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# Counseling Points™

Enhancing Patient Communication for the MS Nurse

## The Role of the MS Nurse in Relapse Assessment and Management

**Series Editor**

Amy Perrin Ross, APN, MSN, CNRN, MSCN

**Faculty Advisor**

Colleen Harris, MN, NP, MSCN

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## FACULTY:

### Series Editor

**Amy Perrin Ross, APN, MSN, CNRN, MSCN**  
Neuroscience Program Coordinator  
Loyola University Medical Center  
Maywood, IL

### Faculty Advisor

**Colleen Harris, MN, NP, MSCN**  
Nurse Practitioner/Manager  
University of Calgary MS Clinic  
Calgary, AB CANADA

### Faculty Disclosure Statements

Amy Perrin Ross has received honoraria for participating on the Speakers' Bureaus for Acorda, Bayer HealthCare, Inc., Biogen Idec, EMD Serono, Genzyme, Mallinckrodt, Novartis, Pfizer, and Teva Pharmaceuticals, and as a consultant for Acorda, Bayer HealthCare, Inc., EMD Serono, Genzyme, Mallinckrodt, Novartis, and Teva Pharmaceuticals.

Colleen Harris has received honoraria as a consultant for Biogen Idec, EMD Serono, Genzyme, Novartis, and Teva Pharmaceuticals.

### Planners and Managers

The following planners and managers have declared no relevant financial relationships: Joseph J. D'Onofrio, Frank Marino, Katherine Wandersee.

## PUBLISHING INFORMATION:

### Publishers

Joseph J. D'Onofrio  
Frank M. Marino  
Delaware Media Group  
66 South Maple Avenue  
Ridgewood, NJ 07450  
Tel: 201-612-7676  
Fax: 201-612-8282  
Websites: [www.delmedgroup.com](http://www.delmedgroup.com)  
[www.counselingpoints.com](http://www.counselingpoints.com)

### Medical Writer

Katherine Wandersee

### Art Director

James Ticchio

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# Counseling Points™

## The Role of the MS Nurse in Relapse Assessment and Management

### Continuing Education Information

#### Target Audience

This educational activity is designed to meet the needs of nurses who treat or who have an interest in patients with multiple sclerosis (MS).

#### Purpose

To provide nurses with information and practice advice related to detecting and managing acute relapses of multiple sclerosis (MS).

#### Learning Objectives

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

- Identify criteria for assessment of an MS relapse
- Discuss current recommendations for treatment of acute relapse in MS
- Describe the impact of disease modifying therapies on MS relapses and disease progression

#### Continuing Education Credit

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# welcome

Dear Colleague,

As we move forward in the current era of managing multiple sclerosis (MS), our response to patients with acute relapses takes on a new significance. Our consideration is not only, “Is this a relapse, and how do we manage it?” but also, “What does this relapse mean in terms of disease management? How can we try to prevent these relapses from occurring?”

MS is a condition that requires a multidisciplinary effort. MS nurses often have a high degree of decision-making in the management of relapses, including educating patients about the signs of a relapse, evaluating possible relapses either via phone or in the clinic, and deciding how to proceed with treatment. These decisions require clinical judgment—not all MS relapses present as textbook cases. By knowing the right questions to ask and what elements might raise suspicion, the MS nurse can better determine whether the patient should be seen immediately, should be evaluated for a possible infection, or could potentially wait a day or two to see if the signs and symptoms abate.

Part of our decision-making also relates to ruling out serious complications, such as progressive multifocal leukoencephalopathy (PML). In its early stages, PML symptoms can mimic those of a relapse. For this issue of *MS Counseling Points*, we worked with Colleen Harris, an authority on this topic, to examine a full range of decision points and clinical considerations for MS nurses in the management of acute MS relapses.



Amy Perrin Ross, APN, MSN, CNRN, MSCN (series editor)  
Neuroscience Program Coordinator  
Loyola University Medical Center  
Maywood, IL

# The Role of the MS Nurse in Relapse Assessment and Management

Ideally, our patients with multiple sclerosis (MS) would experience few or no acute relapses, especially while they are being managed on a disease-modifying therapy (DMT). Although newer therapies and better treatment approaches are helping to minimize the occurrence of relapses, we know that these events cannot be avoided completely. Nurses who care for patients with MS need to be aware of the signs of a relapse, how to distinguish a true relapse from a pseudo-relapse, and strategies for acute management, rehabilitation, and prevention.

## What is an MS Relapse?

A relapse of MS represents an episode of new disease activity, with active inflammation and/or demyelination. Relapses may also be called exacerbations, flares, or acute episodes of MS.<sup>1</sup> Among patients with relapsing-remitting MS (RRMS), the disease usually enters quiet periods of remission in which symptoms remain relatively stable without showing obvious worsening or progression. When a true relapse occurs, new or worsening symptoms usually appear. The definition of a relapse or exacerbation of MS is shown in **Table 1**.<sup>2</sup>

## What is happening neurologically during an MS relapse?

Relapses are the outward manifestations of a spike in inflammatory activity. Relapses may represent a new breach in the blood-brain barrier which allows immune cell migration into the central nervous system (CNS), including cells that target myelin and oligodendrocytes such as CD4<sup>+</sup> and CD8<sup>+</sup> T cells, B cells, and macrophages.<sup>3,4</sup> On

MRI, relapses are characterized by the presence of new gadolinium-enhancing white matter lesions. MS relapses are usually followed by some degree of remission, although many patients do not fully recover to baseline status.<sup>3,5</sup>

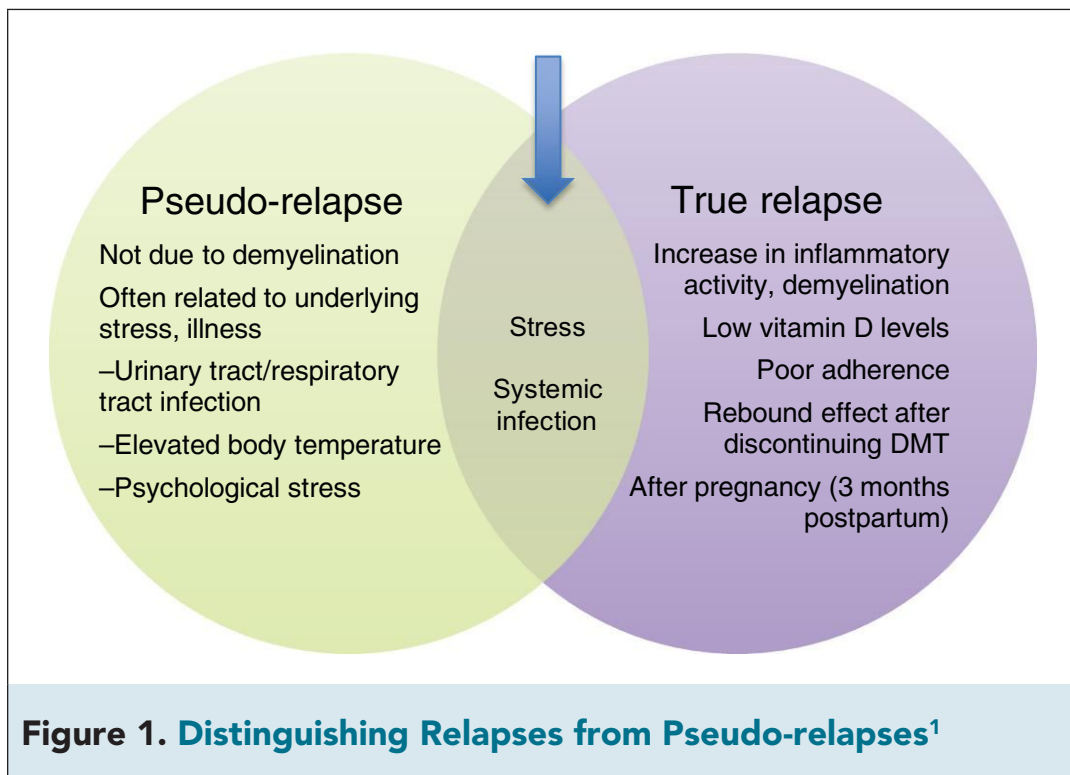
## Identifying MS Relapses

A key aspect of evaluating the clinical presentation of relapse in patients with MS is in distinguishing a true relapse episode from a pseudo-relapse.<sup>1</sup> While this may seem easy on paper, in clinical practice there may be fine line between these concepts, and even overlap of pseudo-relapse features with true relapse. For example, a patient may have a classic sign of pseudo-relapse such as a urinary tract infection (UTI), but this may be superimposed on a true relapse.<sup>6</sup> Some signs and symptoms fall into a gray area, in the sense that they could occur in the presence of either a true relapses or a pseudo-relapse. The Venn diagram in **Figure 1** depicts characteristics of relapse, pseudo-relapse, and the potential for overlap.<sup>1</sup>

**Table 1. Definition of MS Relapse<sup>2</sup>**

Acute or subacute episodes of new or increasing neurologic dysfunction, followed by full or partial recovery (in the absence of fever or infection)

- New symptoms of neurological dysfunction, or
- Worsening of existing symptoms that have been stable for past last 30 days
- Acute or subacute onset
- Lasting more than 24 hours
- Not attributable to another cause such as infection (not a pseudo-relapse)



- Have you recently had a viral infection? Do you have any bladder symptoms such as pain or frequency with urination?
- Do you have any areas of skin breakdown? Is there evidence of cellulitis (areas of redness, swelling, warmth on skin)? Do you have signs of a dental abscess or infection?

To assist nurses and other clinicians in

### Nursing evaluation to detect relapse: how to ask the right questions

Whether the patient is interviewed over the phone or is seen in an office or clinic setting, the questions the nurse asks are keys to identifying what is happening and determining the next steps. The line of questioning should seek to determine whether the disease activity and symptoms that the patient is experiencing differs from his or her usual or baseline functioning. If so, we also want to know how long these signs have persisted. Questions to ask the patient may include:<sup>7</sup>

- What is going on? What new signs/symptoms are you experiencing?
- How long ago did these changes start?
- Prior to these changes, how were you feeling?
- How are these symptoms or changes affecting your lifestyle? Do they impact your ability to work, take care of children, sleep, or other activities?

the process of evaluating a patient for presence of relapse, Perrin-Ross and colleagues developed an assessment tool, the Assessing Relapse in Multiple Sclerosis (ARMS) questionnaire (**Figure 2**).<sup>7</sup> In this two-part questionnaire, the first 7 questions evaluate the patient’s symptoms and how they affect the patient’s current functioning. In the second part, questions are designed to assess the patient’s response 3 to 6 weeks after they have received treatment for the relapse.<sup>7</sup> A pilot study evaluating use of the ARMS questionnaire in 103 patients with MS found that more than half (58%) reported their symptoms as having a significant effect on activities of daily living. Most patients (67%) reported that their symptoms began  $\geq 8$  days prior to completing the ARMS. The mean time since last relapse in this study was 13.4 months.<sup>8</sup>

### Working With the Patient to Detect and Evaluate Relapse

Educating patients to be aware of the possible onset of a relapse is part of early identification and



## MS Relapse Evaluation—New Relapse

Patient's age in years: \_\_\_\_\_

Patient's sex (circle one):                      **Male**                      **Female**

1) What are the **new or worsening** symptoms that you are currently experiencing? (*Check all that apply*)

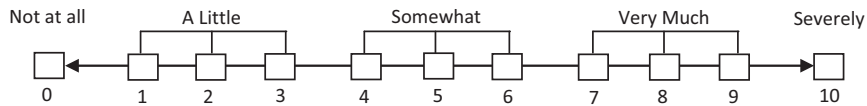
- |   |   |   |
|---|---|---|
| <input type="checkbox"/> Vision changes     | <input type="checkbox"/> Speech changes                           | <input type="checkbox"/> Dizziness/poor balance |
| <input type="checkbox"/> Chewing/swallowing | <input type="checkbox"/> Numbness/tingling                        | <input type="checkbox"/> Pain, burning, itching |
| <input type="checkbox"/> Hand/arm weakness* | <input type="checkbox"/> Leg/foot weakness*                       | <input type="checkbox"/> Bladder problems       |
| <input type="checkbox"/> Bowel problems     | <input type="checkbox"/> Sexual problems                          | <input type="checkbox"/> Memory problems        |
| <input type="checkbox"/> Fatigue            | <input type="checkbox"/> Muscle tightness or stiffness            | <input type="checkbox"/> Thinking problems      |
| <input type="checkbox"/> Difficulty walking | <input type="checkbox"/> Coordination (tripping, dropping things) |   |
| <input type="checkbox"/> Other: _____       |   |   |

\*Indicate left, right, or bilateral

2) When did these symptoms begin? (*Check one*)

- Within the last 3 days       4 -7 days ago       8 -15 days ago       16+ days ago

3) How much have these symptoms affected your daily activities or overall function? (*Mark one*)

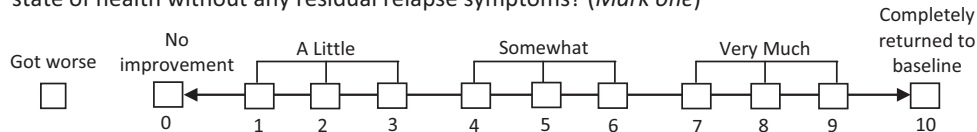


4) How many days/months ago was your last relapse (attack, exacerbation) prior to this current episode?  
\_\_\_\_\_

5) What treatment did you receive for your last relapse (attack, exacerbation)? (*Check all that apply*)

- |   |  |   |
|---|--|---|
| <input type="checkbox"/> IV steroid infusion                            | <input type="checkbox"/> Oral steroid tablets (only) | <input type="checkbox"/> Oral steroid tablets (after IV steroids)       |
| <input type="checkbox"/> Acthar/ACTH injections                         | <input type="checkbox"/> Plasma exchange             | <input type="checkbox"/> No treatment ( <i>skip questions 6 and 7</i> ) |
| <input type="checkbox"/> Not sure <input type="checkbox"/> Other: _____ |  |   |

6) After treatment for your last relapse (attack, exacerbation), how much did you return to your baseline state of health without any residual relapse symptoms? (*Mark one*)



7) Have you had any side effects from treatments for previous MS relapses (attacks, exacerbations)? (*Check all that apply*)

- |  |   |   |
|--|---|---|
| <input type="checkbox"/> Mood changes/depression/anxiety | <input type="checkbox"/> Weight gain              | <input type="checkbox"/> Nausea and/or vomiting       |
| <input type="checkbox"/> Sleep disturbance               | <input type="checkbox"/> Increased blood pressure | <input type="checkbox"/> Low blood pressure           |
| <input type="checkbox"/> Stomach upset or heartburn      | <input type="checkbox"/> Headache                 | <input type="checkbox"/> Faintness (light headedness) |
| <input type="checkbox"/> High blood sugar                | <input type="checkbox"/> Increased fatigue        | <input type="checkbox"/> Dizziness                    |
| <input type="checkbox"/> Increased appetite              | <input type="checkbox"/> Fever                    | <input type="checkbox"/> Muscle cramps                |
| <input type="checkbox"/> Chills                          | <input type="checkbox"/> Infection                | <input type="checkbox"/> Other: _____                 |

***If you have any questions, please ask your MS Nurse***

For office use only

Date: \_\_\_\_\_

Patient initials: \_\_\_\_\_

Type of MS (circle one): RRMS    PPMS                      SPMS

Type of visit (circle one):                      Phone                      Office

Questionnaire completed by (circle one):                      Patient                      Office Staff

***Site Identifier***

**Figure 2. Assessing Relapse in Multiple Sclerosis (ARMS) Questionnaire<sup>8</sup>**

the determination of where and how the relapse should be treated. “Experienced” patients who have had MS for many years may be better able to detect early signs and changes and to distinguish between common pseudo-relapse triggers such as a UTI and a true relapse that causes new symptoms and impacts functioning. In the self-assessment process, patients should be taught to recognize new or worsening symptoms; do a self-screen for symptoms suggesting infections in the oral cavity, urinary tract, or skin; monitor core body temperature; and recognize signs such as increased fatigue and cognitive changes.<sup>7</sup>

If it is not possible or practical for a patient to be seen immediately in the office or clinic to evaluate a suspected relapse, the nurse may need to perform the initial screening over the phone. It is important to listen for cues that suggest a significant change in functioning that has been present for more than 24 hours. How are the changes affecting the person? Is the person missing work? Unable to care for her children? Affecting gait or ability to walk? For example, the patient might say, “I was doing well last week but now all of a sudden my whole side is numb. I’m struggling to keep up with my work. This has been going on for the past 3 to 4 days.” This would be a cause for concern and would signal the need for immediate evaluation and likely treatment with high-dose corticosteroids. However, the patient might report, “The symptoms are annoying, but I’m doing okay.” Signs of a milder relapse should always be reported by the patient, but not every relapse requires a course of steroids.<sup>4</sup> It is important to document in the medical record that the relapse occurred, and to follow the patient closely to monitor recovery. Even if this event passes with minimal effect on the patient’s functioning, a subsequent relapse may be a sign that a change in therapy is needed.

## Role of Urinary Tract Infections in MS Relapses

One of the first steps in evaluating a patient with a possible relapse is to rule out the possibility of UTI. UTIs are common in patients with MS and are the biggest culprits for mimicking a true relapse. Recurrent UTIs are often due to urinary stasis or catheter use secondary to bladder dysfunction. In people with MS, bladder dysfunction may present as:<sup>9</sup>

- Detrusor hyperreflexia: inability to inhibit detrusor muscle contractions, resulting in voiding even when there is a low volume of urine in the bladder. Presenting as urinary frequency and urgency and incontinence, this condition occurs in about half to as many as 90% of patients with MS.
- Detrusor-sphincter dyssynergia: a common complication of detrusor hyperreflexia, this condition is failure of the urethral sphincter to relax on detrusor contraction. It results in high micturition pressures and symptoms of hesitancy, incomplete emptying, intermittent urine stream, and painful urination
- Detrusor areflexia: absence of contractures of the detrusor muscle, this dysfunction occurs in about 20% of patients with MS, often those with lesions on the sacral spinal cord. It presents as urgency, frequency and urinary retention.<sup>10</sup>

If untreated, a UTI may lead to systemic infection and sepsis. UTIs may increase existing MS symptoms and therefore mimic a relapse, but they also may trigger a true relapse.<sup>6</sup>

Determining the presence of UTI is also an important aspect of determining how a relapse should be treated. If an infection goes undiagnosed, placing the patient on a regimen of corticosteroids could mask the UTI, so a dipstick

urine sample is an important screening step. However, even if the dipstick result is normal, a urine sample should be sent for complete analysis based on clinical judgment because this method may miss a low-grade infection.<sup>10</sup> Antibiotic treatment should be either confirmed or modified on the basis of bacterial sensitivity when results are available. If the patient has signs of a UTI while having a clinical exacerbation of MS, antibiotic treatment should be started empirically without delaying therapies such as high-dose corticosteroids, if indicated.<sup>10</sup>

### Determining the Severity of a Relapse

Determining whether a relapse is mild, moderate, or severe may rest largely on clinical judgment. As shown in **Table 2**, a mild or low-level relapse has minimal effects on activities of daily living, likely affects only one functional system, and does not have motor or cerebellar features.<sup>11</sup> These events often resolve quickly with minimal functional deficits. Steroid treatment is usually not recommended for mild, sensory-only relapses.

In the case of a moderate or severe relapse, the patient may describe symptoms affecting multiple

functional systems and moderate to severe motor or cerebellar involvement (Table 2).<sup>11</sup> Dysphagia, or difficulty swallowing, is of concern since this could increase risk of aspiration.<sup>12</sup> Likewise, a patient who goes from being fully ambulatory to requiring a cane is having a significant relapse. Symptoms that worsen rapidly are also cause for concern. Disabling relapses should always be treated acutely, with high-dose corticosteroids (IV methylprednisolone or oral prednisone) as first-line treatment. Adrenocorticotropic hormone gel (ACTH; also called Acthar gel) is considered a second-line therapy for patients who cannot tolerate the adverse effects of corticosteroids or who have had an inadequate response to steroids in the past.<sup>13</sup>

Although hospitalization was at one time considered necessary for managing relapses, today many MS clinicians try to avoid hospitalization unless the residual disability is severe enough to require rehabilitation. Hospitalizations are costly and may not be fully covered on the patient's insurance plan. An analysis by O'Brien and colleagues shows how care of relapses based on severity affects treatment costs in MS (**Figure 3**).<sup>14</sup>

Another consideration is whether to treat with

**Table 2. Staging a Relapse of Multiple Sclerosis<sup>11</sup>**

Severity	Mild	Moderate	Severe
Relapse rate	1 in 2nd year of treatment	1 in 1st year of treatment	>1 in 1st year of treatment
Treatment	Steroids not required	Steroids required	Steroids/hospitalization required
Effect on activities of daily living (ADL)	Mild effect	Moderate effect	Severe effect
# Functional symptoms affected	1	>1	>1
Motor/cerebellar involvement	None	Moderate involvement	Severe involvement
Recovery	Prompt; no functional deficit	Incomplete at 3 months; some functional impairment	Incomplete at 6 months; functional impairment

Adapted from: Freedman MS, et al. Treatment optimization in MS: Canadian MS Working Group updated recommendations. *Can J Neurol Sci.* 2013;40(3):307-323.<sup>11</sup>



intravenous (IV) or oral corticosteroids. Although IV methylprednisolone may seem to deliver a more potent anti-inflammatory effect, studies have shown that a course of IV steroids is not significantly more effective than a course of high-dose oral steroids. A multicenter study published in 2015 showed similar 28-day improvements (**Table 3**).<sup>15</sup>

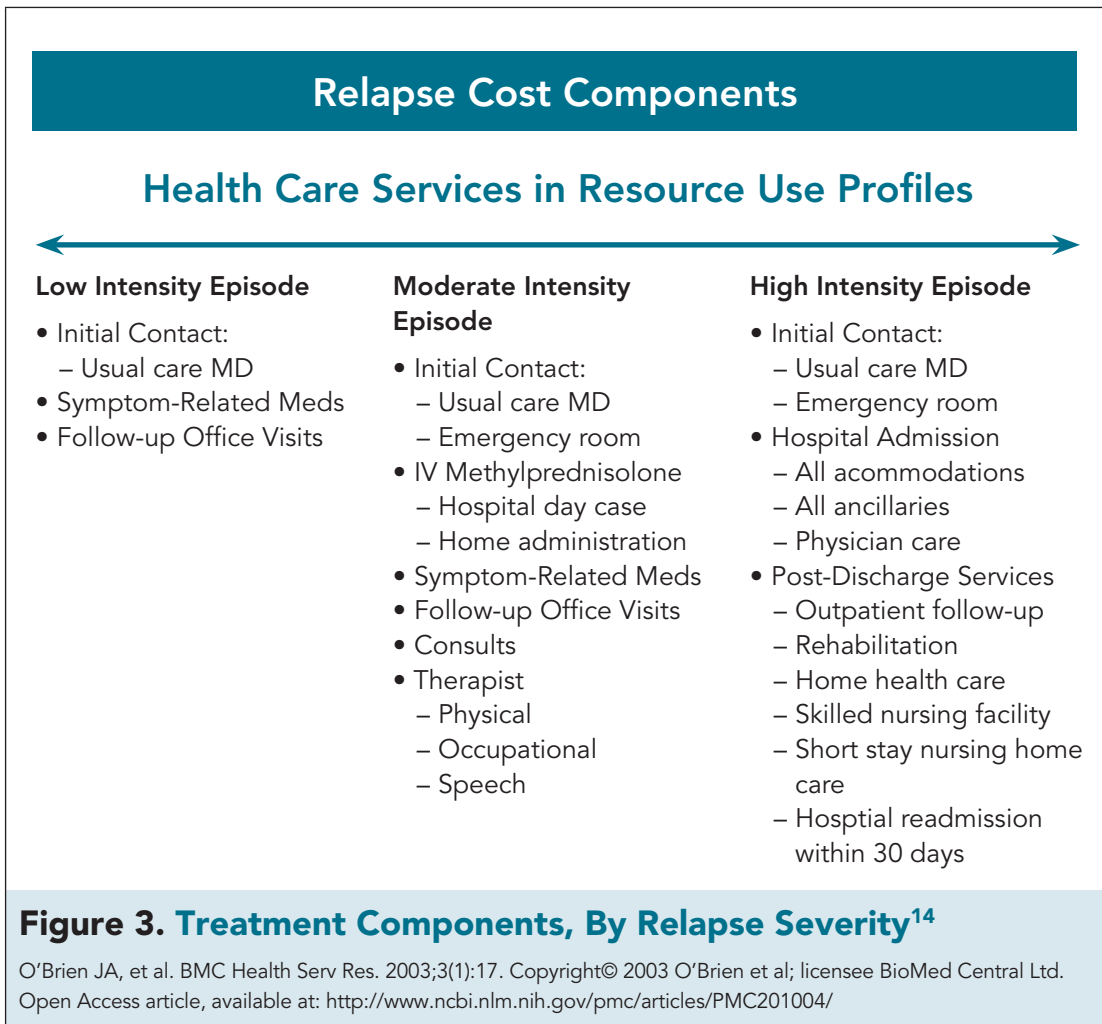
This comparative study showed similar rates of adverse effects with IV and oral steroids, includ-

ing metallic taste, hot flashes, and headache. Rates of insomnia and agitation were higher in the oral treatment group.<sup>15</sup>

The algorithm in **Figure 4** summarizes evaluation and treatment decision making for acute relapses of MS.<sup>16</sup>

### Impact of MS Relapses on the Patient and the Disease Course

The occurrence of a relapse is a time of great anxiety for a person with MS.<sup>17</sup> Relapses are an unwelcome sign that the disease is active and that efforts to limit disease activity are not fully effective. New neurologic signs may persist after the acute phase has resolved, although it may take 6 months or longer to determine the extent of the damage. Relapse activity often presents the patient



and the clinician with a reason to reevaluate the current disease-modifying therapy. Is this the most appropriate choice for the patient? Is the person taking the medication as directed? Is he or she missing doses, or taking drug holidays?

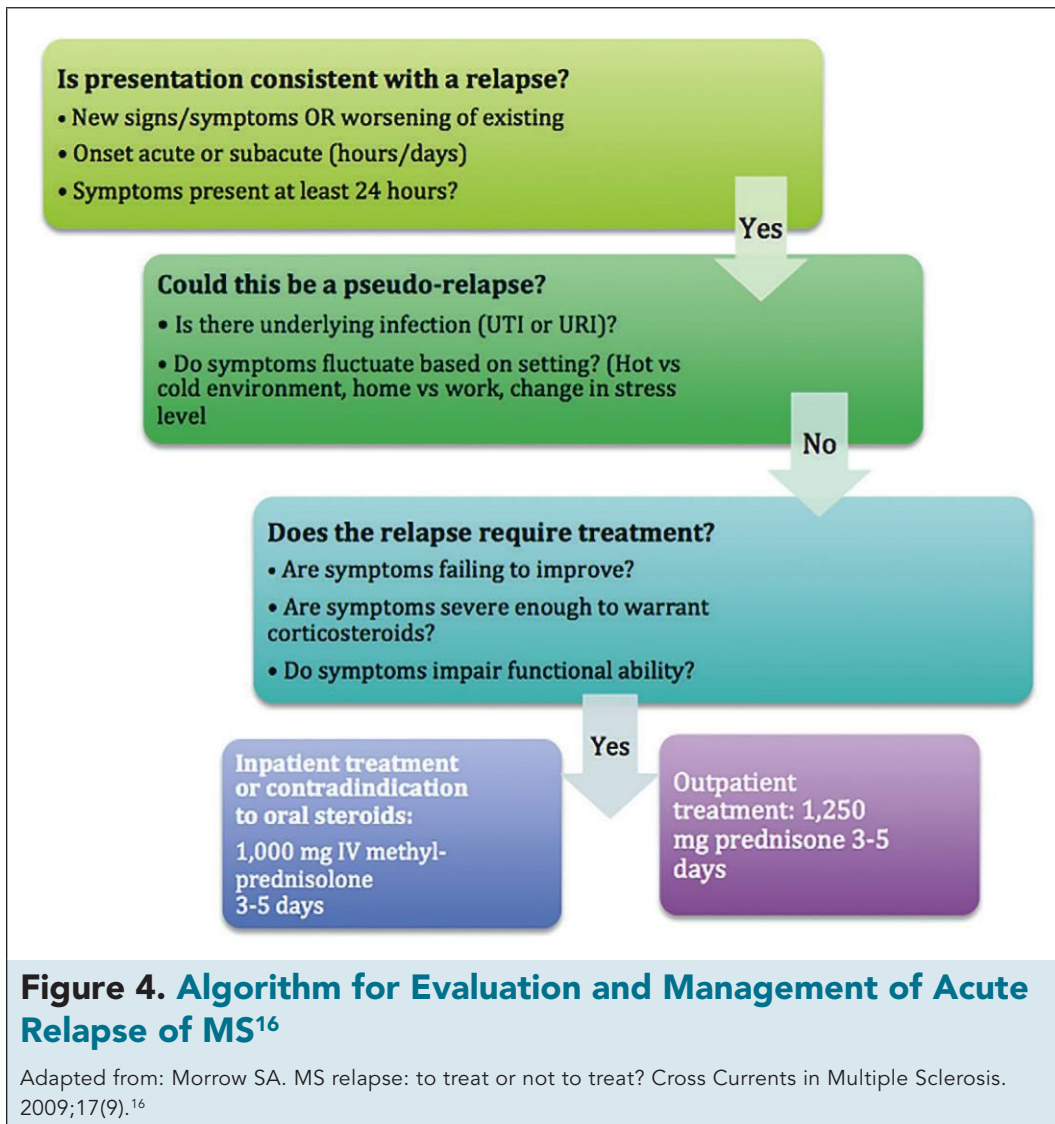
**Table 3. Comparison of IV and Oral Corticosteroids for MS Relapse<sup>15</sup>**

Outcome	Oral (100 pts)	IV (99 pts)
Improved by 28 days after treatment course	77.7%	77.9%
Full recovery	43%	39%
Required re-treatment	16%	12.6%
Subsequent relapse (86 to 90 days)	27.6%	32%

## When Should the Patient Have an MRI?

Magnetic resonance imaging (MRI) is not required to diagnose a relapse, but during treatment for a relapse MRI is often performed to evaluate disease status. Recently released MRI guidelines issued by a European consensus group (MAGNIMS) state that: “Patients should be further evaluated with MRI after each unexpected clinical presentation that might be related to MS (such as unexplained or atypical

symptoms of disease activity).”<sup>24</sup> Relapses typically appear on MRI as gadolinium-enhancing lesions. If the patient has risk factors for progressive multifocal leukoencephalopathy (PML)—positive JC virus antibodies and current or prior use of natalizumab and/or other drugs associated with the disease—an MRI is essential to evaluate and rule out this condition. In its earliest stages, symptoms of PML can present similarly to those of an MS relapse, so it is critical to make this determination early on in patients who have elevated risk.<sup>25</sup> Some cases of PML may present asymptotically.<sup>25</sup>



Although we do see patients who have full recovery from relapses and minimal lingering deficits, there is much research showing that relapses have an effect on longer-term disease outcomes, including functional milestones (time to cane or EDSS 6), time to secondary progressive MS (SPMS), and others (Table 4).<sup>5,18</sup> For example, we know that a higher number of relapses in the first five years of diagnosis is associated with shorter times to SPMS and EDSS milestones. In addition, a pattern of “poor recovery” from relapses is associated with a shorter time to SPMS.<sup>19–21</sup>

## Table 4. Short- and Long-Term Effects of Relapses in MS<sup>17,18,22,23</sup>

### Short-term

- Disrupts work, family responsibilities
- May require hospitalization

### Psychosocial effects

- Depression
- Lowered mood results from uncertainty about illness (Coping, cognitive reframing techniques)
- Scary and discouraging for the patient
  - Anxiety about disease progression
  - Is my DMT still working?
  - Missing work, parenting difficulties
  - Mobility and access issues (driving)
  - Marital, family discord

### Clinical effects

- Measurable, sustained deficits resulting from relapse
- Change in Expanded Disability Status Scale (EDSS) score lasting more than 60 days
- New brain lesions, demyelination

### Long-term: Relapse as a marker of late disability

- Shorter time to disability milestones (e.g., EDSS 3, 6, and 8)
- Shorter time to progressive MS

## Interdisciplinary Approach to Relapse Management

Treating relapses does not stop at the decision of whether or not to use steroids. Symptomatic and supportive care by the multidisciplinary team may include psychosocial and emotional support, bowel and bladder management, pain control, and spasticity management. Rehabilitation approaches have been shown to be valuable during both the acute phase and the recovery phase in patients with MS.<sup>26-28</sup> These interventions are an essential way to help the patient regain and/or optimize function, and should be targeted to the needs

of the individual. Rehabilitation strategies may include:

- Physical therapy (enhance strength, balance, stability, gait, endurance, use of mobility aids)
- Occupational therapy (energy conservation; use of adaptive equipment in the home and workplace; cognitive strategies)
- Speech/language pathology (assessment and management of dysarthria, dysphonia, and dysphagia)

## Conclusion

As MS nurses, our goal is to keep our patients healthy and relapse free as long as possible. We never want to receive the phone call that suggests a relapse is occurring. Significant relapses may require patients to consider developing a care plan or lifestyle changes to adapt to any new areas of functional loss. Relapse outcomes can be greatly improved with the involvement of a comprehensive care team, including prompt and optimal treatment of the acute inflammatory activity, supportive care, and rehabilitation services. Ultimately, the goal is to implement a disease-modifying strategy that will minimize relapse rates and reduce relapse severity.

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# CP Counseling Points™

## The Role of the MS Nurse in Relapse Assessment and Management

- Relapses are characterized by an acute or subacute onset of new or worsening symptoms lasting more than 24 hours and not attributable to another cause such as an infection.
- Relapses may represent a new breach in the blood-brain barrier, which allows immune cell migration into the central nervous system (CNS).
- The nurse's line of questioning should seek to determine whether the disease activity and symptoms the patient is experiencing differs from his or her usual or baseline functioning.
- The Assessing Relapse in Multiple Sclerosis (ARMS) questionnaire is a tool that can be used to assess relapse symptoms and to evaluate response to treatment.
- Distinguishing a true relapse from a pseudo-relapse is not always straightforward. There may be areas of overlap between these two conditions, including urinary tract infections (UTIs).
- Treatment approaches depend on the severity of relapse. A mild relapse should be monitored closely; a severe relapse warrants treatment with high-dose steroids or an alternative approach.
- Supportive care by the multidisciplinary team may include psychosocial and emotional support, bowel and bladder management, pain control, and spasticity management.
- MRI is essential if the patient has risk factors for progressive multifocal leukoencephalopathy (PML), as this condition may mimic relapse symptoms in its early stages.



# Counseling Points™

## The Role of the MS Nurse in Relapse Assessment and Management

### Continuing Education Post-test

To receive contact hours, please read the program in its entirety, answer the following post-test 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 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](http://www.IOMSN.org). Click on Educational Materials > Publications > *Counseling Points* and follow the instructions to complete the online post-test and application forms.

#### PLEASE SELECT THE BEST ANSWER

- 1. Which of the following elements is NOT part of the definition of MS relapse?**
  - worsening of existing symptoms
  - acute or subacute onset
  - attributable to infection
  - symptom duration 24 or more hours
- 2. A patient with MS calls you to discuss a possible relapse. She describes frequency, urgency and burning with urination. Based on this, you determine:**
  - she is likely having a relapse of MS
  - she is having a pseudo-relapse, not a true MS relapse
  - she has bladder dysfunction related to MS
  - you need more information about her symptoms to determine whether it is a relapse or a pseudo-relapse
- 3. The physiologic activity underlying an MS relapse is:**
  - increase in inflammatory activity in the CNS
  - a breach in the blood-brain barrier
  - demyelination
  - all of the above
- 4. MRI should be ordered as part of the diagnosis of an MS relapse:**
  - in all cases
  - in patients at risk for progressive multifocal leukoencephalopathy (PML)
  - if the patient requests it
  - rarely or never
- 5. After examining a patient with MS, you determine that he is having a mild relapse. Is steroid treatment recommended for this patient?**
  - yes, all relapses require high-dose corticosteroids
  - no, if it appears the relapse is resolving without treatment
  - it depends upon whether the patient wants the steroids
  - it depends upon which disease-modifying agent the patient is taking
- 6. Detrusor hyperreflexia is characterized by:**
  - uncontrolled contractures of the detrusor muscle
  - absence of contractures of the detrusor muscle
  - excess relaxation of the urethral sphincter
  - urinary retention predisposing patient to infection
- 7. Your patient is having an MS relapse with motor/cerebellar involvement and affecting more than one functional system. Her activities of daily living have been affected "quite a bit." This relapse would be staged as:**
  - mild
  - moderate
  - severe
  - unknown
- 8. A possible second-line treatment approach for an acute relapse of MS is:**
  - low dose oral prednisone
  - IV methylprednisolone
  - adrenocorticotrophic hormone gel (ACTH)
  - mitoxantrone
- 9. In choosing between IV methylprednisolone and oral prednisone for treating an MS relapse, which of the following is accurate?**
  - recovery rates and adverse events are comparable with IV and oral steroids
  - IV steroids will reduce relapse symptoms more quickly
  - patients tend to have a more complete recovery after IV steroids
  - patients have more adverse events such as headache with IV steroids
- 10. A patient has risk factors for PML and has presented with an apparent relapse. The most important course of action is:**
  - observe the patient closely in case of rapid worsening
  - obtain blood tests including JC virus antibody titre
  - order an immediate MRI
  - all of the above



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