

This section will review the epidemiology of headache, with a specific emphasis on migraine. Standard definitions that will appear in this module include:

***Prevalence:*** The actual number of existing cases of a disease that appear in a given population at a specific time.

***Incidence:*** The number of new cases of a disease that appear in a given population, over a period of time.

***Odds ratio:***

*Stedman's Medical Dictionary*, 24<sup>th</sup> Edition. Baltimore, MD: Williams & Wilkins, 1982

## EPIDEMIOLOGY AND IMPACT OF HEADACHE

### Objectives

- Review the epidemiology of headache, especially migraine
- Discuss the burden of migraine in the United States
- Identify patterns of treatment
- Propose methods for resolving barriers to care

## OVERVIEW OF EPIDEMIOLOGY AND IMPACT

- Migraine is common, disabling, and important to physicians
- The burden of migraine is greatest for the most severely affected sufferers
- Despite improvements, migraine remains underdiagnosed and undertreated
- Resolving barriers to care requires several interventions

Although most migraine patients receive their treatment in the primary care setting, headache nonetheless remains a significant component of the neurologist's practice.

Migraine pain and suffering represents a substantial personal and social burden worldwide, and those individuals with the greatest disability from their migraines incur and create the greatest associated costs.

Although migraine diagnosis and treatment has made substantial gains in the last decade, the disease continues to be underdiagnosed and undertreated.

The issues surrounding this care gap are multifaceted and require improvements in several areas.

## MIGRAINE PREVALENCE (American Migraine Study II)

- There are currently 28 million migraine sufferers age 12+ in the United States
  - 21 million female
  - 7 million male
- Nearly 1 in 4 households has at least 1 migraine sufferer
- Migraine prevalence peaks between the ages of 25–55

Lipton RB et al. *Headache*. 2001.

The American Migraine Study II, a follow-on study of the first American Migraine Study in 1989, was conducted in 1999 with the objective of describing the prevalence, sociodemographic profile, and burden of migraine in the United States and of comparing these results with the first study.

A validated, self-administered questionnaire was sent to 20,000 households to identify IHS criteria-based migraine sufferers 12 years of age or older. Of 43,527 age-eligible individuals, 29,727 responded to the questionnaire, for a 68.3% response rate.

Twenty-three percent of respondent households had at least one member with migraine. The 1-year prevalence of migraine in the United States is 13%. Consistent with other studies, the 1-year prevalence is 18.2% in female patients and 6.5% in male patients. Prevalence is highest in the 25–55 age group.

The study did not find an increase in migraine prevalence or incidence that has been suggested by other studies. The 4 million sufferer increase from the 1989 survey is consistent with population increase. There may be an increase in disease awareness.

Lipton RB, Stewart WF, Diamond S, et al. Prevalence and burden of migraine in the United States: data from the American Migraine Study II. *Headache*. 2001;41(7):646-657.

## LIFETIME PREVALENCE OF HEADACHE IN GENERAL POPULATION

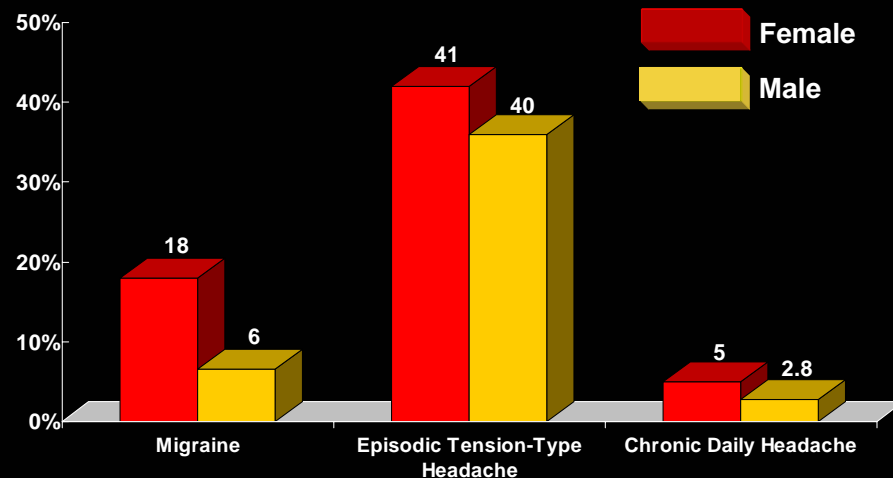
<b>Primary Headache</b>	<b>Prevalence (%)</b>
Tension-type headache	78%
Migraine	16%
<b>Secondary Headache</b>	
Fasting	19
Nose/sinus	15
Head trauma	4
Non-vascular intracranial disease (including tumor)	0.5

Rasmussen BK. et. al. *J Clin Epidemiology*. 1991.

This is a population-based study looking at the prevalence of primary and secondary headache disorders with the most common being tension-type headache with a prevalence of 78%. From this study, it is clear that migraine is also very common with a prevalence of 16% of the population surveyed. Among secondary headaches, the most common cause is attributable to fasting. Nasal- and sinus-related headaches, and head trauma are less common. Many fear that headaches are caused by intracranial disease such as tumors, however, this actually occurs in a very small percent of the population (0.5%).

Rasmussen BK, Jensen R, Schroll M, Olesen J. Epidemiology of headache in a general population — a prevalence study. *J Clin Epidemiol* 1991;44:1147-1157.

## ONE-YEAR PREVALENCE OF COMMON HEADACHE DISORDERS



Lipton RB et al. *Headache*. 2001; Schwartz BS et al. *JAMA*. 1998; Scher AI et al. *Headache*. 1998.

This slide summarizes the 1-year prevalence of some common primary headache disorders. By far, the most common headache disorder in the general population is episodic tension-type headache, which affects 40% of the population. These are the bilateral, pressing or squeezing headaches of everyday life that do not have many accompanying features. Migraine also is a common primary headache disorder, affecting 18% of women and 6% of men.

Chronic daily headaches occur  $\geq 15$  days per month and affect 5% of women and 2.8% of men. The two most common headaches are chronic tension-type headache and transformed/chronic migraine, which will be discussed within the context of chronic daily headache.

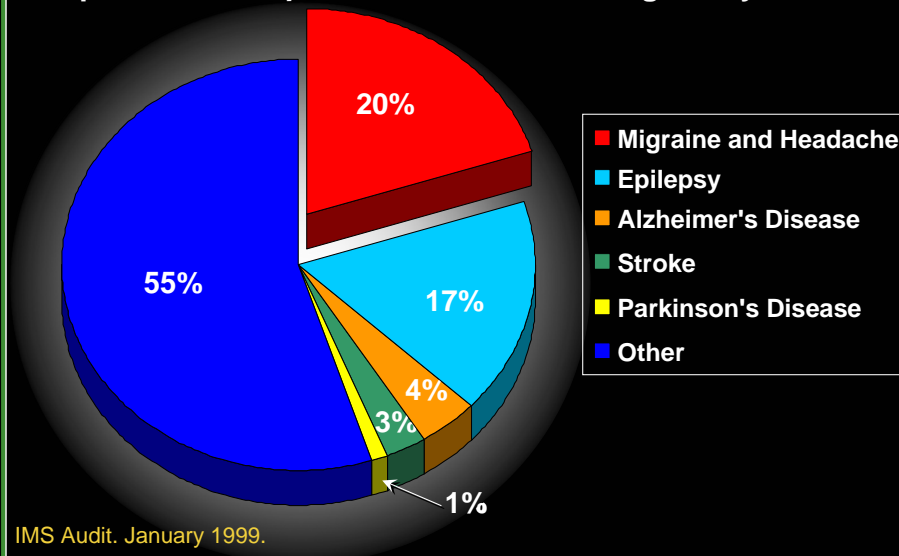
Lipton RB, Stewart WF, Diamond S, et al. Prevalence and burden of migraine in the United States: data from the American Migraine Study II. *Headache*. 2001;41(7):646-657.

Schwartz B, Stewart WF, Simon D, Lipton RB. Epidemiology of tension-type headache. *JAMA*. 1998;279:381-383.

Scher AI, Stewart WF, Liberman J, Lipton RB. Prevalence of frequent headache in a population sample. *Headache*. 1998;38:497-506.

## HEADACHE IS AN IMPORTANT PROBLEM FOR NEUROLOGISTS

Proportion of Outpatient Visits to Neurologists by Disease

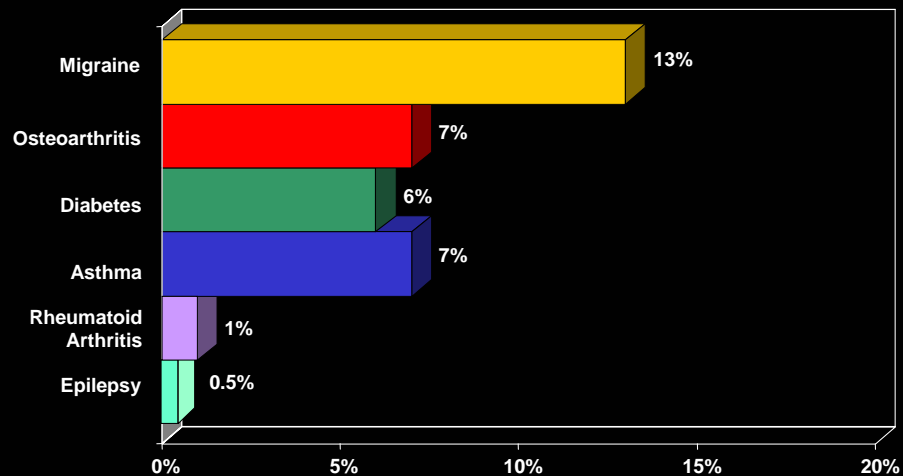


Headache is clearly an important problem for neurologists. Summary data based on audits of outpatient visits to neurologists in the United States (this is recent data from IMS, an organization that collects health care data in the United States and around the world) indicate that migraine and headache are the leading reasons for outpatient visits to neurologists in the United States. These conditions account for about 20% of all outpatient visits.

Epilepsy and other seizure types come in as a close second at 17%. Migraine and headache are much more common than neurologic problems, such as Alzheimer's disease and Parkinson's disease.

IMS Audit, January 1999 [Note: IMS is a market research company that audits physician visits in representative samples to identify reasons for visits and patterns of treatment.]

## MIGRAINE IS MORE COMMON THAN ASTHMA AND DIABETES COMBINED



Data from the Centers for Disease Control & Prevention, US Census Bureau, and the Arthritis Foundation. Hauser WA, et al. *Epilepsia*. 1993.

Migraine is more common than many other chronic, disabling conditions. Its prevalence equals that of asthma and diabetes combined.

- Rheumatoid arthritis affects 2.1 million Americans, mostly women.
- Asthma affects an estimated 14.6 million American adults, has an overall lifetime prevalence of 10.5%, and affects women more than men.
- Diabetes affects 17 million Americans, or 6.2% of the population.
- Osteoarthritis affects 20.7 million Americans and women more than men.
- Severe migraine affects 27.9 million Americans with a female to male ratio of 3 to 1.

<http://www.cdc.gov/nedss>

<http://www.arthritis.org>

<http://www.census.gov>

Hauser WA, Annegers JF, Kurland LT. Incidence of epilepsy and unprovoked seizures in Rochester, Minnesota: 1935-1984. *Epilepsia*. 1993;34(3):453-468.



# CLUSTER HEADACHE

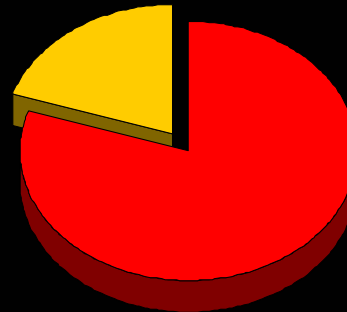
Overall prevalence in general population is 0.4%

- Episodic type (80%)

- Chronic type (20%)

Predominates in males

Onset generally between 30-50 years of age



■ Episodic ■ Chronic

IHS Headache Classification Committee. *Cephalalgia*. 1988.

Although the unique clinical features of cluster headache (CH) have been recognized since the 17<sup>th</sup> century, the striking periodicity was not articulated until the 1940s. The term “cluster headache” was coined in the 1950s, and since then the International Headache Society (IHS) has identified and classified two major temporal patterns of CH (1). The episodic type (ECH), by far the most common (90%), is characterized by discrete attack and remission phases. The chronic type (CCH) is defined by attacks that occur daily for more than one year without remission or with remission periods lasting less than 14 days.

Cluster headache is rare (about 0.4% of the general population), and it predominates in males, although recent studies indicate that the rate in females is rising (2). Onset can occur at any age but usually begins between 30 and 50 years of age (3).

In contrast to migraine headache, genetics in cluster headache is not thought to be important, although recent studies have shown a positive family history in about 7% of patients with cluster headache. When compared with prevalence of CH in the general population, first-degree relatives have about a 14-fold increased risk of developing CH. Furthermore, in one study, five sets of monozygotic twins were 100% concordant for CH (4).

A number of related short-lasting headaches, referred to as “cluster variants,” may be confused with cluster headache. These less common variants include chronic and episodic paroxysmal hemicranias and short-lasting unilateral neuralgiform with conjunctival injection and tearing (or SUNCT). Cluster variants have a number of distinguishing features that have therapeutic implications and are important to recognize. These related syndromes will be reviewed later in this presentation.

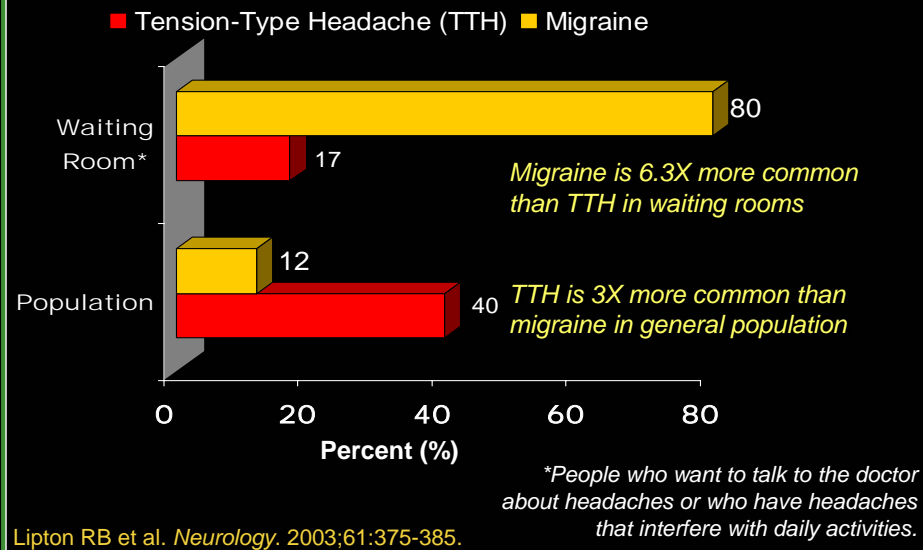
1. International Headache Society Classification and diagnostic criteria for headache disorders, cranial neuralgias and facial pain. *Cephalalgia*. 1988;8(Suppl 7):35-38.

2. Ekblom K, Ahlbom B, Schele R. Prevalence of migraine and cluster headache in Swedish men of 18. *Headache*. 1978;18(1):9-19.

3. Swanson JW, Yanagihara T, Stang PE, et al. Incidence of cluster headaches: a population-based study in Olmstead County Minnesota. *Neurology*. 1994;44:433-437.

4. Russell MB. Genetic epidemiology of migraine and cluster headache. *Cephalalgia*. 1997;17:683-701.

## Prevalence of Primary Headache Types in Waiting Rooms

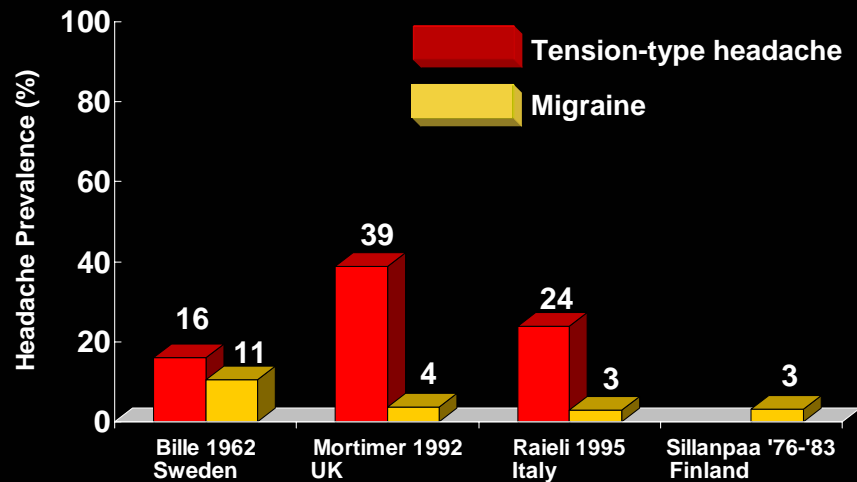


This study was designed to evaluate the validity and reliability of a short, self-administered migraine screening questionnaire in patients with headache complaints who seek medical care for their headaches in a primary care setting. Overall, 563 patients attending primary care offices for routine appointments and who also reported headaches in the past 3 months completed a self-administered migraine screener. All patients were referred for a second evaluation to a headache expert, where they received a specific migraine diagnosis. Four-hundred and fifty one (80%) participants completed the full evaluation.

In this study, migraine was significantly more common in primary care offices than what was previously reported in the general population. This study suggests that patients with tension-type headache do not seek medical treatment for their headaches, whereas, migraine patients do.

Lipton RB, Dodick D, Sadovsky R, et al. ID Migraine validation study. A self-administered screener for migraine in primary care: The ID Migraine validation study. *Neurology*. 2003;61(3):375-382.

## OVERALL PREVALENCE OF HEADACHE TYPES IN CHILDREN



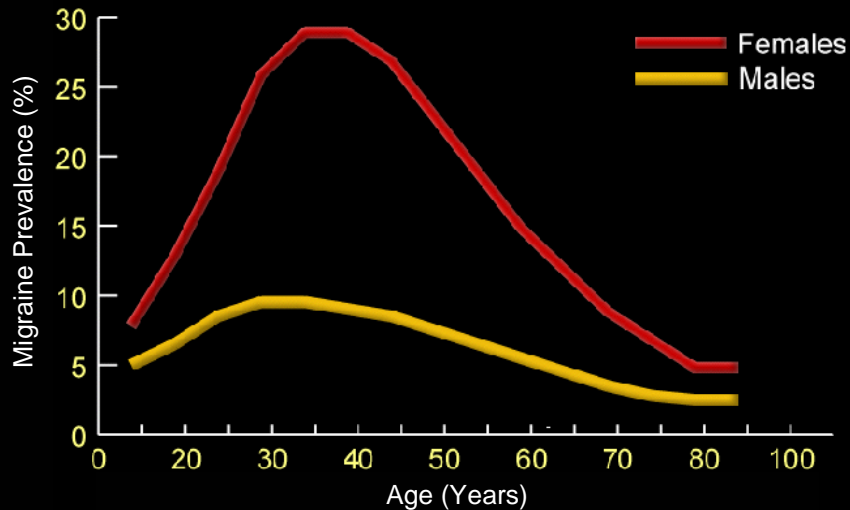
Bille BS. *Acta Paediatr.* 1962; Mortimer MJ et al. *Dev Med Child Neurol.* 1992. Raieli V et al. *Cephalalgia.* 1995. Sillanpaa M. *Headache.* 1976.

Although the prevalence of tension-type headache appears to vary across different countries, the prevalence of migraine appears relatively consistent ranging between 3 and 11%. Methodological issues make across-study comparisons difficult as the prevalence of migraine changes with age, and therefore, these rates are all dependent upon the age of the child and the gender.

Author Country/year	Sample size	Age (years)	Headache Prevalence			Migraine Prevalence	
			Males	Females	Total	Males	Females Total
Bille Sweden/1962	8,993	5-15				10.6	
Linet USA/1984	10,132	12-29	90	95		5.3	14
Mortimer UK/1992	1,083	3-11	40.6	36.9	38.8	4.1	2.9 3.7
Raieli Italy/1995	1,445	11-14	19.9	28.0	23.9	2.7	3.3 3.0
Sillanpaa Finland/1976- 83	4,825	3		4.3			
		7				3.2	3.2
	3,784	13	79.8	84.2		3.2	8.1 15.1

Bille BS. Migraine in school children. A study of the incidence and short-term prognosis, and a clinical, psychological and electroencephalographic comparison between children with migraine and matched controls. *Acta Paediatr.* 1962;51(Supp 136):1-151. Linet MS, Stewart WF. Migraine headache: epidemiologic perspectives. *Epidemiol Rev.* 1984;6:107-139. Mortimer MJ, Kay J, Jaron A. Epidemiology of headache and childhood migraine in an urban general practice using Ad Hoc, Vahlquist and IHS criteria. *Dev Med Child Neurol.* 1992;34(12):1095-1101. Raieli V, Raimondo D, Cammalleri R, Camarda R. Migraine headaches in adolescents: a student population-based study in Monreale. *Cephalalgia.* 1995;15(1):5-12. Sillanpaa M. Prevalence of migraine and other headache in Finnish children starting school. *Headache.* 1976;15(4):288-290.

## AGE- AND GENDER-SPECIFIC PREVALENCE OF MIGRAINE



Lipton RB et al. *Headache*. 2001.

In both males and females, the prevalence distribution of migraine is an inverted U-shaped curve. Prevalence rises through early adult life and then falls after midlife. The second important point to emphasize is that, at all postpubertal ages, migraine is substantially more common in women than in men.

The prevalence of migraine varies as a function of age. Migraine is a disorder that is most prevalent between the ages of 25 and 55. Part of the reason the condition has such a big impact in the workplace is that it affects people during their peak productive years.

At prepubertal ages, the rate of onset for migraine is actually a little bit higher in boys than in girls, but at all postpubertal ages, the incidence is higher in girls than in boys. The incidence of migraines without aura peaks around age 12 in boys and age 15 in girls. Although half of all migraine onsets begin before the age of 20, migraine can begin at age 1.

Lipton RB, Stewart WF, Diamond S, et al. Prevalence and burden of migraine in the United States: data from the American Migraine Study II. *Headache*. 2001;41(7):646-657.

Lipton RB, Stewart WF. Migraine in the United States: a review of epidemiology and health care use. *Neurology*. 1993;43 (suppl 3):S6-S10.

Stewart WF, Linet MS, Celantano DD, et al. Age- and sex-specific incidence rates of migraine with and without visual aura. *Am J Epidemiology*. 1991;134:1111-1120.

# BURDEN OF MIGRAINE

## Individual burden

## Societal burden

- Direct costs
  - \$2.5 billion per year
- Indirect costs
  - \$13 billion per year
  - Absenteeism
  - Reduced effectiveness
- Burden disproportionately distributed
  - 51% female migraineurs → 93% of work loss due to migraine
  - 38% male migraineurs → 85% work loss due to migraine



Hu HX et al. *Arch Intern Med.* 1999.  
Stewart WF et al. *Cephalalgia.* 1996.

When contemplating the burden of migraine, it is useful to distinguish individual burden and societal burden. Individual burden is determined by symptoms during attacks, by anticipation of symptoms between attacks, by the reduced quality of life in people who suffer with migraine compared with the general population, and in lost economic opportunity. The evidence shows that migraine reduces family, social, and recreational activities.

Traditionally, assessment of societal burden is expressed in economic terms by distinguishing between direct costs and indirect costs. Direct costs refer primarily to the cost of medical care. Indirect costs refer primarily to the impact the illness has on work and on function in other domains. For work, it is useful to distinguish absenteeism from reduced effectiveness.

With regard to indirect costs, which are the primary costs of migraine, individuals with migraine from the general population required on average 3.8 days of bed rest for men and 5.6 days of bed rest for women per year. Projecting to the US population, migraine causes a total of 112 million bedridden days per year. Migraine costs American employers about \$13 billion per year because of missed work and also reduced function while at work. Patients between the ages of 30 and 49 incurred the greatest indirect costs relative to younger and older workers, which is not surprising given the epidemiologic profile of the disease.

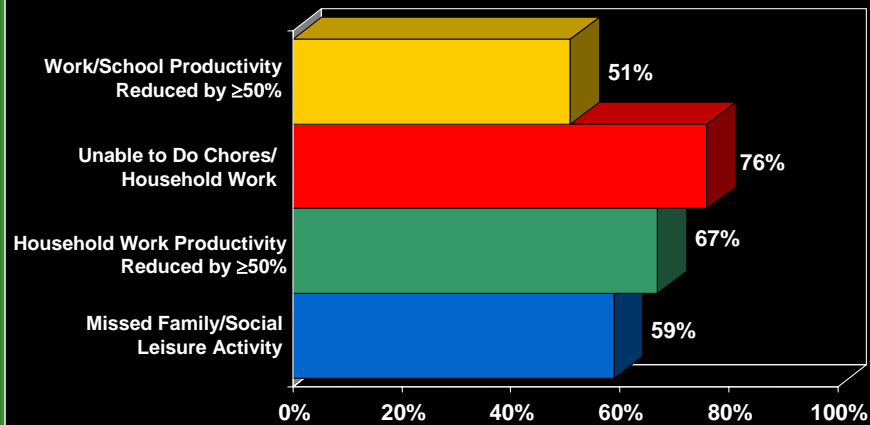
It is important to recognize that the distribution of the burden of migraine is not uniform across the population of migraine sufferers. Individuals who miss the equivalent of 6 or more days of work per year account for most of the reported work lost due to migraine. Fifty-one percent of women miss the equivalent of 6 or more days of work per year due to migraine, which accounts for 93% of all work lost due to migraine. Thirty-eight percent of men lose that same amount of time (6 days), accounting for 85% of work loss because of migraine.

There is a compression of disability where the most disabled segments of migraine sufferers account for most of the work loss. These most disabled individuals are good targets for intervention because, by effectively and aggressively treating these individuals, one is likely to reduce the burden of migraine at work.

Hu HX, Markson LE, Lipton RB, et al. Burden of migraine in the United States: disability and economic costs. *Arch Intern Med.* 1999;159(8):813-818.

Stewart WF, Lipton RB, Simon D. Work-related disability: results from the American migraine study. *Cephalalgia.* 1996;16(4):231-238.

## ADVERSE IMPACT OF MIGRAINE ON PATIENTS' DAILY LIVES

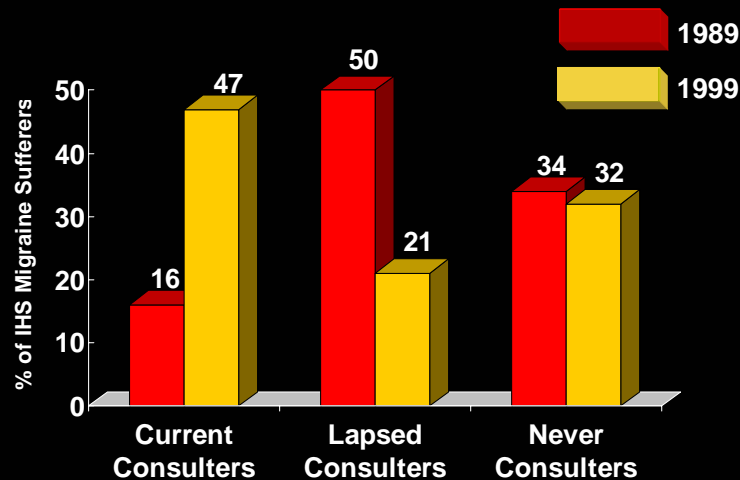


Lipton RB et al. *Headache*. 2001.

For many patients, migraine has a significant adverse impact on patient's daily lives. This can be measured using time missed from routine activities including work,

Lipton RB, Stewart WF, Diamond S, et al. Prevalence and burden of migraine in the United States: data from the American Migraine Study II. *Headache*. 2001;41(7):646-657.

## CONSULTATION PATTERNS IN THE UNITED STATES



Lipton RB et al. *Headache*. 1998; Lipton RB et al. *Neurology*. 2002.

Lack of consultation for headache is a major contributing factor to underdiagnosis.

**Never consulters** have never seen a doctor specifically for headache. In 1989 and in 1999, this group accounted for about one third of migraine sufferers.

**Lapsed consulters** have seen a doctor for headache at some point in the past but not within the last year. The lapsed consulter group has decreased from 50% to 21% of all migraine sufferers.

**Current consulters** have seen a doctor for headache in the last year. By 1999, the proportion had tripled to 47%.

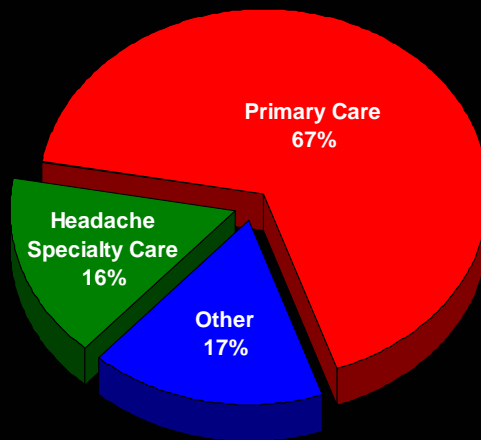
These changes in consultation patterns are not fully reflected in patterns of diagnosis and treatment. These data are very much the sort that can be looked at from the perspective of, “Is the glass half empty or is the glass half full?” Clearly, the increase in the number of migraine sufferers who are currently seeking care (47% in 1999) is encouraging. On the other hand, more than half of migraine sufferers are not seeking care (21% of the lapsed and 32% of the never consulters), and not everyone who does consult his or her doctor gets a specific diagnosis of migraine or receives specific therapy.

Lipton RB, Scher AI, Kolodner K, et al. Migraine in the United States: epidemiology and patterns of health care use. *Neurology*. 2002;58(6):885-894.

Lipton RB, Diamond S, Reed M, et al. Migraine diagnosis and treatment: results from the American Migraine Study II. *Headache*. 2001; 41(7):638-645.

Lipton RB, Stewart WF, Simon D. Medical consultation for migraine: results from the American Migraine Study. *Headache*. 1998;38(2):87-96.

## WHERE DO MIGRAINE SUFFERERS SEEK MEDICAL CARE?



Lipton RB et al. *Headache*. 1998.

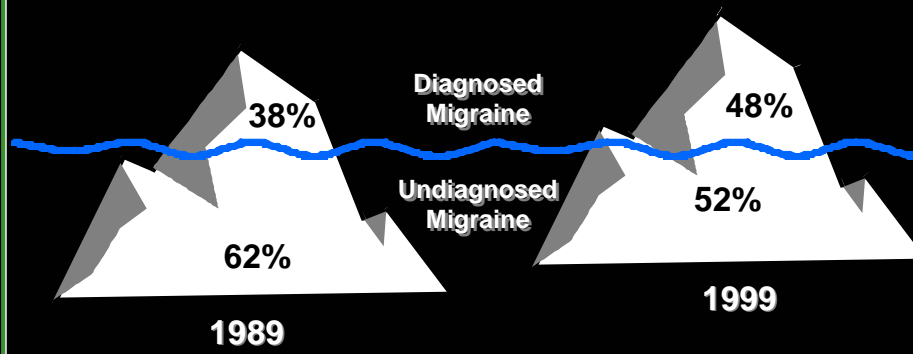
Of the migraine sufferers who consult a doctor, about two thirds consult primary care physicians, which includes general practitioners, family practitioners, internists, and pediatricians; 16% consult neurologists or headache specialists.

Lipton RB, Stewart WF, Simon D. Medical consultation for migraine: results from the American Migraine Study. *Headache*. 1998;38:87-96.



## MEDICALLY DIAGNOSED MIGRAINE THE TIP OF THE ICEBERG

### The Migraine Iceberg is Rising



- 14.6 million migraine sufferers remain undiagnosed
- 53% have headache-related disability

Lipton RB et al. *Headache*. 2001.

Each iceberg represents the migraine sufferers in the US—23 million people in 1989 and 28 million in 1999. Those above the water line represent the medically diagnosed migraine sufferers. Those below the water line represent the migraine sufferers who never receive a diagnosis. In 1989, only 38% of IHS migraine sufferers, who were identified by direct questionnaires, had received a medical diagnosis. In 1999, the good news is that the migraine iceberg has risen. The proportion of medically diagnosed migraine sufferers has increased to 48%. The bad news is that the majority of migraine sufferers remain below the water line without a diagnosis (1,2).

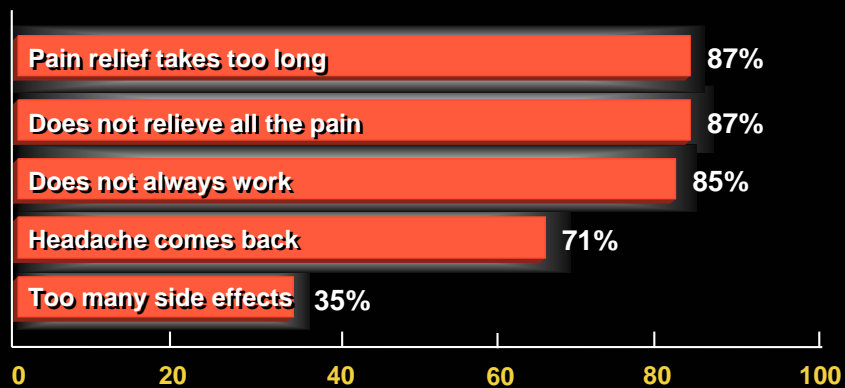
Many people who suffer with severe headache continue to receive care on an episodic basis in emergency departments. In 1999, there were 102.7 million emergency department visits. Of these, 2.8 million of them were for headache, representing nearly 3% of all emergency department visits for the period (3). Despite the availability of cost-effective migraine-specific agents like DHE and the triptans, most headache sufferers diagnosed with migraine in the emergency department received IV opioids and an antiemetic as their only treatment (4).

1. Lipton RB, Scher AI, Kolodner K, et al. Migraine in the United States: epidemiology and patterns of health care use. *Neurology*. 2002;58(6):885-894.
2. Lipton RB, Stewart WF, Simon D. Medical consultation for migraine: results from the American Migraine Study. *Headache*. 1998;38:87-96.
3. <http://www.cdc.gov/nedss>
4. Vinson DR. Treatment patterns of isolated benign headache in US emergency departments. *Ann Emerg Med*. 2002;39(3):215-222.

## UNDERTREATMENT OF MIGRAINE

Only **29%** of US migraine sufferers are very satisfied with their usual acute treatment

### Reasons for Dissatisfaction



Lipton RB, Stewart WF. *Headache*. 1999.

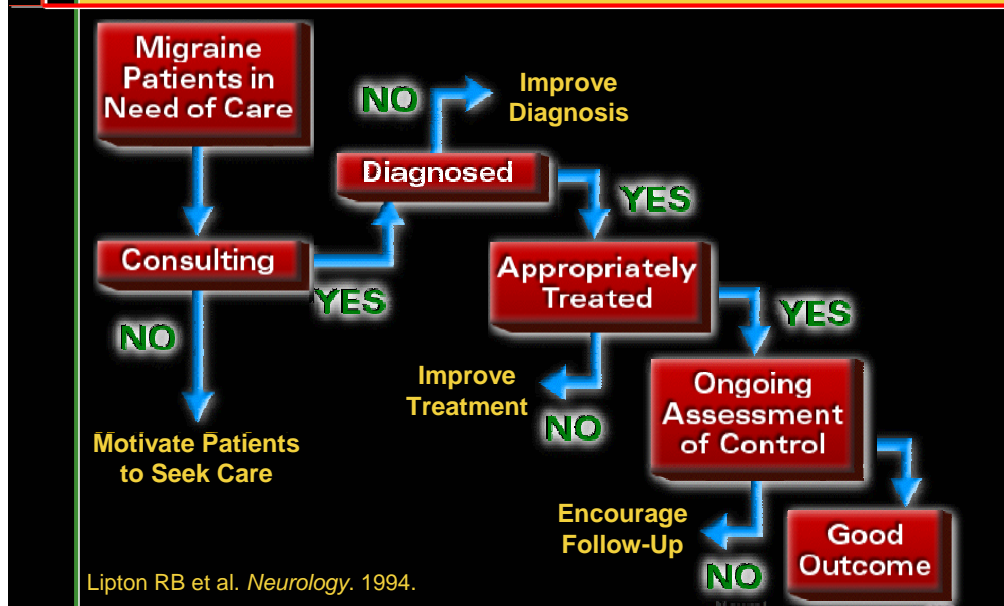
In another survey, migraine sufferers in the United States were asked how satisfied they were with the usual acute treatment. Only 29% of migraine sufferers in 1998 said that they were very satisfied with their usual acute treatments. When asked why they were less than completely satisfied, they said the following:

- Pain relief takes too long
- Pain relief is incomplete
- The pain does not go away completely
- The medication doesn't always work (meaning that it works for one attack, but not others)
- The pain goes away and comes back (a phenomenon called headache recurrence)
- Medications produce too many side effects

It is interesting to note that dissatisfaction with efficacy was much more important than dissatisfaction with side effects for the majority of migraine sufferers.

Lipton RB, Stewart WF. Acute migraine therapy: do doctors understand what patients with migraine want from therapy? *Headache*. 1999;39 (suppl 2):S20-S26.

## BARRIERS TO SUCCESSFUL OUTCOMES



In considering the group of migraine sufferers in need of medical care, the first question is: Are they consulting a physician, and are they seeking medical care for their headaches? If not, patients need to be motivated to seek medical care specifically for their headaches.

If they are consulting, the next question is: Did the patient receive a specific medical diagnosis? If there has been no diagnosis, the need is to improve medical diagnosis.

If the patient is consulting and has been diagnosed, the next question is: Are they being appropriately treated? If not, therapy will need to be improved.

If patients are being appropriately treated, the next question is: Are they receiving regular assessment of headache control to ensure their needs are being met? If not, routine follow-up and assessment need to be established.

If ongoing assessment occurs, this can be defined as a “good headache outcome”—a patient in need of medical care who has consulted, been diagnosed, received appropriate treatment, and receives ongoing monitoring to make sure that the treatment benefits continue. “Good outcome” is defined during a dialogue between the doctor and patient. In general, good outcomes includes: a good feeling of illness control; management of attacks with effective acute treatments that rapidly relieves pain and restores ability to function; reduction or stabilization of frequency— which should be  $\leq 10$  per month in order to minimize the risk of medication overuse; and achieve good tolerability with medications and overall treatment.

Lipton RB, Amati JC, Ferrari MD, Gross M. Migraine: identifying and removing barriers to care. *Neurology*. 1994;44 (suppl 4):S63-S68.

## HEADACHE PROGRESSION

- Epidemiological studies suggest headache progresses in some patients

- Natural history is crucial

- Helps predict progression
- Treatment goal is to modify history

- Strategies for modifying history

- Identify risk factors
- Optimize use of medications

Headache progression in migraine is not common, but occurs in a small subgroup of patients. Epidemiological studies suggest that there are specific factors that might lead to progression in selected patients. Understanding the natural history of migraine progression as a clinical phenomenon will help better understand how to prevent it.

## RESULTS OF INCIDENCE STUDY

**798 controls with 2 to 104 headache days per year were followed for up to an average of 11 months**

<b># of patients (%)</b>	<b>1-year follow-up</b>
23 (3%)	New-onset CDH (180+ headache days/year)
49 (6%)	Intermediate (105 to 179 headache days/year)
726 (91%)	Stable controls (2 to 104 headache days/year)

Scher AI et al. *Pain*. 2003;16:81-89.

In a recent study by Scher and colleagues assessed factors that predicted CDH onset or remission in an adult population. Overall, there were 1134 potential cases who reported having 180+ headaches per year and 798 controls who reported 2 to 104 headaches per year. Patients were interviewed twice during an average of 11 months of follow-up.

The incidence of chronic daily headache and associated risk factors for chronic daily headache were evaluated in the control population, who had a headache frequency increase to 180+ per year (over the 2 to 104 headaches per year) during follow-up. At follow-up, 3% of the controls developed CDH and reported 180 or more headaches per year. This agrees with epidemiologic studies in the general population, whether in Spain or Greece or Taiwan or United States showing that about 3 to 5% of the patients go on to develop chronic daily headache.

Six percent went on to develop intermediate (105 to 179 headache days per year) CDH. The authors suggest that this is a sign of progression. Ninety-one percent were stable and maintained a headache frequency between 2 to 104 headache days per year. So the vast majority of control patients remained stable and did not develop chronic daily headache, but clearly there was a significant number who did.

Scher AI, Stewart WF, Ricci JA, Lipton RB. Factors associated with the onset and remission of chronic daily headache in a population-based study. *Pain*. 2003;106(1-2):81-89.

## FACTORS ASSOCIATED WITH CDH

	<u>Adjusted odds of incident CDH</u>
Female	0.94 (0.4-2.4)
<b>BMI (kg/m<sup>2</sup>)</b>	
Normal (<25 kg/m <sup>2</sup> )	1.00 (reference)
Overweight (25-29.9 kg/m <sup>2</sup> )	1.97 (0.4-9.0)
<b>Obesity (≥30 kg/m<sup>2</sup>)</b>	<b>5.28 (1.3-21.1)</b>
Baseline frequency	<i>P</i> <.001

Scher AI et al. *Pain*. 2003;16:81-89.

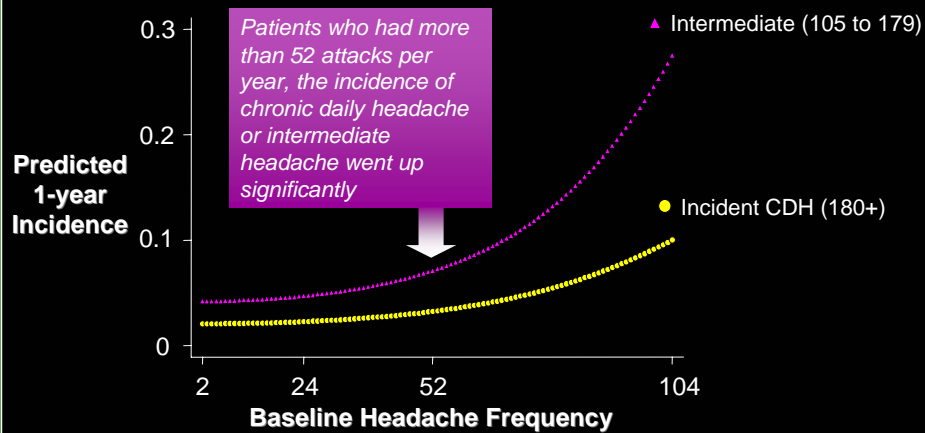
The results from this study report that CDH was more common in women, in whites, and in patients with less education. Other predictors included:

- obese
- previously married (divorced, widowed, separated),
- diagnosis of diabetes or arthritis

The found that body mass index was highly predictive for development of chronic daily headache as illustrated with an adjusted odds ratio of 5.28. Patients who were obese, with a body mass index of 30 or higher, were at least five times more likely to go on to develop chronic daily headache.

Scher AI, Stewart WF, Ricci JA, Lipton RB. Factors associated with the onset and remission of chronic daily headache in a population-based study. *Pain*. 2003;106(1-2):81-89.

## ATTACK FREQUENCY AT BASELINE PREDICTS CDH AT FOLLOW-UP



Scher AI et al. *Pain*. 2003;16:81-89.

This curve illustrates the control patients who went on to develop intermediate headache and those controls who went on to develop chronic daily headache.

Patients who had more than 52 attacks per year, the incidence of chronic daily headache or intermediate headache went up significantly. In other words, for those patients who have one attack per week, that is predictive of those patients who are going to go on and develop chronic daily headache.

This is actually the first data to show that baseline headache frequency is an actual risk factor for CDH development. Frequency is a highly significant predictor of those patients who were destined to develop chronic daily headache.

Scher AI, Stewart WF, Ricci JA, Lipton RB. Factors associated with the onset and remission of chronic daily headache in a population-based study. *Pain*. 2003;106(1-2):81-89.

## CONCLUSIONS FROM THE SCHER STUDY

Incidence of CDH is 3/100 person-years

Case control and cohort analyses identify risk factors for CDH:

### **Not readily modifiable**

Migraine

Gender: Female

Low education/socioeconomic status

Head injury

### **Readily modifiable**

Attack frequency

Obesity

Medication overuse

Stressful life events

Snoring (sleep apnea,  
sleep disturbance)

Scher AI et al. *Pain*. 2003;16:81-89.

The conclusions from this frequent headache epidemiology study is that the incidence of chronic daily headache is 3 per 100 person-years, meaning 3% of the general population will develop chronic daily headache over the next year.

Case control and cohort analyses have identified risk factors for CDH. There are risk factors that are not readily modifiable and there are risk factors that are readily modifiable.

We cannot modify inherited genetic predisposition for migraine, or being female, or education or social economic status, or a history of head injury.

But what we may be able to intervene on and modify is attack frequency, obesity, and medication overuse. We hope to find a way to modify response to stressful life events. Snoring is an interesting factor that needs further exploration.

As physicians these are factors that we ought to be looking for in our patients with chronic daily headache because modifying them may prevent development of chronic daily headache. They also may be risk factors that, if modified, may increase the remission rate of CDH, reverting to episodic headache.

Scher AI, Stewart WF, Ricci JA, Lipton RB. Factors associated with the onset and remission of chronic daily headache in a population-based study. *Pain*. 2003;106(1-2):81-89.



## OVERALL CONCLUSIONS

### Migraine is:

- common
- disabling
- underdiagnosed and undertreated

### Improvements needed in:

- consultation
- diagnosis
- treatment
- outcomes
- follow-up

Lipton RB et al. *Headache*. 2001.

In summary, migraine is a highly disabling disease that affects roughly 18% of women and 6% of men in the US. Prevalence is highest during the peak productivity years between the ages of 25 and 55. It represents a large part of the neurologist's practice.

Progress has occurred over the last decade in the proportion of migraine sufferers who seek care and in the proportion of migraine sufferers who have received a diagnosis and have been treated with prescription drugs. The majority of individuals suffering from migraine still do not receive a physician diagnosis nor receive migraine-specific agents. The bottom line remains that better diagnosis and treatment are needed.

Lipton RB, Diamond S, Reed M, et al. Migraine diagnosis and treatment: results from the American Migraine Study II. *Headache*. 2001;41(7):638-645.

Lipton RB, Stewart WF, Diamond S, et al. Prevalence and burden of migraine in the United States: data from the American Migraine Study II. *Headache*. 2001;41(7):646-657.

Lipton RB, Stewart WF. Migraine in the United States: a review of epidemiology and health care use. *Neurology*. 1993;43 (suppl 3):S6-S10.

Stewart WF, Lipton RB, Liberman J. Variation in migraine prevalence by race. *Neurology*. 1996;47:52-59.

Scher AI, Stewart WF, Ricci JA, Lipton RB. Factors associated with the onset and remission of chronic daily headache in a population-based study. *Pain*. 2003;106(1-2):81-89.