Headaches in Children and Adolescents
Approximately 60% of children experience occasional headaches. Most of these children never present to a physician. Up to 18% of females and 6% of males under the age of 20 have migraines and may need medical management.

**Headache vs. Migraine: Making the Right Diagnosis**

In adults, migraines usually last at least four hours and are typically unilateral, but the duration may be much shorter in the pediatric population and present bilaterally. Only about 10% of pediatric migraneurs will have an aura, and younger patients may not notice or be able to describe an aura if it is present.

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### Migraine Diagnostic Criteria:

- >5 headaches over the past year that last 2-72 hours when untreated
- 2 of 4 additional features
  - Pulsatile quality
  - Unilateral
  - Worsening with activity or limiting activity
  - Moderate to severe in intensity
- Associated with nausea, vomiting, photophobia or phonophobia

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**Is It a Brain Tumor?**

Despite parents’ common concern, it is exceedingly rare for headache to be the presenting complaint of a brain tumor. However, the following “red flags” should increase your level of suspicion of a serious underlying cause:

**History Red Flags:**

- Sudden onset
- Worst headache of child’s life
- No family history of headaches
- Progressive headache

**Physical Exam Findings Red Flags:**

- Headache that awakens a child or teen from a sound sleep and is associated with nausea and vomiting
- Headaches in the back of the head
- Worse when laying down, upon awakening or with Valsalva

- Focal deficits on your exam
- Papilledema, cranial nerve VI palsy

- Evidence of recent head trauma
- Meningeal signs or fevers
- Altered mental status
- Neurocutaneous findings

If any of these red flags exist, further workup for a serious underlying issue or a referral to a pediatric neurologist may be indicated. Patients without red flags generally do not need CT scans, MRIs or EEGs for their headaches or migraines.

**TREATMENT: PREVENTION**

**Lifestyle Management**

Recent studies have shown that lifestyle factors can greatly contribute to headache management in children and adolescents.

**Diet:** Migraine sufferers must eat three meals a day (No skipped meals). Healthy nutrition habits, such as adequate fruits and vegetables and avoidance of excessive added sugars can be particularly helpful. Breakfast is a common meal to remind teenagers about. Some patients can have specific food triggers that can be identified by keeping a headache journal and noting the foods eaten on days when headaches occur. Some common food triggers include citrus, meats cured with nitrates, bread baked with yeast, red food coloring, nuts, yogurt/sour cream, artificial sweeteners and vinegar.

**Sleep:** Adequate sleep is vital for health and wellbeing, particularly for headache sufferers. Consistent sleep and wake times, including on weekends.

- 3-5 years: 10-12 hours of sleep per 24 hours (including naps)
- 6-12 years: 9-12 hours of sleep
- 13-18 years: 8-10 hours of sleep
**Hydration:** Poor hydration is often the cause of migraines, especially in hot weather. It is helpful to give families a fluid goal in ounces as this can be one of the most powerful interventions. An easy rule of thumb is to have the child drink their weight in kilograms, in ounces (e.g., a 50kg child should drink 50 ounces of water per day).

**Caffeine:** Though caffeine is present in a number of over-the-counter medications for migraines, we recommend caffeine avoidance because the frequent intake of caffeinated products is one of the most common causes of rebound headache. Excessive caffeine intake can be dehydrating and interfere with sleep, as well. It is important to discuss sources of caffeine, such as soda and tea, that can go unrecognized.

**Analgesic-overuse:** Review home medication use. Recommend caution in OTC analgesic medications. Patients should be advised not to take any abortive medications more than two days a week and no more than twice daily.

**Exercise:** Studies have shown that good exercise habits can decrease migraine frequency and intensity.

**Psychological support:** Many of these patients are under stress from school, work, family or other relationships. These stressors should be addressed for optimal treatment. Oftentimes, psychiatric comorbidities go unrecognized by patients and families. In some instances, treatments such as biofeedback and relaxation therapy may be helpful.

### Preventive Medical Therapy for Frequent Migraines

For patients who suffer from migraines at least once a week or who have migraines that last for long periods of time, preventive therapy may be indicated. Consider starting one of these preventive therapies, which have been shown to be helpful in preventing migraines in children and adolescents. If limited response to below medications, consider referral to the Headache Clinic at Nationwide Children's.

- Melatonin 3mg QHS
- Riboflavin 50-400mg QDAY
- Magnesium oxide 400mg QDAY

### TREATMENT: ACUTE MEDICAL MANAGEMENT

1. First line therapy: Acetaminophen 15mg/kg, or NSAID medications such as ibuprofen (10mg/kg) or naproksen may resolve symptoms. This should be given with 24-32 ounces of fluids (supposing significant nausea is not present).

2. For children and adolescents who do not respond to OTC analgesics, a triptan may be prescribed. (Triptans are contraindicated in patients with a history of migraines accompanied by focal neurological deficits or loss of consciousness, cardiovascular disease, stroke, TIA, MI, severe peripheral vascular disease, or cardiac accessory conduction pathway disorders.)

- Rizatriptan ODT (Maxalt) (5mg or 10mg) is approved for ages 6 and up by the FDA
- Zolmitriptan nasal spray (5mg)
- Sumatriptan/naproksen OT (10/60mg, 30/180mg, or 85/500mg)
- Sumatriptan nasal spray 5-20mg
- Almotriptan OT (6.25mg or 12.5mg)
- Sumatriptam 50-100mg

To avoid a medication-overuse headache, patients should be advised not to take any medications more than 1-2 days a week and no more than twice daily.

It is critical that the patient take the medication as soon as possible after the onset of the headache (less than one hour). The longer the delay, the less effective the treatment will be. This needs to be clearly communicated to the patient, the family and the school.

This guideline is meant as a starting point for headache treatment in the general pediatrician’s office. Many times, lifestyle factors are significantly contributing to the headache and can be addressed. If patients are continuing to experience headaches beyond the above steps, please refer them to the Headache Clinic.
**Headache Clinic at Nationwide Children’s Hospital**

In the Headache Clinic at Nationwide Children’s Hospital, patients are evaluated by physicians and nurse practitioners with unique expertise in headache management for children and adolescents. Clinical psychologists are also available to provide expertise in biofeedback and relaxation therapy for families that are interested in these non-medication treatments. These approaches may be particularly helpful for older children and teens who suffer from other conditions that may be contributing to frequent headaches, such as depression or anxiety. Clinic appointments may be made at the Nationwide Children’s main campus, or at locations surrounding Columbus in Dublin, Westerville and New Albany.

**Referrals and Consultations**

Online: [NationwideChildrens.org/Neurology](http://NationwideChildrens.org/Neurology)
Phone: (614) 722-6200 or (877) 722-6220 | Fax: (614) 722-4000
Physician Direct Connect Line for 24-hour urgent physician consultations: (614) 355-0221 or (877) 355-0221

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**Patient Presents with Headache**

[Diagram showing decision tree for headache management]

- **No Red Flags**
  - Classify headache and review headache hygiene
    - Hydration
    - Meals
    - Sleep
  - Start headache hygiene interventions
  - Keep headache log – including date, time, situation and treatment of headaches – and assess response in 4 weeks

- **Red Flags**
  - Consider consulting neurologist
  - Call Nationwide Children’s if acute concerns
  - Consider imaging and other investigations
  - If history of trauma, head CT
  - Otherwise MRI is the preferable study

- **Infrequent**
  - Acute symptomatic treatment

- **Frequent >1 a week**
  - Start appropriate treatment
  - Start headache hygiene interventions
  - Keep headache log – including date, time, situation and treatment of headaches – and assess response in 4 weeks

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**When your child needs a hospital, everything matters.**