating substance surrounding nerve fibers in the white matter of the brain and spinal cord) causing scarring (also called plaques or lesions). The name multiple sclerosis comes from the multiple areas of scarring that characterize the disease process. The inflammatory attacks – along with the scarring they produce – occur randomly, varying widely in number and frequency from one person to another. The scars along the myelin sheath interfere with the transmission of nerve impulses, thereby producing the symptoms experienced by people with MS. Because of the randomness of the plaques within the CNS, no two people with MS will have exactly the same symptoms.

Purpose:

The nurse will better understand the MS disease process, treatment strategies, and the nurse’s role in MS management.

Objectives:

Upon completion of this course, the participant will be able to...

1. Define multiple sclerosis.
2. Discuss the pathophysiology, etiology, and epidemiology of the disease.
3. List and describe disease course classifications.
4. Discuss the diagnosis, symptoms, prognosis and treatment options (including medications) for the patient with MS.
5. Explore the evolving role of nursing in MS care.
Audience:

This course is appropriate for: LPNs, RNs, ARNPs, and other healthcare personnel interested in this subject matter.

Credit:

Nursing - 5 contact hours (based on a 60-minute hour); 6 contact hours (based on a 50-minute hour).

The CE Solutions Group, a Division of VGM Education is an approved provider of continuing nursing education by the Alabama State Nurses Association, an accredited approver by the American Nurses Credentialing Center’s COA.

The CE Solutions Group, A Division of VGM Education is an approved provider of continuing education for the Iowa Board of Nursing, #335.

The CE Solutions Group, a Division of VGM Education is an approved provider by the Florida Board of Nursing through CE Broker, #50-4572. This approval is also under effect for the District of Columbia Board of Nursing.

The CE Solutions Group, a Division of VGM Education is a California Board of Registered Nursing Provider Number CEP 14033 for 6 contact hours.
Test for
Multiple Sclerosis: The Nursing Perspective

1. Multiple Sclerosis (MS) is thought to be an immune-mediated (most likely autoimmune) disease that primarily affects the central nervous system – the brain, spinal cord, and optic nerves.
   a. True
   b. False

2. Research indicates that MS may be the result of an abnormal autoimmune response to some infectious agent or environmental trigger in a genetically susceptible individual.
   a. True
   b. False

3. MS is a hereditary disease.
   a. True
   b. False

4. MS is more common in African American and Hispanic males than in other population groups.
   a. True
   b. False

5. It is estimated that there are approximately 500,000 people with MS in the United States and Canada, and 2.5 million worldwide.
   a. True
   b. False

6. Disease categories are meant to serve primarily as a tool for the development of clinical research protocols, and as a guide for certain types of treatment decisions. These disease categories are meant to be descriptive in nature rather than a “report card” or rating scale of a person’s disease. An individual may not fit neatly into one category or another.
   a. True
   b. False
7. With Primary-Progressive MS (PPMS), the individual may expect clearly defined acute attacks with full recovery or with residual deficit upon recovery.
   a. True
   b. False

8. Secondary-Progressive MS (SPMS), which follows an initial relapsing-emitting disease course, is characterized by progression of variable rate that may also include occasional relapses and minor remissions and plateau.
   a. True
   b. False

9. Primary-Progressive MS (PPMS) is the least common disease course, characterized by progression from onset but with clear acute relapses with or without full recovery.
   a. True
   b. False

10. Magnetic resonance imaging (MRI) can independently determine if a person has MS.
    a. True
    b. False

11. In a population-based survey of individuals with MS, the most common symptom reported was
    a. visual disturbances.
    b. tremor.
    c. fatigue.
    d. ambulation problems.

12. Although prognosis with MS is uncertain, there are certain factors that seem to predict a more favorable course. They include all of the following EXCEPT:
    a. female gender,
    b. monoregional vs. polyregional attack,
    c. complete recovery after an exacerbation, leaving little or no residual impairment,
    d. onset after age 35.

13. Studies in MS indicate that 50% of people with MS will experience __________ at some point of the course of the disease, a higher prevalence than is seen in other, equally disabling chronic illnesses, perhaps resulting in part from the disease process itself.
    a. receptive aphasia
    b. a major depressive episode
    c. tremor of the neck and head
    d. restless leg syndrome
14. Although _______ are less likely than Caucasians to develop MS, studies indicate they tend to experience a more progressive disease course.
   a. Hispanics
   b. Asians
   c. African-Americans
   d. None of the above

15. The primary purpose of rehabilitation in the treatment of MS is to
   a. enhance and maintain physical function.
   b. sustain mental acuity.
   c. enhance symptom management.
   d. treat acute exacerbations.

16. With an acute MS exacerbation most neurologists will use a high-dose intravenous (IV) corticosteroid agent to reduce inflammation in the CNS. There can be serious side effects from the chronic use of steroids, however, including
   a. hypotension, skin disorders, and lethargy.
   b. hypoglycemia, ataxia, and mood disorders.
   c. hypertension, diabetes, osteoporosis, and ulcers.
   d. All of the above

17. An individual with MS who is experiencing ambulation problems may resist using mobility aids due to
   a. fear of marital strain.
   b. self perception of being weak or damaged or “giving in”.
   c. fear of falling.
   d. financial concerns.

18. Bowel dysfunction may be a symptom of MS and is treated with
   a. high-fiber diet.
   b. exercise.
   c. stool softeners.
   d. mild laxatives.
   e. All of the above.

19. An invisible symptom in the MS patient that can be easily misinterpreted by others is ___________.
   a. weakness
   b. fatigue
   c. spasticity
   d. blurred vision
20. Medications used to treat sensory problems in the patient with MS may include
   a. tolterodine.
   b. baclofen.
   c. amantadine HCL.
   d. duloxetine HCL.

21. Sexual dysfunction, which is common in MS, may include:
   a. impaired arousal.
   b. inability to orgasm.
   c. sensory changes.
   d. erectile dysfunction/reduced vaginal lubrication.
   e. All of the above.

22. ________ may be the most difficult symptom to treat.
   a. Spasticity
   b. Tremor
   c. Vertigo
   d. Dysarthria

23. It is important to do a complete assessment at every physician visit, asking about symptoms or changes whether or not a person has mentioned any difficulties. This can be challenging for the healthcare team because
   a. some changes are less-visible or not visible at all to the observer.
   b. some topics are embarrassing for the patient to discuss, even with their healthcare provider.
   c. the patient may assume problems are unrelated to the MS.
   d. All of the above.

24. Disease modification drugs are used primarily in the MS patient to
   a. relieve symptoms.
   b. treat primary-progressive MS.
   c. reduce relapses and slow progression.
   d. All of the above.

25. The most frequent side-effect of interferon beta 1-b is
   a. flu-like symptoms.
   b. nausea.
   c. pain
   d. inflammation.

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26. _______, an immunomodulating agent, which is delivered by infusion, is generally recommended only for people who have already had less than satisfactory results with the injectable medications or cannot tolerate their side effects.
   a. Interferon beta 1-a
   b. Natalizumab
   c. Interferon beta 1-b
   d. Glatiramer acetate

27. Interferon beta medications are used in the treatment of MS to
   a. interfere with DNA replication.
   b. enhance bacterial reflux.
   c. reduce immune responses that attack myelin and nerve fibers in MS.
   d. All of the above.

28. This drug is a synthetic compound made up of four amino acids that are found in myelin. This drug seems to block myelin-damaging T-cells through a mechanism that is not yet completely understood.
   a. natalizumab
   b. interferon beta 1-a
   c. interferon beta 1-b
   d. glatiramer acetate

29. These drugs are used for the treatment of relapsing forms of MS, including relapsing-remitting MS, progressive-relapsing MS, and secondary-progressive MS in those individuals still experiencing relapses.
   a. Interferon beta 1-b (Betaseron, Extavia)
   b. Interferon 1-a (Avonex, Rebif)
   c. All of the above
   d. None of the above

30. This medication is a potent immunosuppressant that acts by slowing the division of cells and altering other immune cells and substances. In MS this drug has been shown to slow progression of disability, reduce frequency of relapses, and reduce accumulation of new brain lesions as shown on MRI.
   a. azathioprine
   b. mitoxantrone
   c. cladribine
   d. dexamethasone
31. There are risks associated with mitoxantrone, primarily risks associated with
   a. cardiac function.
   b. liver function.
   c. renal function.
   d. blood dyscrasias.

32. Treatments of progressive disease in MS may include drugs like azathioprine, cladribine, or
cyclophosphamide. These are actually __________ agents that work as immunosuppressives.
   a. DNA replicating
   b. protein inhibiting
   c. cancer chemotherapeutic
   d. None of the above

33. Early intervention is important in MS as recent studies confirm
   a. early relapses can cause permanent axonal damage as well as destruction of myelin.
   b. early therapy reduces fatigue and new symptoms in patients with worsening disease.
   c. management in early stages reduces the risk of progressive-relapsing MS
   d. All of the above.

34. The major obstacle(s) to adherence to the beta interferon medications is(are) _________________.
   Improved education for people with MS and their families is recommended to address patients’ concerns,
clarify misconceptions, and manage side effects.
   a. their short-term side effects.
   b. their long-term potential for hepatotoxicity.
   c. perceived lack of effectiveness.
   d. All of the above.

35. Rehabilitation in the MS patient is a(an) ________ process directed toward helping the person recover
and/or maintain the highest possible level of functioning and realize his or her optimal physical, mental, and
social potential given any limitations that exist.
   a. active
   b. passive
   c. social
   d. analytical
36. The unique role of rehabilitation in MS differs from rehabilitation in general medical practice in that
   a. the goal is always one of complete recovery.
   b. the process is ongoing with periodic assessments and interventions.
   c. rehabilitation is only necessary following an exacerbation.
   d. None of the above.

37. As part of the rehabilitation “team”, the nurse generally functions as the team’s ____________. The nurse
   provides education about MS, teaches self-management skills (self-injection and symptom management
   strategies, bowel/bladder care, and skin care), facilitates referrals, and provides ongoing support for the
   rehabilitation process.
   a. leader
   b. resource liaison
   c. coordinator
   d. collaborator

38. Psychosocial support is very important to the MS patient and family and encompasses
   a. disease-related education.
   b. diagnosis/treatment of emotional and/or cognitive problems.
   c. family interventions designed to support family members’ efforts to cope with the intrusion of MS into
      the household.
   d. support for people’s efforts to remain productively employed as long as they are able and interested,
      and to transition out of the workforce when, and if, it is necessary to do so.
   e. helping individuals with MS and their families to access available resources.
   f. All of the above

   The next group of questions encompasses medications commonly used in MS to treat
   symptoms of the disease.

39. This medication is used to relieve shock-like pain, such as the facial pain caused by trigeminal neuralgia.
   a. ciprofloxacin
   b. ACTH
   c. carbamazepine
   d. fluoxetine
40. This medication is a wakefulness-promoting agent approved for the treatment of narcolepsy and is used in the MS patient to treat excessive daytime sleepiness.
   a. mitoxantrone
   b. natalizumab
   c. modafinil
   d. methenamine

41. This medication is an antispasmodic formulated to help decrease muscle spasms of the bladder and the frequent urge to urinate caused by these spasms.
   a. oxybutynin
   b. mineral oil
   c. papaverine
   d. venlafaxine

42. This medication is used to treat mental depression.
   a. Venlafaxine
   b. Mitoxantrone
   c. Meclizine
   d. Tolterodine

43. This medication is used in MS to relieve the symptoms of pruritis or paroxysmal itching—one of the sensory symptoms, or dysesthesias, which can be associated with MS.
   a. duloxetine hydrochloride
   b. glatiramer acetate
   c. gabapentin
   d. hydroxyzine

44. This drug is used in MS primarily for the relief of muscle spasms and spasticity.
   a. gabapentin
   b. diazepam
   c. docusate
   d. dexamethasone
45. Docusate is an over-the-counter stool softener (emollient) that helps liquids to mix into dry, hardened stool, making the stool easier to pass. Patient education would include not taking ______________ within two hours of taking docusate.
   a. iron formula
   b. orange juice
   c. milk
   d. mineral oil

46. __________ is used in MS to control dysesthasias (pain caused by MS lesions) and the pain caused by spasticity.
   a. Hydromorphone
   b. Percocet
   c. Gabapentin
   d. Imipramine

47. The evolving role of nursing in MS care is an important one as the nurse is the healthcare professional with the most frequent contact with the patient. The nurse’s role for the newly diagnosed MS patient would include
   a. promoting understanding of disease progression.
   b. working within the long-term care setting to promote independence, self-esteem, productivity, and self-determination.
   c. providing education about the disease and its treatment to individuals with MS and their families.
   d. All of the above.

48. The nurse’s role in working with the person transitioning to more progressive disease includes all of the following, EXCEPT
   a. teaching injection techniques.
   b. helping people adhere to their recommended treatment regimen.
   c. stressing the need for financial assessment and planning (including healthcare coverage).
   d. educating individuals and families about long-term care options and supporting people’s efforts to communicate about these options.
49. Complementary and alternative medicine (CAM) is widely used in the United States, especially by people with chronic conditions. People with MS should be alerted to dangerous misconceptions about supplements, including
   a. “Natural” is not necessarily the same as “safe”.
   b. Supplements that are beneficial can contain chemicals that are potentially harmful.
   c. “More” is not necessarily “better”.
   d. All of the above.

50. ___________ is (are) a simple, safe, low-cost approach that may produce many health benefits. This method may also have a variety of beneficial effects on MS-associated symptoms, including weakness, walking difficulties, muscle stiffness, osteoporosis, low back pain, bladder difficulties, bowel problems, fatigue, insomnia, depression, anxiety, and anger.
   a. Exercise
   b. Prokarin
   c. Vitamins and other supplements
   d. Homeopathy
### Answer Sheet

**Multiple Sclerosis: The Nursing Perspective**

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Name: ________________________________

Please continue by checking your answers against the answer key provided. Then return your corrected answer sheet, the course evaluation form, your Personal Record Form, and a personal check or money order in the amount of $25.00 to:

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A Division of VGM Education
1111 W San Marnan Dr
Waterloo, Iowa 50701
Toll-Free Telephone: 1-866-650-3400
Self-Study Evaluation (ED II)

Course Title: Multiple Sclerosis: The Nursing Perspective

Date completed: ________________

Please score your responses (1 – 5) with one (1) being the least effective and five (5) being the most effective.

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8. Please indicate the amount of time actually taken to complete the reading material (hours)________________________

9. Please indicate the amount of time actually taken to complete the testing portion (minutes or hours)________________________

10. Other comments are welcomed:

11. How did you hear of us?
   ( ) Newspaper ( ) Web
   ( ) Flier ( ) A friend
   ( ) Direct Mail ( ) Other ________________________________

12. How might we serve you better?

13. What other course offerings might you be interested in?

If you prefer, this evaluation may be sent directly to the Iowa Board of Nursing at 400 S.W. 8th Street, Suite B, Des Moines, Iowa 50309-4685

Thank you. We have appreciated this opportunity to serve you.
Answer Key for
Multiple Sclerosis: The Nursing Perspective

1. Multiple Sclerosis (MS) is thought to be an immune-mediated (most likely autoimmune) disease that primarily affects the central nervous system – the brain, spinal cord, and optic nerves.
   a. True
   b. False

2. Research indicates that MS may be the result of an abnormal autoimmune response to some infectious agent or environmental trigger in a genetically susceptible individual.
   a. True
   b. False

3. MS is a hereditary disease.
   a. True
   b. False

4. MS is more common in African American and Hispanic males than in other population groups.
   a. True
   b. False

5. It is estimated that there are approximately 500,000 people with MS in the United States and Canada, and 2.5 million worldwide.
   a. True
   b. False

6. Disease categories are meant to serve primarily as a tool for the development of clinical research protocols, and as a guide for certain types of treatment decisions. These disease categories are meant to be descriptive in nature rather than a “report card” or rating scale of a person’s disease. An individual may not fit neatly into one category or another.
   a. True
   b. False

7. With Primary-Progressive MS (PPMS), the individual may expect clearly defined acute attacks with full recovery or with residual deficit upon recovery.
   a. True
   b. False
8. Secondary-Progressive MS (SPMS), which follows an initial relapsing-emitting disease course, is characterized by progression of variable rate that may also include occasional relapses and minor remissions and plateau.
   a. True
   b. False

9. Primary-Progressive MS (PPMS) is the least common disease course, characterized by progression from onset but with clear acute relapses with or without full recovery.
   a. True
   b. False

10. Magnetic resonance imaging (MRI) can independently determine if a person has MS.
    a. True
    b. False

11. In a population-based survey of individuals with MS, the most common symptom reported was
    a. visual disturbances.
    b. tremor.
    c. fatigue.
    d. ambulation problems.

12. Although prognosis with MS is uncertain, there are certain factors that seem to predict a more favorable course. They include all of the following EXCEPT:
    a. female gender,
    b. monoregional vs. polyregional attack,
    c. complete recovery after an exacerbation, leaving little or no residual impairment,
    d. onset after age 35.

13. Studies in MS indicate that 50% of people with MS will experience ________ at some point of the course of the disease, a higher prevalence than is seen in other, equally disabling chronic illnesses, perhaps resulting in part from the disease process itself.
    a. receptive aphasia
    b. a major depressive episode
    c. tremor of the neck and head
    d. restless leg syndrome

14. Although _______ are less likely than Caucasians to develop MS, studies indicate they tend to experience a more progressive disease course.
    a. Hispanics
    b. Asians
    c. African-Americans
    d. None of the above
15. The primary purpose of rehabilitation in the treatment of MS is to
   a. **enhance and maintain physical function.**
   b. sustain mental acuity.
   c. enhance symptom management.
   d. treat acute exacerbations.

16. With an acute MS exacerbation most neurologists will use a high-dose intravenous (IV) corticosteroid agent to reduce inflammation in the CNS. There can be serious side effects from the chronic use of steroids, however, including
   a. hypotension, skin disorders, and lethargy.
   b. hypoglycemia, ataxia, and mood disorders.
   c. **hypertension, diabetes, osteoporosis, and ulcers.**
   d. All of the above

17. An individual with MS who is experiencing ambulation problems may resist using mobility aids due to
   a. fear of marital strain.
   b. self perception of being weak or damaged or “giving in”.
   c. fear of falling.
   d. financial concerns.

18. Bowel dysfunction may be a symptom of MS and is treated with
   a. high-fiber diet.
   b. exercise.
   c. stool softeners.
   d. mild laxatives.
   e. **All of the above.**

19. An invisible symptom in the MS patient that can be easily misinterpreted by others is ____________.
   a. weakness
   b. **fatigue**
   c. spasticity
   d. blurred vision

20. Medications used to treat sensory problems in the patient with MS may include
   a. tolterodine.
   b. baclofen.
   c. amantadine HCL.
   d. **duloxetine HCL.**
21. Sexual dysfunction, which is common in MS, may include:
   a. impaired arousal.
   b. inability to orgasm.
   c. sensory changes.
   d. erectile dysfunction/reduced vaginal lubrication.
   e. All of the above.

22. ________ may be the most difficult symptom to treat.
   a. Spasticity
   b. Tremor
   c. Vertigo
   d. Dysarthria

23. It is important to do a complete assessment at every physician visit, asking about symptoms or changes whether or not a person has mentioned any difficulties. This can be challenging for the healthcare team because
   a. some changes are less-visible or not visible at all to the observer.
   b. some topics are embarrassing for the patient to discuss, even with their healthcare provider.
   c. the patient may assume problems are unrelated to the MS.
   d. All of the above.

24. Disease modification drugs are used primarily in the MS patient to
   a. relieve symptoms.
   b. treat primary-progressive MS.
   c. reduce relapses and slow progression.
   d. All of the above.

25. The most frequent side-effect of interferon beta 1-b is
   a. flu-like symptoms.
   b. nausea.
   c. pain
   d. inflammation.

26. ________, an immunomodulating agent, which is delivered by infusion, is generally recommended only for people who have already had less than satisfactory results with the injectable medications or cannot tolerate their side effects.
   a. Interferon beta 1-a
   b. Natalizumab
   c. Interferon beta1-b
   d. Glatiramer acetate
27. Interferon beta medications are used in the treatment of MS to
   a. interfere with DNA replication.
   b. enhance bacterial reflux.
   c. reduce immune responses that attack myelin and nerve fibers in MS.
   d. All of the above.

28. This drug is a synthetic compound made up of four amino acids that are found in myelin. This drug seems to block myelin-damaging T-cells through a mechanism that is not yet completely understood.
   a. natalizumab
   b. interferon beta 1-a
   c. interferon beta 1-b
   d. glatiramer acetate

29. These drugs are used for the treatment of relapsing forms of MS, including relapsing-remitting MS, progressive-relapsing MS, and secondary-progressive MS in those individuals still experiencing relapses.
   a. Interferon beta 1-b (Betaseron, Extavia)
   b. Interferon 1-a (Avonex, Rebif)
   c. All of the above
   d. None of the above

30. This medication is a potent immunosuppressant that acts by slowing the division of cells and altering other immune cells and substances. In MS this drug has been shown to slow progression of disability, reduce frequency of relapses, and reduce accumulation of new brain lesions as shown on MRI.
   a. azathioprine
   b. mitoxantrone
   c. cladribine
   d. dexamethasone

31. There are risks associated with mitoxantrone, primarily risks associated with
   a. cardiac function.
   b. liver function.
   c. renal function.
   d. blood dyscrasias.

32. Treatments of progressive disease in MS may include drugs like azathioprine, cladribine, or cyclophosphamide. These are actually ________ agents that work as immunosuppressives.
   a. DNA replicating
   b. protein inhibiting
   c. cancer chemotherapeutic
   d. None of the above
33. Early intervention is important in MS as recent studies confirm
   a. early relapses can cause permanent axonal damage as well as destruction of myelin.
   b. early therapy reduces fatigue and new symptoms in patients with worsening disease.
   c. management in early stages reduces the risk of progressive-relapsing MS
   d. All of the above.

34. The major obstacle(s) to adherence to the beta interferon medications is(are) ______________.
   Improved education for people with MS and their families is recommended to address patients’ concerns,
   clarify misconceptions, and manage side effects.
   a. their short-term side effects.
   b. their long-term potential for hepatotoxicity.
   c. perceived lack of effectiveness.
   d. All of the above.

35. Rehabilitation in the MS patient is a(an) ______ process directed toward helping the person recover
   and/or maintain the highest possible level of functioning and realize his or her optimal physical, mental,
   and social potential given any limitations that exist.
   a. active
   b. passive
   c. social
   d. analytical

36. The unique role of rehabilitation in MS differs from rehabilitation in general medical practice in that
   a. the goal is always one of complete recovery.
   b. the process is ongoing with periodic assessments and interventions.
   c. rehabilitation is only necessary following an exacerbation.
   d. None of the above.

37. As part of the rehabilitation “team”, the nurse generally functions as the team’s ___________. The nurse
   provides education about MS, teaches self-management skills (self-injection and symptom management
   strategies, bowel/bladder care, and skin care), facilitates referrals, and provides ongoing support for the
   rehabilitation process.
   a. leader
   b. resource liaison
   c. coordinator
   d. collaborator
38. Psychosocial support is very important to the MS patient and family and encompasses
   a. disease-related education.
   b. diagnosis/treatment of emotional and/or cognitive problems.
   c. family interventions designed to support family members’ efforts to cope with the intrusion of MS into
      the household.
   d. support for people’s efforts to remain productively employed as long as they are able and interested,
      and to transition out of the workforce when, and if, it is necessary to do so.
   e. helping individuals with MS and their families to access available resources.
   f. All of the above

   The next group of questions encompasses medications commonly used in MS to treat symptoms of
   the disease.

39. This medication is used to relieve shock-like pain, such as the facial pain caused by trigeminal neuralgia.
   a. ciprofloxacin
   b. ACTH
   c. carbamazepine
   d. fluoxetine

40. This medication is a wakefulness-promoting agent approved for the treatment of narcolepsy and is used in
    the MS patient to treat excessive daytime sleepiness.
   a. mitoxantrone
   b. natalizumab
   c. modafinil
   d. methenamine

41. This medication is an antispasmodic formulated to help decrease muscle spasms of the bladder and the
    frequent urge to urinate caused by these spasms.
   a. oxybutynin
   b. mineral oil
   c. papaverine
   d. venlafaxine

42. This medication is used to treat mental depression.
   a. venlafaxine
   b. mitoxantrone
   c. meclizine
   d. tolterodine
43. This medication is used in MS to relieve the symptoms of pruritus or paroxysmal itching—one of the sensory symptoms, or dyesthesias, which can be associated with MS.
   a. duloxetine hydrochloride
   b. glatiramer acetate
   c. gabapentin
   d. hydroxyzine

44. This drug is used in MS primarily for the relief of muscle spasms and spasticity.
   a. gabapentin
   b. diazepam
   c. docusate
   d. dexamethasone

45. Docusate is an over-the-counter stool softener (emollient) that helps liquids to mix into dry, hardened stool, making the stool easier to pass. Patient education would include not taking ______________ within two hours of taking docusate.
   a. iron formula
   b. orange juice
   c. milk
   d. mineral oil

46. ___________ is used in MS to control dyesthesias (pain caused by MS lesions) and the pain caused by spasticity.
   a. Hydromorphone
   b. Percocet
   c. Gabapentin
   d. Imipramine

47. The evolving role of nursing in MS care is an important one as the nurse is the healthcare professional with the most frequent contact with the patient. The nurse’s role for the newly diagnosed MS patient would include
   a. promoting understanding of disease progression.
   b. working within the long-term care setting to promote independence, self-esteem, productivity, and self-determination.
   c. providing education about the disease and its treatment to individuals with MS and their families.
   d. All of the above.
48. The nurse’s role in working with the person transitioning to more progressive disease includes all of the following, EXCEPT
   a. teaching injection techniques.
   b. helping people adhere to their recommended treatment regimen.
   c. stressing the need for financial assessment and planning (including healthcare coverage).
   d. educating individuals and families about long-term care options and supporting people’s efforts to communicate about these options.

49. Complementary and alternative medicine (CAM) is widely used in the United States, especially by people with chronic conditions. People with MS should be alerted to dangerous misconceptions about supplements, including
   a. “Natural” is not necessarily the same as “safe”.
   b. Supplements that are beneficial can contain chemicals that are potentially harmful.
   c. “More” is not necessarily “better”.
   d. All of the above.

50. _________ is (are) a simple, safe, low-cost approach that may produce many health benefits. This method may also have a variety of beneficial effects on MS-associated symptoms, including weakness, walking difficulties, muscle stiffness, osteoporosis, low back pain, bladder difficulties, bowel problems, fatigue, insomnia, depression, anxiety, and anger.
   a. Exercise
   b. Prokarin
   c. Vitamins and other supplements
   d. Homeopathy