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Injection-site and Skin-reaction Management



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Counseling Points™

Injection-site and Skin-reaction Management

Continuing Education Information

Target Audience

This educational activity is designed to meet the needs of multiple sclerosis (MS) nurse specialists and other nurses in the care of patients with MS.

Purpose

To provide MS nurses with strategies for teaching patients to properly self-inject MS medications and for preventing and managing skin-related injection-site reactions.

Learning Objectives

Upon completion of this educational activity, the participant should be able to:

- Identify issues that may prevent or deter patients from correctly self-injecting multiple sclerosis (MS) medications
- Recognize the most frequently encountered mild and serious injection-site reactions associated with MS disease-modifying therapies (DMTs)
- Explain appropriate injection technique for subcutaneous MS medications and provide tips for preventing minor discomfort and injection-site reactions
- Review treatment, follow-up, and referral guidelines for injection-site reactions requiring medical treatment

Continuing Education Credit

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Approximate time to complete this activity is 60 minutes.

This program expires August 31, 2012.

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welcome

Dear Colleague,

Despite the current level of anticipation for oral therapies for multiple sclerosis (MS), many of us, as MS nurse specialists, do not envision injectable therapies becoming obsolete any time soon. In the near future, we may need to balance the novelty and convenience of oral administration against the well-established safety and efficacy profile of the injectable agents. Many of our patients are living healthy, active lives with few relapses and little sign of disease progression due to regular use of therapy with an interferon, glatiramer acetate, or natalizumab.

Skin reactions and injection-site complications are some of the primary detractors to injectable therapies. Many strides have been made toward reducing complications, with newer technologies and better management techniques. Still, keeping skin healthy must be accomplished on a patient-by-patient, day-to-day basis. Teaching patients how to safely administer these agents, watching the skin for potential problems, and helping to manage complications that may arise are important responsibilities frequently handled by the MS nurse.

The nurse specialists on this *MS Counseling Points*[™] panel have a great deal of experience in managing skin- and injection-related issues in MS. I'm sure that any nurse who treats MS patients can learn from their expertise.



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Injection-site and Skin-reaction Management

With oral disease-modifying therapies (DMTs) for multiple sclerosis (MS) on the horizon, many people with MS are anxiously awaiting the “end of the needle.” Others recognize that the transition might not be quite so straightforward. Not every person will be an appropriate candidate for a new oral or infused MS therapy, and some MS clinicians will advocate a “wait and see” approach until they gain more experience with newer therapies and learn how individual patients respond to them. What this means for people who are doing well on an existing therapy—and many who are newly diagnosed with MS—is that the injections are here to stay, at least for now.

MS nurses can help make regular injections safer and more comfortable for patients with the strategies reviewed in this issue. Follow-up is essential to ensure that patients are using their medication as directed and injecting correctly, and to detect the development of any new problems, such as local injection-site reactions.

A main advantage of the current injectable therapies for MS is their established long-term safety and efficacy.

Pros and Cons to Injected Therapies for MS

A main advantage of the current injectable therapies for MS is their established long-term safety and efficacy. Over periods of study extending up to 16 years, no significant new safety concerns have emerged from treatment with glatiramer acetate (GA, Copaxone®), interferon beta-1a (Avonex®), or interferon beta-1b (Betaseron®), or with other ver-

sions of these agents such as interferon beta-1a subcutaneous (Rebif®) and interferon beta-1b (Extavia®) (Table 1).¹⁻⁴ Patients receiving long-term treatment have had significantly slower progression of disability, fewer magnetic resonance imaging (MRI) signs of neurologic damage, and delayed conversion to secondary-progressive MS (SPMS) compared with people who discontinued therapy or received intermittent treatment.¹⁻⁴

Table 1. Self-injectable Disease-modifying Therapies (DMTs)

Brand Name	Generic Name	Dosing Route/ Frequency	Frequency
Avonex®	Interferon beta-1a	Intramuscular	Once a week
Betaseron®	Interferon beta-1b	Subcutaneous	Every other day
Copaxone®	Glatiramer acetate	Subcutaneous	Daily
Extavia®	Interferon beta-1b	Subcutaneous	Every other day
Rebif®	Interferon beta-1a	Subcutaneous	Three times a week

However, skin reactions and complications involving the injection site remain among the most commonly reported adverse events associated with these therapies. For those newly diagnosed with MS, fears about injections can cause patients to delay starting therapy at the time when it may help the most, according to a recent industry survey conducted in collaboration with the National Multiple Sclerosis Society (NMSS).⁵ Among 250 people with relapsing forms of MS who participated in the survey, 20% said they had delayed starting therapy, many for more than a year. Forty-one percent cited fear or anxiety about

injections as being instrumental in this decision.⁵ At the same time, data from studies such as BENEFIT and PreCISe show the significant benefits of starting these therapies at the earliest signs of disease activity.^{6,7}

Effect of Administration Method on Adherence

Having to pierce the skin with a needle, either subcutaneously or into a muscle, clearly affects a patient's motivation and ability to maintain regular therapy. An estimated 50% of patients with MS discontinue therapy, many in the first year. Skin- and injection-related issues have been cited as key reasons for discontinuation, along with the perception that the drug is not working.⁸

Surveys of patients with MS indicate that sharper, thinner needles improve their perception of skin penetration and pain on injection relative to the thicker needles used in the earlier days of MS therapy.

Anxiety about the pain of injection therapy and “needle phobia” frequently prevent patients with MS from self-injecting their DMTs.⁹ These types of fears can be overcome with proper support. Mohr and colleagues tested the efficacy of a six-session, nurse-administered program to teach self-injection to 30 patients with MS who were unable to self-inject their medications due to anxiety or phobia. Patients were randomized to receive either the nurse-taught program or a telephone support service based on that offered by the manufacturer. Eight patients receiving individualized instruction were able to self-inject after the 6-week program, compared with just three in the standard instruction group. While this study was small, it suggests the potential value of this type of intervention to teach self-injection skills to injection-phobic and anxious patients.⁹

The introduction of thinner needles for MS injectable therapies has increased patient comfort and may potentially decrease injection-site reactions. The thinnest needles available with MS agents are currently either 29- or 30-gauge.¹⁰ Newer technology has allowed for the same rate of medication flow from a thinner needle by maintaining the same inner diameter even though the outer diameter is reduced.¹¹ This means that the same pressure is required to inject fluid once the skin has been penetrated. Improvements in technology have also increased the number of bevels, or angles, on the needle tips, allowing for easier penetration of the skin.¹² Surveys of patients with MS indicate that sharper, thinner needles improve their perception of skin penetration and pain on injection relative to the thicker needles used in the earlier days of MS therapy.^{11,13}

Skin Complications and Injection-site Reactions in MS

Injection-site reactions can occur from any injected drug; the risk of these reactions varies widely depending upon the type of drug, needles, and equipment used, and individual patient technique (**Table 2**).¹⁴

Table 2. Injection-site Reactions Associated with MS Therapies

Mild

- Erythema
- Induration
- Blister formation

Severe

- Granulomatous reactions
- Necrosis
- Ulcerations
- Lipoatrophy

Subcutaneous Injections

In the placebo-controlled trials of subcutaneous interferon beta-1b, injection-site reactions were reported in 78% of patients treated with the active drug.¹⁵ In the pivotal trials of subcutaneous interferon beta-1a, 83% of patients receiving the active drug reported

injection-site reactions.¹⁶ In the pivotal trials of GA, the most common injection-site related adverse events were redness (43% in the GA group versus 10% in the placebo group), pain (40% versus 20%), itching (27% versus 4%), and induration (26% versus 6%).¹⁷

Fortunately, the majority of skin reactions resulting from injected MS therapies are mild, consisting primarily of erythematous site responses.¹⁸ In some cases, however, patients may develop erythematous plaques, ulcers, or granulomatous reactions.^{19,20}

Severe skin reactions to subcutaneous injection of MS DMTs occur relatively rarely.²¹ Why severe reactions occur in some patients is not fully understood; contributing factors are thought to include poor injection technique, inadequate skin cleansing, using the incorrect needle length, failure to properly rotate injection sites, and sun exposure.²² Some data suggest that, for unknown reasons, women have a significantly higher risk of severe injection-site reactions than men.^{22,23}

Severe skin reactions to subcutaneous injection of MS DMTs occur relatively rarely.

Severe injection-site reactions associated with MS include lipoatrophy and necrosis, both of which can occur with any of the injected therapies for MS. Lipoatrophy is defined as the loss of subcutaneous fat that occurs in previously inflamed subcutaneous tissue. Lipoatrophy appears clinically as a depression of the skin, and can be either localized or generalized. Localized lipoatrophy has been reported in approximately 2% of patients taking GA in clinical trials. While lipoatrophy tends to be associated more with GA than with interferons, this reaction can occur with any injectable MS drug and has been associated with other types of injected therapies (**Table 3**).²⁴

Table 3. Injectable Medications Associated with Lipoatrophy

- Corticosteroids
- Insulin
- Human growth hormone
- Antihistamines
- Morphine/meperidine
- Vitamin K

Psoriasis, both new cases and exacerbation of existing cases, has been reported among users of interferon agents.^{25,26}

Injection-site necrosis (ISN) has been reported in 4% of patients taking subcutaneous interferon beta-1b.^{15,16} Necrosis may occur at a single or multiple injection sites. Lesions are typically 3 centimeters or less in diameter, but larger areas have been reported. Necrosis usually affects only the subcutaneous fat, but there are reports of necrosis extending to and including the fascia overlying muscle.¹⁵ In some lesions where biopsy results are available, vasculitis has been reported.¹⁵

The treatment of necrotic lesions may involve debridement and, in severe cases, skin grafting. Any infection must be carefully treated. After healing, these areas of skin often contain scar tissue, which may necessitate the discontinuation of the subcutaneous therapy, especially if multiple areas of skin are involved. For patients who are able to continue therapy after injection-site necrosis has occurred, the medication should not be administered into the affected area until it is fully healed.²⁷

Intramuscular Injection

Intramuscular interferon injections tend to be associated with a different set of skin issues but are not free of complications, despite that prevailing impression. Muscle pain is one of the most frequently reported reactions to this type of injection.²⁸ Some patients find these injections more painful and more difficult to administer than subcutaneous injections. In patients with lean body mass, a 1-inch needle length may be

better tolerated than the standard 1.25- or 1.5-inch needles.¹⁸

Teaching Injection Techniques to New Patients with MS

For the person newly diagnosed with MS, getting over the fear of injection or “needle phobia” is often a challenge.²⁸ With the potential introduction of oral therapies, some patients may be particularly reluctant to even entertain the idea of an injected therapy for MS. Yet studies in clinically isolated syndrome (CIS) emphasize the benefits of starting a patient on therapy as early as possible after the appearance of a clinical episode or MRI changes suggestive of MS.^{6,7} In patients with CIS or newly diagnosed MS, therapies with proven efficacy and established long-term safety may remain the best options to get these people started on therapy quickly.

Newly diagnosed patients can be, in effect, “blank slates” for education about injection therapies. It is essential to start these patients with a positive and hopeful approach, encouraging them to feel in control of their disease and its management. Many excellent resources are available for teaching new patients proper injection techniques, including expert nursing support and training from the manufacturers of DMTs.

It is important for the MS nurse to allocate sufficient time for each patient’s first exposure to an injected therapy. It’s unrealistic to assume that patients are going to assimilate all of the necessary information in just one visit. Trying to rush through the procedure and overload patients with too much information at once is likely to backfire in the long run. It’s also a good idea to suggest that patients have a family member or friend accompany them on the visit to take notes and provide support. The nurse doing the training should set the pace and try to make this anxiety-producing experience as pleasant and upbeat as possible.

Keeping the skin healthy, for as long as possible, is a goal that should begin with the first injection. Teach-

ing correct techniques for self-injection (or injection by a caregiver) is an important part of this goal. While specific approaches vary with the medication, needle size, and applicator used, some general rules can be applied to help minimize pain or discomfort upon injection and prevent potential skin reactions. These strategies are outlined in **Table 4**.

Table 4. Teaching Patients Strategies for Successful Injections

Planning

- Adopt a consistent routine
- Allow medications to reach room temperature
- Keep all items in a clean, portable case
 - Topical anesthetics
 - Alcohol wipes
 - Syringes
 - Sharps container
- Consider using a site map/logbook to record site rotation

Site Preparation

- Rotate sites
- Consult map/logbook to select site
- Warm site via shower or compress
- Wash hands with warm soapy water, dry with paper towels
- Apply alcohol for 2 minutes and allow skin to air dry

Correct Injection Technique

- Inject at 90° angle (or according to manufacturer’s directions)
- Use dry needle—do not discharge any medication onto needle before injection

Post-injection Tips

- Apply cold pack to site postinjection
- Use lidocaine/prilocaine cream or lidoderm patch for pain

Source: Carol Saunders, RN

Patients should be instructed to use a puncture-resistant container for disposal of needles and syringes, and about the safe disposal of full needle containers. In addition, patients should be taught to properly dispose of syringes and should be cautioned against reuse of these items. In many areas, used needles in a sealed, puncture-proof container can be disposed of with the regular trash. Patients should be encouraged to contact their municipalities for local regulations.

Follow-up and Monitoring of Skin Reactions in MS

The key to keeping adverse skin reactions from becoming serious is monitoring injection sites and catching potential problems early. This is not always a straightforward proposition. Patients tend to have different perspectives about what skin signs might warrant medical attention. Some patients may have the impression that the presence of any small red spot or bruise means they cannot inject in that area again. On the other hand, other people may wait until a skin problem has become advanced or infected before seeking treatment. Many people with MS are motivated to try their best to administer their medication correctly and feel that they have somehow failed if they experience an adverse reaction. These patients feel they must be “brave soldiers” and will tolerate a painful or worsening condition rather than report it to a health care professional.

This scenario underscores the importance of setting appropriate expectations for patients early in the course of treatment. Patients must understand that an occasional red spot or bruise is likely to occur with any injected drug and does not necessarily constitute an area of significant damage. On the other hand, if an area of the skin is excoriated, exuding, or scabbed, this site should be examined right away by a medical professional familiar with injection-site reactions (**Table 5**). Most MS nurses will agree that erring on the side of caution is best—better to examine a healthy injection site and rule out any problems than to ignore one that could be cause for concern.

During each patient’s regular follow-up visits, the nurse should ask the patient to point out the two most recent injection sites. This not only provides information about the patient’s skin condition, but may reveal information about adherence and how effectively he or she is rotating injection sites. If the patient can’t remember the most recent sites, this may help the nurse initiate a discussion about how regularly the medication is being administered.

Table 5. Injection-site Problems: When is Professional Follow-up Warranted?

Difficulty with injections

- Fear of needle or self-injecting
- Unfamiliarity with new drug or device
- Uncertainty about dose/frequency of injections
- Problems/questions concerning site rotation

Skin reactions

- Warm to the touch
- Pain that does not abate in 24 hours
- Scabbed or bleeding
- Pus or discharge
- Hard lump that resists needle insertion

Managing Skin Issues over the Long Term

Patients who use DMTs over a period of many years may develop skin problems characteristic of long-term injected medications. Skin may become toughened or numb at frequently used sites. Patients with a low body mass index may experience a loss of subcutaneous tissue in which to inject. Finally, while use of thinner needles may help to reduce pain among patients with lesser amounts of skin damage, it may actually be more difficult to penetrate toughened skin with these thin-gauge needles.

When to Refer Patients to a Specialist

Most adverse reactions involving the skin can be managed in the MS office or clinic. Care of patients with severe skin reactions depends upon the type of damage, but may involve debridement, excision, or treatment with intravenous antibiotics. Patients may need to be referred to a dermatologist, a wound clinic, or a plastic surgery service depending upon the type of injury.

It has been noted that dermatologists who do not have experience in treating MS may tell patients to discontinue their medication in order to stop the skin reactions. The dermatologist’s perspective is different from that of MS care specialists. The MS nurse should

be aware of this potential dilemma and be prepared to advocate to keep patients with MS on therapies that can effectively suppress the disease.

Use of Autoinjectors and Other Technologies

Love them or hate them, autoinjectors and other injection aids are part of MS therapy and continue to evolve as newer, digital technologies are incorporated into these devices.

Unless forthcoming and alternative disease-modifying approaches can be established as safe, efficacious, and superior to existing therapies, injectable medications will continue to be a mainstay of treatment in MS for some time to come.

Like any medical device, the autoinjector needs to be used correctly to be of benefit to patients. One mistake that is commonly made with these devices is that patients exert too much force into the skin when activating the autoinjector. This has the tendency to constrict the skin at the location where the medication is being injected, which could potentially produce an increase in skin reactions.²⁹

Another important tip for correct use of an autoinjector is to calibrate the needle depth according to the distribution of subcutaneous fat in the individual and at the particular injection site.³⁰

Not all patients who self-inject medications will embrace autoinjector technology. This appears to be a very individual decision. Some patients prefer the ease of use and the ability to inject without having to see a needle; others prefer the control and slower pace afforded by injecting the drug manually.

More sophisticated electronic devices for administering injections are now approved in other countries such as Canada, and are currently under consideration for Food and Drug Administration approval

in the United States.³¹ Advantages of these devices include their portability and ease of use (medications are added by inserting a cartridge). While the devices being tested vary in their capabilities, some of these “smart” devices sense moisture and heat levels in the skin to help determine whether a site is appropriate for injection. Electronic devices may also be used to keep track of when and how often injections are administered, although some MS nurses argue that this feature should be used primarily as an aid to the patient rather than by the nurse to monitor adherence.

Conclusion

Unless forthcoming and alternative disease-modifying approaches can be established as safe, efficacious, and superior to existing therapies, injectable medications will continue to be a mainstay of treatment in MS for some time to come. In order to maximize patient adherence, safety, and comfort with injectable therapies, MS nurses need to 1) provide expert training on drug preparation and injection technique; 2) schedule follow-up visits to review technique and examine injection sites; and 3) encourage patients to report any potential adverse reactions so they can be managed early and thoroughly.

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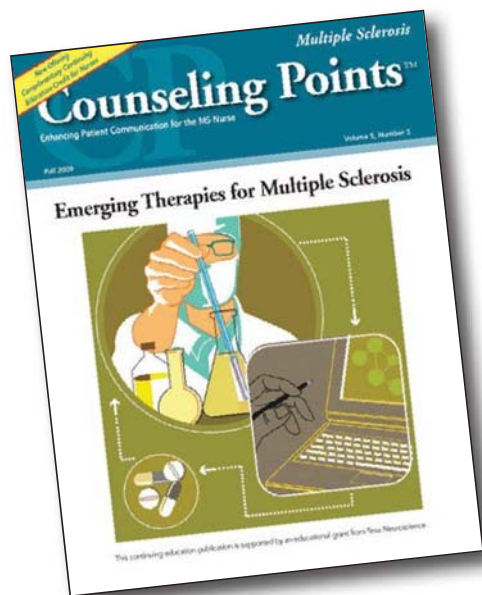
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- Counseling Patients on Long-term Disease-modifying Therapy
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Counseling Points™

Injection-site and Skin-reaction Management

- Despite the anticipation for oral therapies for multiple sclerosis (MS), injectable therapies are not likely to become obsolete, based on their long-term safety and efficacy record.
- Skin reactions and injection-site complications are some of the primary detractors to injectable therapies. In addition, the need to pierce the skin, either subcutaneously or into a muscle, adversely affects patients' motivation for beginning and maintaining regular therapy.
- The majority of injection-site reactions associated with MS subcutaneous injectable therapies are mild and include erythema, induration, and blister formation. Muscle pain is the most common injection-related problem with intramuscular injections.
- Potentially severe injection-site reactions include granulomatous reactions, necrosis, ulcerations, psoriasis, and lipoatrophy.
- The MS nurse needs to allocate sufficient time to teach patients self-injection techniques. Do not assume that patients will be able to assimilate the information in one session.
- Strategies for preventing injection-site reactions and discomfort include diligent rotation of injection sites, using proper injection technique (either with an autoinjector or via manual injection), and using a dry needle.
- The key to keeping adverse skin reactions from becoming serious is monitoring injection sites and catching potential problems early. This calls for instructing patients about potential skin changes and setting expectations early in the course of treatment.
- During a patient's regular follow-up visit, ask the patient to point out the two most recent injection sites. This provides information about the patient's skin condition and may also reveal information about adherence to therapy.
- Patients who use disease-modifying therapies over a period of many years may develop problems such as toughened skin or numbness.
- Most adverse skin reactions can be managed in the MS office/clinic or a wound clinic, and may involve debridement, excision, or treatment with intravenous antibiotics. Dermatologists who do not have experience in treating MS may tell patients to discontinue their medication in order to stop the skin reactions.
- Not all patients embrace autoinjector technology. Some patients prefer its ease of use and the ability to inject without having to see a needle, while others prefer the control and slower pace afforded by injecting the drug manually. Autoinjectors continue to evolve as newer, digital technologies are incorporated into these devices.
- To maximize patient adherence, safety, and comfort, MS nurses should provide expert training on injection technique, schedule follow-up visits to examine injection sites and observe technique, and encourage patients to report any potential adverse reactions early.

In The Literature



Breastfeeding May Help Reduce Postpartum MS Relapse

The exact reasons why pregnancy hormones impact multiple sclerosis (MS) relapse rates remain a mystery, and new studies are now looking at breastfeeding to see whether these hormones may play a role. Finnish researchers recently examined whether breastfeeding by patients with MS had an effect on postpartum relapse frequency.

The study enrolled 61 patients with MS who became pregnant between the years 2003 through 2005 (mean age 30.5 years; mean disease duration 5.7 years; mean total number of relapses before pregnancy 4.1). The women were followed from early pregnancy until 6 months postpartum, with information collected about MS relapses, disease-modifying therapy (DMT) use, and breastfeeding history.



The investigators found that women whose MS was stable prior to their pregnancy were more likely to breast-feed their infants, while logically those with active disease prepregnancy chose not to breast-feed in order to resume treatment with a DMT. As expected, average relapse rates dropped during the pregnancies and increased during the first 3 months postpartum.

In this study, mothers who breastfed more than 2 months had lower postpartum relapse rates.

While these results generally support the encouragement of breastfeeding for mothers with MS, "we should not forget those mothers who have high pre-pregnancy disease activity and are possibly in need of postpartum medication," the authors conclude.

Airas L, Jalkanen A, Alanen A, et al. Breast-feeding, postpartum and prepregnancy disease activity in multiple sclerosis. *Neurology*. 2010;75:474-476.

Treatment Regimen for PML May Offer Hope for Survival of the Serious Natalizumab Complication

Early detection and treatment of progressive multifocal leukoencephalopathy (PML) associated with the MS drug natalizumab may allow for successful treatment of the condition. This finding is in contrast to the prevailing belief that PML is nearly always fatal. "Natalizumab-associated PML can be well managed in some cases," reported German researchers in an article published in an online version of the *Archives of Neurology*.

The investigators treated a 41-year-old woman with relapsing-remitting MS who developed PML after 29 natalizumab infusions. The patient immediately underwent plasma exchange, with 5 courses used to accelerate removal of natalizumab. The patient also received 60 mg/day of the antidepressant mirtazapine and a loading dose (250 mg) of the antimalarial mefloquine for 3 days, followed by weekly administration of that drug. Because of cognitive decline and somnolence occurring a week into the plasma exchange process, methylprednisolone was given for 5 days and cerebral edema was treated with mannitol for 4 days.

The patient rapidly improved during her stay in the intensive care unit. Three months after the start of treatment, JC virus was undetectable in her cerebrospinal fluid, plasma, and urine. At that time, the mefloquine and mirtazapine were discontinued and the patient started receiving immunomodulatory therapy with glatiramer acetate. Her Expanded Disability Status Scale score remained stable at 3.5 before and after the PML episode.

Novel aspects of this treatment regimen included use of antidepressant and antimalarial agents, according to the authors. The investigators acknowledge that additional study is needed and emphasize the importance of monitoring for new cases of PML as well as adhering closely to the TOUCH program for natalizumab use.

Schroder A, Lee D, Hellwig K, et al. Successful management of natalizumab-associated progressive multifocal leukoencephalopathy and immune reconstitution syndrome in a patient with multiple sclerosis. *Arch Neurol*. Published online July 12, 2010.

Health Insurance Plan Launched to Bypass "Pre-existing Condition" Glitch

One of the great injustices of MS has been the inability of people with this disease to obtain health insurance because of "pre-existing condition" clauses. In July 2010 the Department of Health and Human Services (HHS) launched its program



to provide health insurance for people unable to obtain coverage due to pre-existing conditions. The Pre-existing Condition Insurance Plan will immediately make coverage available to as many as 350,000 individuals, as a way to bridge the time lag until the Affordable Care Act (ACA) goes into effect in 2014. Congress has allocated \$5 billion to the program through 2013.

To be eligible for a Pre-existing Condition Insurance policy, a person must be a US citizen or a legal resident, must have been denied coverage by a private insurance company due to a pre-existing condition, and must have been uninsured for at least 6 months.

HHS will be operating the program in 21 states, while 29 states (plus the District of Columbia) will operate their own plans. Cost of the policies and specific benefits will vary by state, but premiums are expected to range between \$140 and \$900 per month. Eligibility for the plan is not based on income, but younger patients (under age 65) can expect to pay less for the policies.

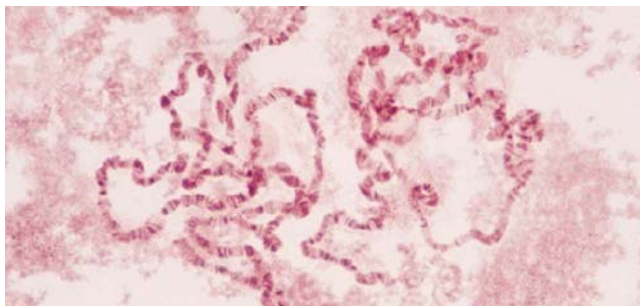
To learn about particular state requirements and application information, patients can go to www.healthcare.gov and select the Pre-existing Condition Insurance Plan link.

US Department of Health & Human Services. New pre-existing condition insurance plan (PCIP). Available at www.healthcare.gov/law/provisions/preexisting/index.html.

Genetic Phenotyping Predicts Which Patients Will Develop More Severe MS

One of the "holy grails" of MS research has been the quest to predict how severe patients' disease will be and how they might respond to different treatments. An answer to this mystery may lie in genotyping and genetic studies, including a recent study by researchers from Dublin, Ireland.

Investigators from St. Vincent's University Hospital studied a gene called oligoadenylate synthetase 1 (OAS1), looking at MS frequency and severity among people with two different variants of the gene, labeled AA and GG. People with the GG genotype were found to have lower rates of MS overall and, among those who did develop MS, fewer relapses and lower disease activity during beta interferon therapy. In contrast, the AA genetic variant was associated with higher MS rates and more severe disease. Among people with highly active disease despite ongoing interferon therapy, all had the AA genotype and none had GG.



Lead author Margaret O'Brien, MD, PhD, notes that MS etiology has long been thought to combine a genetic predisposition and an unknown viral trigger. Genetic susceptibility such as the one described here may heighten response to the virus by triggering an excessive and prolonged inflammatory response, she speculates. Although practical use of this type of genotyping is still in the future, the research may eventually be useful in determining which patients are the best candidates for interferon therapies, since approximately 30% of MS patients do not respond to the drug.

O'Brien M, Lonergan L, Costelloe L, et al. OAS1: a multiple sclerosis susceptibility gene that influences disease severity. *Neurology*. 2010;75:411-418.

Counseling Points™

Injection-site and Skin-reaction Management

Continuing Education Posttest

To receive contact hours, please read the program in its entirety, answer the following posttest questions, and complete the program evaluation. A certificate will be awarded for a score of 80% (8 correct) or better. A certificate will be mailed within 4 to 6 weeks. There is no charge for the CNE credit.

By Mail: Delaware Media Group, 66 S. Maple Ave., Ridgewood, NJ 07450

By Fax: (201) 612-8282

Via the Web: Applicants can access this program at the International Organization of MS Nurses website, www.IOMSN.org. Click on Counseling Points and follow the instructions to complete the online posttest and application forms.

PLEASE SELECT THE BEST ANSWER

- 1. Which of the following is most commonly reported among adverse reactions to current disease-modifying therapies used for multiple sclerosis (MS)?**
 - A. Headache
 - B. Muscle pain
 - C. Flu-like symptoms
 - D. Skin and injection-site reactions
- 2. Current administration methods are NOT a deterrent for newly diagnosed patients in starting disease-modifying therapy.**
 - A. True
 - B. False
- 3. Patients who are needle-phobic can be helped by:**
 - A. using the medication less often
 - B. delaying therapy until oral agents are available
 - C. attending nurse-administered training programs
 - D. taking antidepressant medications
- 4. The thinnest needle provided with MS injectable therapies is currently:**
 - A. 25 gauge
 - B. 27 gauge
 - C. 30 gauge
 - D. 33 gauge
- 5. Which of the following conditions is NOT associated with an increased risk of injection-site reactions in MS?**
 - A. Poor injection technique
 - B. Excessive rotating of injection sites
 - C. Inadequate skin cleansing
 - D. Using too short a needle
- 6. Severe skin reactions associated with MS injectable therapies include all of the following EXCEPT:**
 - A. urticaria
 - B. lipoatrophy
 - C. necrosis
 - D. psoriasis
- 7. Risk of lipoatrophy can occur among patients receiving regular glatiramer acetate injections but not with other types of injected drugs.**
 - A. True
 - B. False
- 8. Recommended methods for preventing discomfort during subcutaneous injection of MS disease-modifying therapies include all BUT:**
 - A. select injection sites where there is numbness
 - B. warm the injection site prior to administration
 - C. apply a topical anesthetic such as a lidocaine product
 - D. apply ice to the area post-injection
- 9. Patients with MS should always alert a health care professional in the event of which of the following skin reactions?**
 - A. Skin that is warmer than the surrounding area
 - B. Pain at a site that does not abate within 24 hours
 - C. A scab or discharge at the injection site
 - D. All of the above
- 10. Which of the following is an INCORRECT practice associated with the use of autoinjectors in the administration of MS medications?**
 - A. Exerting too mild a force against the skin during injection
 - B. Failure to calibrate correct needle depth
 - C. Sticking with manual injection rather than trying an autoinjector
 - D. All of the above

Counseling Points™: Program Evaluation Form

Injection-site and Skin-reaction Management

Using the scale provided, Strongly Agree = 5 and Strongly Disagree = 1, please complete the program evaluation so that we may continue to provide you with high quality educational programming. Please fax this form to **(201)612-8282**.

5 = Strongly Agree 4 = Agree 3 = Neutral 2 = Disagree 1 = Strongly Disagree

At the end of this program, I was able to: *(Please circle the appropriate number on the scale.)*

1. Identify issues that may prevent or deter patients from correctly self-injecting multiple sclerosis (MS) medications 5 4 3 2 1
2. Recognize the most frequently encountered mild and serious injection-site reactions associated with MS disease-modifying therapies (DMTs)..... 5 4 3 2 1
3. Explain appropriate injection technique for subcutaneous MS medications and provide tips for preventing minor discomfort and injection-site reactions..... 5 4 3 2 1
4. Review treatment, follow-up, and referral guidelines for injection-site reactions requiring medical treatment 5 4 3 2 1

To what extent was the content:

5. Well-organized and clearly presented 5 4 3 2 1
6. Current and relevant to your area of professional interest 5 4 3 2 1
7. Free of commercial bias..... 5 4 3 2 1
8. Clear in providing disclosure information 5 4 3 2 1

General Comments

9. As a result of this continuing education activity (check only one):

- I will modify my practice. (If you checked this box, how do you plan to modify your practice?) _____
- I will wait for more information before modifying my practice.
- The program reinforces my current practice.

Suggestions for future topics/additional comments: _____

Follow-up

As part of our continuous quality-improvement effort, we conduct postactivity follow-up surveys to assess the impact of our educational interventions on professional practice. Please check one:

- Yes, I would be interested in participating in a follow-up survey.
- No, I would not be interested in participating in a follow-up survey.

There is no fee for this educational activity.

Posttest Answer Key	1	2	3	4	5	6	7	8	9	10

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