Migraine is a very common medical disorder with a broad societal impact. There are many stakeholders—patients and their families, clinicians, health plans/payers, employers, and the pharmaceutical industry—each bringing a different perspective on migraine and how to manage it effectively. For patients and families, the perspective is personal, with considerable pain, disability, and psychologic stress. For clinicians, the perspective is clinical, encompassing epidemiology, pathophysiology, diagnosis, and treatment. For health plans/payers and employers, the perspective encompasses demographics, clinical outcomes, and economics. Health plans bear the cost of treatment. Employers bear the cost of headache-related disability, which takes the form of absenteeism as well as reduced effectiveness at work (presenteeism).

Menstrually related migraine (MRM) is important to health plans because it is common and costly. MRM attacks may be longer in duration than other migraine headaches and may require more treatment. MRM attacks also account for a substantial number of emergency room visits. Although effective treatment results in improved health outcomes, treatment of MRM often is suboptimal.

Health plans also are factors to consider by the employers who contract with them. Employers are increasingly viewing healthcare expenditures not only as a cost, but as an investment in a healthy, productive workforce. Better migraine treatment saves money for the employer by reducing absenteeism and presenteeism. This, in turn, may increase the costs of care.

MRM is important from the employer's perspective because it is common in women of working age, particularly those between the ages of 25 and 55. Companies employing women of childbearing age bear the economic brunt of MRM. For these employers, effective treat-
ment of MRM reduces the economic burden and is most likely a good investment over the long term.

**Measuring the Burden of Migraine**

This article considers 3 aspects of the burden of migraine disease: prevalence, employer perspectives on disability, and health plan perspectives on the cost of medical care.

With regard to prevalence, migraine—including MRM—is a very common disorder in the United States and worldwide. Numerous population-based studies have reported 1-year prevalence rates ranging from 7% to 16%, with a rate between 11% and 12% in the United States. Prevalence is greatest in men and women alike between the ages of 25 and 55 years. At all post-pubertal ages migraine is 3 times more common in women. Regardless of sex, most migraine sufferers report severe or very severe pain associated with migraine headache.

**Employer Perspectives on Migraine Burden**

Employer perspectives on migraine burden are important because migraine is most prevalent during the peak productive years. Traditionally, occupational health has focused on health problems resulting from conditions in the workplace such as stress, noise, improper lighting, poor ventilation, the presence of toxic substances, or lax safety standards. Increasingly, the focus has shifted to health problems that employees bring to the workplace, health problems that reduce productive time. Measuring the economic impact of health problems in the workplace is challenging.

Dr Walter Stewart has advocated for the measurement of productive time rather than productivity as a measure of the workplace burden of health problems. Medical care directly influences productive time, the amount of time an employee is able to work effectively. Productivity is determined not only by a worker’s ability to be at work and do the job, but also by how effectively the worker is managed, how well the assembly line is running, and how well all aspects of workplace management are being handled.

Effective treatment may reduce the impact of illness on work. As a consequence, many employers have come to view healthcare expenditures as an investment in a healthy and productive workforce rather than as a cost center. Evaluating the economic value of healthcare requires the ability to measure the burden of disease and the benefits of treatment.

The pyramid shown in Figure 1 depicts 4 different levels of health-related functional impairment that have major implications in the workplace. Long-term disability, the typical scenario for workers who have suffered a stroke or an acute exacerbation of multiple sclerosis, involves an extended absence from work of at least 3 months. Short-term disability, for example maternity leave, involves an absence of up to 3 months. The lower half of the pyramid, which includes numerous 1- or 2-day absences for acute illness and reduced on-the-job effectiveness because of illness, accounts for the overwhelming majority of work loss and overall health-related costs to employers. Migraine and MRM fall into this portion of the pyramid.

Very simply, lost productive time is the sum of missed work hours (absenteeism) and reduced performance hours (presenteeism), expressed as lost hours. Lost productive time can be used to estimate lost productivity in a number of ways. The simplest is to multiply lost hours by the worker’s salary per hour. This approach has been criticized because wages may underestimate or overestimate economic burden. If a worker misses work and then works longer or harder to catch up, this method may overestimate cost. If, on the other hand, an ill worker makes serious errors or loses customers, it may underestimate cost. Despite these limitations, this method is widely used.
The American Productivity Audit was a large-scale population survey of employed Americans from 2001 to 2002 designed to assess the impact of health on work. This national survey of more than 28,000 Americans working full-time, used a validated, computer-assisted telephone interview to assess lost productive time for any reason in the 2-week period prior to the day the survey was conducted. Of the 4 pain conditions evaluated—headache, back pain, arthritis, other musculoskeletal conditions—headache was the most commonly reported reason for time lost from work.

Based on these and other data, the annual cost of productive time lost to headache in the United States was estimated to be $4.2 billion for absenteeism and $15.4 billion for presenteeism, or a total cost of nearly $20 billion. Based on 1994 data. Data from Hu et al. Stewart et al.  

Table 1, far more money is spent on lost productive time than on migraine treatment. Two hypothetical scenarios are shown that explore whether spending more on treatment might be a more cost-effective strategy for society (Figures 2 and 3). Both begin with updated annual direct costs of $2 billion, an increased proportion of direct costs account-
ing for total costs, and a decreased proportion of indirect costs accounting for total costs. In the first scenario (Figure 2), doubling the amount of money spent on direct treatment costs and reducing indirect costs by 15% produces the same net result: total costs of $15 billion. However, in the second scenario (Figure 3), doubling the amount spent on treatment and reducing indirect costs by 50% saves $4.5 billion per year.

The challenge presented by increasing direct costs and reducing indirect costs to lower total costs is to target migraine so the investment in better medical care is cost effective. One way to make workplace interventions cost effective is to target employees who are most disabled by migraine. As demonstrated in a population-based diary study, approximately 40% of employees with migraine accounted for 75% of lost workday equivalents attributable to migraine. Another study found a 41% reduction in productivity among employees who worked on days they had migraine.

ASSESSING THE BURDEN OF MENSTRUALLY RELATED MIGRAINE

Three studies in particular have addressed the burden of MRM: a population-based diary study, a clinic-based diary study, and an Internet-based study. Findings from all 3 support MRM as an attractive target for treatment and cost-effective interventions.

The population-based study involved screening to identify women with 6 or more migraine attacks per year, clinical assessment by a headache specialist to diagnose migraine with or without aura, and having the women keep a detailed daily diary for 98 days. Each diary booklet covered a 1-week period and included daily questions about work, household chores, mood, menstrual status, and when headaches occurred. Also included were questions about headache features, pain intensity, duration, disability, and medication use.

Diary analysis revealed that migraine without aura was associated with the menses, particularly between days -2 to +2 of onset, and that pain and composite symptoms such as nausea, vomiting, photophobia, and phonophobia were worse for MRM than for migraine with aura or tension-type headache, particularly on days 0 and +1.

The clinic-based diary study involved women with 2 to 6 MRM or non-menstrually related migraine (NMRM) attacks per month. Attacks were divided into 4 categories: premenstrual, occurring on days -1 and -2 of the menstrual cycle; menstrual, occurring on days 1 and 2; late menstrual, occurring on days 3 to 7; and nonmenstrual, occurring on all other days. As summarized in Table 2, MRM attacks were worse than nonmenstrual attacks in terms of headache duration and impact on work. Diary analysis found that MRM headaches also were much less likely to respond to treatment and more likely to recur.

The Internet-based MRM study screened more than 1100 women and found that those with MRM had more activity limitations at work than did those with other menstrually associated headaches (70% vs 52%) and more limitations with respect to household chores (77% vs 55%), social activities (65% vs 50%), and family activities (67% vs 43%). The study also found that women with MRM were more likely to consult a primary care clinician for headache treatment than were women with other types of headaches (53% vs 26%), were more likely to receive a prescription for an analgesic (27% vs 12%), and were more likely to receive additional prescriptions for headache treatment (15% vs 3%).

MENSTRUALLY RELATED MIGRAINE AS A TARGET FOR TREATMENT

It is clear from studies assessing the burden of MRM that migraine without aura, a feature of MRM, occurs more frequently between days -2 to +2 of the menstrual cycle. MRM attacks frequently are longer in duration and are associated with higher levels of disability, higher recurrence rates, and more lost productive time at work than are NMRM. MRM headaches therefore are an important treatment target for employers, clinicians, and health plans.

**Table 2. Menstrually Related Migraine Attack Duration and Impact on Work**

<table>
<thead>
<tr>
<th></th>
<th>Menstrually Related</th>
<th>Menstrual</th>
<th>Late Mensural</th>
<th>Nonmenstrual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration (hours)</td>
<td>29.6</td>
<td>33.7</td>
<td>24.0</td>
<td>16.2</td>
</tr>
<tr>
<td>Missed work*</td>
<td>51.3%</td>
<td>27.3%</td>
<td>27.0%</td>
<td>27.3%</td>
</tr>
<tr>
<td>Lost work time (hours)</td>
<td>2.7</td>
<td>2.1</td>
<td>1.0</td>
<td>1.2</td>
</tr>
</tbody>
</table>

* 377 of 459 migraine attacks occurred during work. Data from Granella et al.¹²
The keys to cost-effective treatment of MRM in the workplace are to:
- Target migraineurs with greater disability attributable to MRM
- Educate women about the use of a diary to establish the relationship between migraines and menstruation
- Educate women about the use of effective medical care
- Use acute, preventive, and short-term preventive strategies for MRM as appropriate.

With respect to the pharmaco economics of acute treatment of MRM, it has been shown that triptans reduce the cost of migraine by reducing office and emergency room visits and by improving productivity in the workplace.

Providing cost-effective treatment of MRM involves stratifying acute care to match the intensity of treatment with the level of treatment needed, preventing attacks in selected patients, and instituting short-term prophylaxis when necessary. Short-term prophylaxis is less expensive than long-term prevention, may reduce office and emergency room visits, and should result in indirect cost savings by reducing absenteeism and lost productive time.

Based on the average amount of lost work time per migraine attack (2 to 3 hours) and the onset of action of an oral triptan (1 to 2 hours), acute therapy with an oral triptan may save an hour of lost productive time per attack treated. This is a modest benefit compared with that provided by short-term prophylaxis, which completely eliminates a migraine attack, thereby reducing costs and should result in indirect cost savings by reducing absenteeism and lost productive time.

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**CONCLUSION**

MRM is common in women of childbearing age. It is probably more disabling than NMRM and requires more utilization of healthcare resources. As such, MRM is an attractive target for treatment.

Employers would benefit (in the form of reduced losses in productive time due to absenteeism and presenteeism and reduced indirect costs) from improved care of migraine in general and of MRM in particular. In addition, introduction of wellness programs in the workplace as a component of improved care likely would increase job satisfaction among employees, boost morale, and decrease costly employee turnover.

Health plans also have much to gain from improved medical care of migraine and MRM. If treatment is used effectively, it will result in fewer office and emergency room visits and fewer hospitalizations, thereby offsetting the increased costs of providing better care. Health plans offering better migraine care also will have a competitive edge over health plans that do not offer such care, and thus will be more attractive to employers who contract with them.

**REFERENCES**


