Medical management of patients with multiple sclerosis

Health maintenance
The symptoms of MS overlap with those of a variety of medical conditions. Therefore, clinicians need to remain vigilant so as not to miss development of a coexisting disorder, which can cause fatigue (eg, anemia, thyroid disease, diabetes, or vitamin B\textsubscript{12} deficiency) or a myelopathy (eg, cervical spondylosis). Patients with MS are predisposed to certain conditions, particularly decreased bone mineral density and vitamin D deficiency [126,127]. Furthermore, the adverse effects of some MS therapies increase the risk of certain conditions; for example, corticosteroids used to treat relapses can precipitate or exacerbate hyperglycemia, hypertension, or mood disorders. Although occasional courses of corticosteroids probably do not have deleterious effects on bone mineral density [128], chronic steroids may worsen bone mineral density loss. Chronic immunosuppression increases the risk of infection and malignancy. Finally, many MS disease therapies and symptomatic medications can cause drug-induced hepatitis.

Immunizations
In general, the indications for immunizations in patients with MS are the same as in the general population. Disabled patients with respiratory compromise or who are wheelchair- or bed-restricted should receive influenza and pneumococcal vaccinations. Prior to starting chronic immunosuppressive therapy, it is advisable to consider vaccinating patients who do not have a history of chickenpox and/or have negative herpes zoster titers against shingles. In general, immunizations are safe and effective in patients with MS. Although there is a theoretical concern that immunizations could precipitate an MS
relapse, in practice there is no convincing evidence of this [129]. Patients on chronic immunosuppression should not receive live-attenuated vaccines.

Sleep
Sleep disturbances are common in MS [130]. There are a number of potential causes related to MS, including pain, spasms, nocturia, depression, anxiety, restless leg syndrome, and obstructive sleep apnea. Chronic sleep deprivation can contribute to fatigue and cognitive impairment.

Smoking
In addition to its well-recognized deleterious effects on general health, smoking has been implicated as a risk factor for MS, independent of other environmental and genetic factors [131]. This observation further underscores the importance of assisting patients with smoking cessation.

Reproductive health
Because MS is more common in women and typically presents in early adulthood, reproductive issues commonly arise. In general, gynecologic care for women with MS is similar to that in the general population, but there are several special issues. Long-term immunosuppressive therapy potentially increases the risk of cervical neoplasms, so routine gynecologic examinations are important for women receiving these therapies. Mitoxantrone, cyclophosphamide, and rarely IFN-β cause menstrual irregularity or amenorrhea, particularly in premenopausal women. Woman must be advised of this risk before initiating these therapies.

MS does not affect fertility. In the PRIMS study, a large prospective study of pregnancy in MS [132], there was no apparent increase in congenital abnormalities or complications of pregnancy, labor, or delivery. However, there may be a higher incidence of babies who are small for gestational age [133]. In general, no special precautions or measures are needed during pregnancy, labor, or delivery, including with anesthesia. The principal consideration is that disease therapies and most symptomatic medications should be avoided by women trying to conceive, during pregnancy, and while breastfeeding. At the Mellen Center, women are typically advised to discontinue IFN-β and glatiramer acetate 1 month and natalizumab and immunosuppressants 3 months prior to trying to become pregnant. The PRIMS study confirmed previous reports that the relapse rate tends to decrease during pregnancy but increases for 3–6 months post partum [132]. In general, at the Mellen Center