

The Economics of Migraine

Based on a presentation by Stuart O. Schweitzer, PhD

Presentation Summary

Migraine headaches produce an enormous financial burden on society, primarily because of their high incidence among people in the middle of their careers. Migraine-related indirect costs, which constitute more than three quarters of the total economic burden of this disease, include both lost work time and diminished work capacity. Direct costs of migraine, which run into the

billions of dollars, are attributable mainly to clinic and emergency room visits but also to drug treatments and alternative care. Several studies have documented the efficacy of pharmaceutical agents versus placebo, but good comparative studies and economic studies are rare. Development of rational prescribing guidelines and reimbursement policies will depend on analysis of such studies.

Migraine headaches present a costly burden for the United States. This is due primarily to the high incidence of migraine among people in their prime working years. Although exact estimates of incidence vary from study to study,¹⁻⁴ reports of incidence involving at least one episode per year have ranged as high as 5.3% to 19% for males and 11% to 28% for females.⁵ The incidence of migraine peaks between the ages 25 to 55³ or 35 to 45,⁶ precisely the range of years with the highest labor force participation.

This high rate of migraine among people in their working years leads to a huge loss in labor productivity. Thus

the scope of any managed care inquiry into the economic burden of migraine and the cost and effectiveness of specific interventions must not neglect the indirect costs associated with migraine. These harder-to-measure indirect costs should be of special concern to employer groups because of the significant budget implications related more to productivity and cost of goods rather than healthcare coverage.

Indirect Costs

The indirect costs for most diseases are about half the total social costs.⁵⁻⁸ With migraine, the indirect costs are substantially higher—as

high as 76% to 86%⁹—and this is due to the working-age demographic profile of migraineurs.

Estimates of indirect costs rely mainly on survey-reported frequency of lost days of work or reduced productivity at work. Using such criteria of lost productivity, one research group recently estimated total United Kingdom indirect costs of migraine at between \$1.1 billion and \$1.3 billion (1993 US dollars). These costs constituted 25% of the total costs of absenteeism in the United Kingdom's manufacturing sector.¹⁰

Researchers in the United States have set the annual national bill for lost wages due to migraine-related diminished productivity at between \$5.6 billion and \$17.2 billion (1986 dollars), a range based on an estimated need for 3 million "bed days" per year by migraineurs and an additional 2.7 million restricted-activity days

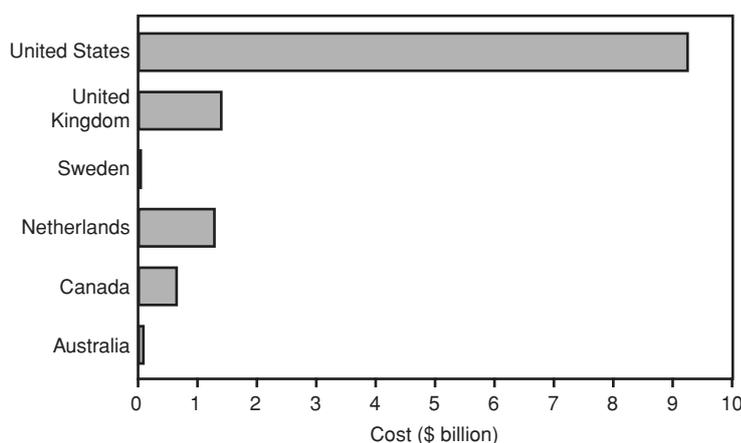
for males and 18.8 million restricted activity days for females.^{11,12} The economic loss from migraine disability exceeds that of Type 2 diabetes. At a more local level, a survey of 4200 hospital workers (overall incidence: 8%) found that migraineurs missed an average of 2 days per year.² When losses for partial disability were included, the total loss each year was 5.5 days—more than 2% of all workdays—leading to an annual cost of more than \$500 per migraineur.

Attaching a dollar value to the indirect economic toll of migraine is not always possible. However, even estimates of lost workdays can provide a valuable guide to the overall impact of disease. For example, one survey of 1663 adults with migraine found that 50% of females and 38% of males missed more than 6 "work-day equivalents" each year—half of these absent days and half due to lost productivity.¹³ An even larger survey of 13,343 adults who had reported headaches found that more than 9% missed work "more than rarely" because of headache and 31% reported reduced work level "more than occasionally."¹⁴ On average, these headaches accounted for 4.2 day-equivalents of lost work, with over half of these days attributable to headaches of the migraine variety. An international range of estimates for losses due to indirect costs are shown in Figure 1.

The potential value assigned to preventing such indirect costs will vary with the perspective of the various interested parties (eg, society as a whole, government, employers, and patients). The value of lost productivity hurts society and an employer, for example, but not necessarily government or patients. This is because the employee may be salaried and fully covered for sick days, with the government consequently not losing any taxable portion of these wages.¹⁵

Of course for many nonemployed individuals with migraine, the indi-

Figure 1. Indirect Costs of Migraine by Country



Source: Adapted from reference 10.

rect economic burden of illness cannot be measured in terms of lost wages or lost workdays. For example, for homemakers, the elderly, and school children, this burden of illness is hard to track—though certainly no less disabling or disruptive to individuals or families. One researcher has estimated that 3.2 million school days are lost each year to migraine,¹² but only a few other attempts have been made to quantify nonmonetary losses due to migraine. Further, lost school days for children often leads to lost workdays for parents.

Future studies attaching monetary value to treatment-related changes in quality of life will be important in calculating this invisible burden of disease and in piecing together the complex puzzle of migraine health costs.

Direct Costs

The burden of migraine is also substantial in terms of use of actual healthcare resources. On a per-member basis, for example, researchers have found that migraineurs use 2.5 times more prescription drugs than non-migraineurs, and 6 times as many diagnostic services, with an average monthly total healthcare cost of \$1435 compared to \$89.¹¹ On a national basis, the total direct costs associated with migraine have been estimated to be as high as \$9.5 billion, including \$5.1 billion spent on clinic visits, \$2.7 billion on prescription drugs, and \$730 million on hospital care (1993 dollars).¹⁰ An international range of estimates for losses due to direct costs are shown in Figure 2.

Even if much lower estimates of direct costs are assumed (other studies have estimated a range from \$1 billion to \$5 billion), these figures would still rival those seen for other chronic conditions for which managed care plans have instituted physician care pathways aimed at reducing costly acute episodes. Thus, any major improvements in migraine

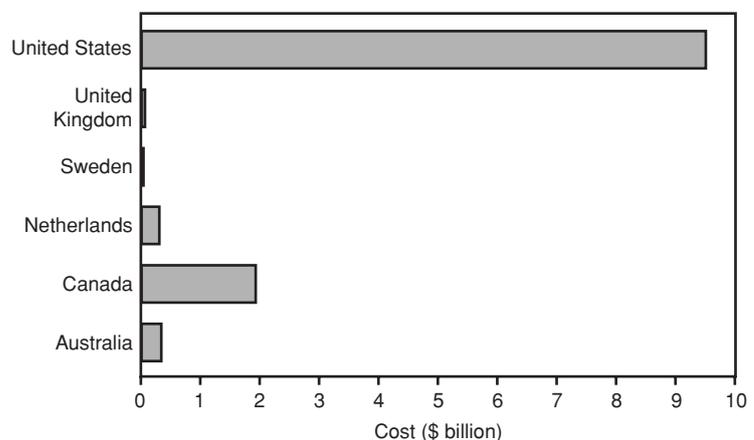
intervention have the potential to reduce overall healthcare costs significantly.

In terms of emergency room (ER) visits, for example, physicians and medical directors may be surprised to learn that headaches caused 2.4 million of the 90.3 million ER visits in 1996. According to the National Hospital Ambulatory Medical Care Survey, this 2.6% share made headache the fourth most common cause of an emergency room visit, after stomach and abdominal pain, chest pain, and fever.¹⁶

Cost Effectiveness of Intervention

Have any studies actually documented reduced costs, direct or indirect, related to specific interventions for migraine? Because of this question's obvious relevance to the development of rational treatment guidelines, several investigations involving

Figure 2. Direct Costs of Migraine by Country



Source: Adapted from reference 10.

new therapies such as dihydroergotamine nasal spray and the 5-hydroxytryptamine (5-HT) agonists have included an economic component in their design. Data from three such studies involving treatment of acute migraine with sumatriptan are summarized here.

- In 101 HMO members, sumatriptan reduced productivity loss due to migraines by an average of \$435 per month (compared to before-treatment levels).⁵ Reductions were seen in days lost from work (- 71%), days worked with symptoms (- 21%), labor costs (- 64%), and leisure days lost (- 70%). With the cost of sumatriptan therapy set at \$43.78 per user per month, the ratio of benefits to costs was 10 to 1.
- In 203 managed care patients, sumatriptan reduced the frequency of severe headaches from 89% to 63% and the number of disability days from 6.5 days to 3.9 days per month.⁶ Reductions were also seen in the number of office visits and the use of other medications. The authors conclude that total healthcare costs fell, despite the increase in drug costs associated with sumatriptan. The monthly cost per disability-free day was calculated to drop from \$12.18 to \$6.43.
- In 38 Veterans Administration patients, sumatriptan reduced ER visits from 128 (\$39,936) to 4 (\$1248), urgent care visits from 105 (\$6615) to 37 (\$2331), and inpatient days from 25 (\$19,362) to 11 (\$8520).¹⁷ In comparing the 6-month treatment period before sumatriptan introduction with the 6-month period after introduction, total treatment costs fell \$1740 per patient.

These examples of cost analyses point out the potential value, as well as the drawbacks, of current literature on the economics of migraine therapy. While the results of each study generally support the economic argument in favor of intervention

with this particular serotonin agonist, the practitioner looking for comparative data on cost—or efficacy or safety for that matter—of migraine treatment alternatives will look in vain. Few studies compare migraine therapies in head-to-head fashion, mainly because the Food and Drug Administration still accepts placebo-controlled trials as proof of efficacy and basis for approval. Thus, patients and the clinical community lack the clear guidelines needed for comparative efficacy of alternative drugs.¹⁸

Another drawback of the current migraine treatment literature is the lack of uniformity in definitions and endpoints. Many of the older trials for ergotamine, for example, were not double-blind and definitions of recurrence differed from those used in triptan studies.¹⁹ Although the more recent studies of new products adhere to standard definitions, the lack of head-to-head comparative studies leaves practitioners in the precarious position of comparing placebo-controlled outcomes from separate trials involving differing populations and protocols. In terms of economic outcomes, clinicians must further attempt to compare the relative values of endpoints such as headaches averted, workdays saved, and quality-adjusted life years (QALYs).

Despite the lack of direct comparative data, studies involving individual antimigraine products in diverse populations indicate, in general, that aggressive therapy for acute attacks is associated with reduced economic loss. Beyond the choice of individual agent for intervention, the organization of that intervention's delivery has also been shown to affect economic outcomes. For example, one study compared the costs of migraine treatment in three separate settings: 1) a dedicated transfusion and injection facility with preauthorized protocols; 2) a walk-in urgent-care center; and 3) a traditional emergency trauma center.²⁰ Costs in these settings were

\$39.93, \$57.28, and \$317.71, respectively, and the waiting times were 35 minutes, 62 minutes, and 105 minutes, respectively. Not surprisingly, patient satisfaction was much higher for the protocol-based specialty clinic.

What About Prophylaxis?

In one of the few published economic evaluations involving prophylaxis of migraine, the costs of caffeine-ergotamine were compared with the costs of a new treatment alternative, sumatriptan.²¹ The cost per migraine aborted with sumatriptan was \$25 (Canadian), or \$7507 per QALY. Overall, sumatriptan saved \$42 per year per patient. The authors noted that the cost-effectiveness ratios for sumatriptan in migraine prevention were moderately favorable compared to other health interventions.

Two other studies have questioned the choice of drug therapy in prophylaxis,^{22,23} with general recommendations for using relatively inexpensive therapies such as antidepressants (not selective serotonin receptor antagonists), aspirin, and beta-blockers (not selective). However, drugs in these evaluations were not compared for efficacy, and costs were noted per tablet rather than per day or per episode, so comparisons cannot be made.

Another recent review concluded, surprisingly, that the 3 most commonly chosen agents for prophylactic migraine therapy—propranolol, amitriptyline, and verapamil—have not been shown irrefutably to prevent migraine.²⁴ And though some reviewers have suggested limiting preventive treatment to patients whose frequency of attacks is 12 to 16 per month,¹¹ it is clear that adequate large comparative studies of treatment versus prevention of migraine have yet to be conducted. Estimates of the economic impact of these alternative treatment strategies must await these data.

Once these comparative efficacy and cost data are available, a deci-

sion-analysis model can predict when prevention might be more cost effective than treatment. In such models, prevention typically becomes the best choice when: 1) the disease incidence or frequency is high in a particular population; 2) the burden of illness is high; 3) the prevention efficacy is high; or 4) the cost of prophylactic therapy is low.

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—Stuart O. Schweitzer, PhD

Managed Care Decisions

Current evidence shows that first-line treatments such as dihydroergotamine nasal spray and the serotonin agonist agents work reasonably well and are well tolerated by patients. Recent publications indicate that the efficacy of most agents is about 70% to 80% (compared to about half for placebo) in resolving acute headache within 4 hours. While not ideal, these agents have proved relatively successful versus placebo in preventing pain and, in some cases, in lowering direct or indirect costs.

To assist in creating improved clinical guidelines, future trials of pharmaceutical agents and alternative therapies should compare alternative therapies directly and capture the potential economic outcomes prospectively. Only with attention to economic factors (Table) will future trials allow managed care organizations and con-

sumers to determine which drugs work best and which are most cost effective.

Prescription coverage of migraine agents already varies considerably among health plans, with a range of generic-only and prior-authorization restrictions included in many formularies. In California, for example, a review of 12 health plans showed that 7 allow unrestricted use of sumatriptan while 5 require the extra and often time-consuming step of prior authorization (Pacific Business Group on Health, Healthscope, (www.healthscope.org/hp/formulary/headache.htm). As tradeoffs in terms of efficacy and cost become clear with the newer agents, it is entirely possible that health plans will see the return on investment in treating the chronic migraine patient more aggressively. Alternatively, insurers may offer members or purchasers the option of less generous coverage in return for a lower premium.

...DISCUSSION HIGHLIGHTS ...

Dr. Brown: What is the main reason indirect costs are so much higher for migraine versus other common conditions?

Dr. Schweitzer: It is mainly due to the high disability rates, which in turn are associated with the working-age population of most of these migraine patients. Thirty years ago, with women less represented in the labor force, these indirect costs would have been less.

Dr. Mondell: Tracking the value for work done in the home remains difficult. Even today, though women are indeed working more in careers, we still have difficulty placing a value on lost time in the home due to migraine. In some cases, a burden is put on the social network, for example, a neighbor or family member caring for the children. Even if not financial, the burden remains.

Dr. Ward: It is unsettling to me to see such a wide variation in estimates of costs due to migraine. I've now heard total direct costs ranging from \$5 billion to \$18 billion, and the per-person cost savings seem to range from \$500 per patient to \$1700 per patient over 6 months. This shows how it is nearly impossible to quantify these costs.

Imagine two different patients. A fast-food worker, perhaps a single mother, who gets bad attacks every 3 or 4 days and does not work is obviously losing less each day than a corporate CEO or a sports star who misses a few days. These economic losses vary widely, but the personal costs in terms of quality of life for these two individuals may be equivalent.

Dr. Schweitzer: Assigning a value to the cost of disability due to migraine is indeed a thorny issue. The elderly and children, for example, are not employed, so if we use only lost wages to measure indirect costs, we undercount the burden. But if a general wage could be applied to children and the elderly to measure the value of leisure and schooling, then we can start to make estimates for an entire population.

Table. Scope of an Economic Inquiry

<ul style="list-style-type: none"> ■ Burden of illness <ul style="list-style-type: none"> —Incidence, age, other determinants such as gender and income —Direct and indirect costs ■ Cost and effectiveness of interventions ■ Alternative strategies ■ Organization/structure of intervention programs ■ Financing of treatment <ul style="list-style-type: none"> —Who pays and who benefits? —How many standards of care?

Dr. Parham: If we truly want to bridge the gap between available treatments and actual practice in managed care, we need to recognize the cost of making benefits more generous. As we increase benefits, the premium to the employer goes up, small employers cannot afford it, and individuals such as this food service worker either become one of the 42 million uninsured or one of the underinsured—those with coverage under a managed care plan with a skimpy benefits package.

I checked with 3 small restaurants in North Carolina recently and found that none offer any insurance at all because of the cost. We need to recognize that if insurance companies design a product that is affordable to the local fast-food joint, the benefits for pharmaceuticals will need to be lean, or the copayments high.

Dr. Stewart: Separate from health-care coverage issues, are employers starting to change their expectations in regard to lost work time related to migraine?

Dr. Parham: Yes, they are recognizing that there may be ways outside of the insurance model to reduce absenteeism. Many are asking about disease management models.

Ms. Bowman: As we talk about who pays for migraine treatment, we need to recognize that within the insurance business there are really two different sources of money available. There are worker-compensation dollars, for work loss, and there are medical-benefits dollars. We need to start talking about mixing these 2 sources of money to attack the migraine problem.

Dr. Lake: But from the managed care company's perspective there is only one source of money—the one that covers medical benefits. So, part of our job is to educate the people who

purchase these plans as to which treatments make the most economic sense. Which dollars are well spent in terms of reducing disability? And which dollars are spent only to appease a person's demand for a poorly validated treatment?

“[Employers] are recognizing that there may be ways outside of the insurance model to reduce absenteeism. Many are asking about disease management models.”

—William Parham III, MD

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