Pediatric Headache in Primary Care

Harry Bramley, DO, FAAP
Physician, CHOP Specialty Care, Lancaster
Chair of Pediatrics, Lancaster General Hospital

Christina Szperka, MD
Director, Pediatric Headache Program
Children's Hospital of Pennsylvania

Carlyn Patterson, MD
Fellowship Director, Pediatric Headache Program
Children's Hospital of Pennsylvania


Bramley


Szperka


Patterson

A 12-year-old male presents to his primary care clinician with the chief complaint of headache. What strategies would be helpful in a busy primary care office to assess for secondary causes of headache? When should neuroimaging be considered? What are some common primary headache disorders and how are they diagnosed? What important lifestyle modifiers could be influencing headaches? What types of rescue strategies and medications should be discussed? When should prevention strategies utilizing supplements and medications be considered?

The goal of this article is to summarize important points for the primary care clinician when evaluating a child or adolescent with a complaint of headache. A helpful resource is the CHOP Primary Care Clinical Pathway for Evaluation and Management of Child with Headache, available by scanning the QR code at left.

INTRODUCTION

Headache disorders cause substantial disability worldwide in adolescents and young adults, and also have a negative impact on the quality of life of affected children and adolescents.[1,2] The prevalence of migraine disease in children 5 to 10 years old is 5% and in adolescents is as high as 15%.[1,3]

Children and adolescents with migraine disease are absent from school more than their peers, and social interactions — including those during classes and at lunch — are often limited.[4,5] Migraine disease has also been associated with comorbidities such as sleep disorders and depression and anxiety.[2] Attempted and completed suicide occurs more often in patients 15 years of age and older diagnosed with headaches as compared to those without.[6]

The primary care clinician can help many children and adolescents with headaches, as two-thirds of children and adolescents will respond to headache therapies.[7,8] For appropriate acute and prevention therapies to be offered, however, the clinician will need to conduct a thoughtful and directed evaluation.

EVALUATING FOR A SECONDARY HEADACHE

A secondary headache is a headache that is a symptom of an identifiable cause, such as an infection or intracranial lesion.[9] Life-threatening causes, such as brain tumors, occur in about 1% of children and adolescents with headaches in a primary care setting.[10,11]

It is important for the primary care clinician to assess for other secondary headaches that may affect management. It is possible for a child to have both primary and secondary headache; for example, a child with migraine disease may have a flare of migraine triggered by an upper respiratory infection.

Medical literature does promote the use of red flags to screen for secondary headache disorders, but there is a lack of epidemiologic studies regarding red flags.[11] Red flags can be defined as symptoms or signs that would suggest the need for additional evaluation or observation. The CHOP Primary Care Clinical Pathway for Evaluation and Management of Child with Headache utilizes the mnemonic SNOOPY (see Table 1 on page 69) to encourage investigators to evaluate for secondary headache; this was adapted from SNOOP10, designed to help discern the cause of secondary headache in adults.[11-13]

The absence of red flags suggests that additional evaluation, such as neuroimaging, would offer a low yield and is not indicated.[14] Parents and caregivers, however, are at times worried that a headache is a sign of a life-threatening cause. If there are no red flags and the concern for a secondary cause of the headache is low, providing reassurance can be helpful.

The presence of a red flag, or multiple red flags, should prompt the clinician to pause and consider further evaluation, such as expedited subspecialty referral

and/or neuroimaging. It is important to note, however, that a high proportion of patients who present with headache report at least one red flag, and a secondary headache disorder is more often suspected than detected.[11] Multiple studies have revealed that even with the use of red flags, neuroimaging is often unremarkable.[15-17] Findings that may offer a higher yield for a secondary headache are an abnormal neurologic exam, systemic illness, and new or worsening headache.[12]

PRIMARY HEADACHE

Primary headaches are idiopathic with no known secondary cause and diagnosed clinically based on the International Clarification of Headache Disorders (ICHD-3) diagnostic criteria. The committee that created this extensive document indicates that neuroimaging is not needed for the obvious case of migraine or tension-type headache but is useful when the diagnosis is uncertain.[18]

With the high prevalence of primary headache disorders, primary care clinicians should be familiar with some of the more common primary headaches found in children and adolescents. Migraine and tension-type headaches are the two most common primary headache disorders. Other, less common primary headache disorders in children and adolescents include new daily persistent headache, trigeminal autonomic cephalalgia, and stabbing headache.[1,12]

In most instances, answers derived from a set of headache-based questions will suggest the pattern of a primary headache disorder; headache frequency, pattern, location, quality, severity, as well as associated features, should all be ascertained.[12,19] As a rule of thumb, migraine is a headache with associated symptoms, while tension-type headache is a headache without associated symptoms.

Migraine

Frequent migraines can be disabling and often have a negative impact on the individual's quality of life — this should not be underestimated or overlooked. Children and adolescents with migraine disease have lower quality-of-life scores on the Pediatric Quality of Life Inventory, with scores similar to those of children and adolescents diagnosed with cancer and arthritis.[20]

Migraine headaches may be described as with or without aura.[18] Most children and adolescents will have migraine without aura, but about 20% will have a preceding or overlapping aura, typically visual, less commonly sensory (tingling > numbness), speech and/or language, motor, brainstem, and retinal.[18] The aura may accompany the headache and may even precede the headache by as much as 60 minutes.[18] Some may have weakness, dysarthria, and coordination difficulties; initial or prolonged presentation of these symptoms should prompt the clinician to use neuroimaging to assess for vascular pathology, such as stroke.[18]

Based on ICHD-3 criteria, migraine without aura may be diagnosed when a patient younger than 18 years has experienced at least five lifetime attacks, each with a duration of between 2 and 72 hours.[18,21] The headache may be unilateral or bilateral, pulsating, of moderate or severe pain intensity, and aggravated by physical activity; associated symptoms may be nausea and/or vomiting, or photophobia and phonophobia.[18]

Tension-Type Headache

Tension-type headaches are common in children and adolescents but generally considered less severe when compared to migraines. Patients often do not seek medical attention as these types of headaches are generally mild and cause little disability.[12,19]

Tension-type headaches are typically bilateral in location; may be described as pressure and may be of a non-pulsating, vice-like quality; tend to be mild or moderate in intensity; and are not aggravated by physical activity.[18] Tension-type headaches are not associated with nausea *and* vomiting; they may be associated with either, but not both.[18]

Patients with Frequent or Daily Headache

Approximately 1% to 2% of adolescents have very frequent headache.[22,23] The old term was "chronic daily headache," but treatments can differ by subtype, so the more precise terms are preferred. The occurrence of both tension and migraine headache can transform over time, with the frequency of attacks increasing over weeks to months until the attacks occur on more days than not.[19]

Specifically, chronic migraine describes the condition in which headaches occur on 15 or more days per month, and the patient may experience the features of migraine headache on at least eight days per month for more than three months.[18] Chronic migraine causes more disability than other chronic headache syndromes, so the majority of youth who seek medical care for frequent headache have chronic migraine.

Medication-overuse headaches should be considered in patients with daily headaches. The diagnosis

Table 1. The SNOOPY Mnemonic

S	**Systemic Disease** History of malignancy or tumor History of congenital heart disease Immunosuppression or immune deficiency Hemotologic — thrombophilia, thrombocytopenia, conagulopathy or sickle-cell disease Genetic disease with predisposition Recent history of head trauma **Signs of Systemic Disease** Constitutional — weight loss, fever, fatigue, malaise, morning vomiting or recurrent vomiting without cause Infectious — sinusitis, encephalitis/meningitis, tickborne Rheumatologic — arthritis, rash
N	**Neurologic Signs** Altered mental status Papilledema Focal neurologic findings New seizure
O	**Onset Sudden** Thunderclap headache — may signal vascular cause
O	**Occipital Location** May be risk factor for secondary headache
P	**Progressive** Chronic or acute progressive pattern **Precipitated by Valsalva** Cough or sneeze triggering a headache may signal increased or decreased intracranial pressure (ICP) **Positional** Worse lying down, awakens patient at night when previously no headache or severe upon wakening may signal ICP Persistently worse with standing may be dehydration, deconditioning, low blood pressure, or low ICP
Y	**Years <6** Risk factor for secondary headache (may be due to limited ability to describe headache)

can occur in patients regularly using one or more medications for acute headache treatment for more than three months; typically, this diagnosis should be considered when patients are using triptans and combination analgesics 10 or more days per month or non-steroidal anti-inflammatory drugs (NSAIDs) and acetaminophen.[18]

New Daily Persistent Headache

Children and adolescents who do not have a significant history of headache yet begin to experience headaches on a regular or daily basis, and for whom this experience lasts for three months or longer, may have a "new daily persistent headache."[12] New daily persistent headache may be disabling and difficult to treat, but treating as soon as possible after the onset of continuous headache may improve outcomes.[22,24]

Though distinguished by the abrupt onset of symptoms, new daily persistent headache often has features of chronic migraine, and at the initial presentation it may be very similar to an episode of prolonged migraine (status migrainosus).[25] Clinicians may consider the use of bridge therapies — twice-daily naproxen for two weeks or a steroid taper or intravenous medications if the headache is severe or disabling — along with early initiation of preventive migraine therapies including supplements and/or prescriptions.

Trigeminal Autonomic Cephalalgia

This class of headaches — which includes cluster headache, hemicrania continua, paroxysmal hemicrania, and short-lasting unilateral neuralgiform headache attacks — has a very low prevalence in children and adolescents.[26] Some adult patients with cluster headache, however, indicate their headaches began during adolescence.[12]

These headaches are marked by a side-locked headache with unilateral autonomic symptoms on the same side as the pain such as eye tearing, pupillary asymmetry, sweating, and nasal congestion. Constant side-locked headache, even in the absence of cranial autonomic symptoms, can be due to hemicrania continua, which is best treated with indomethacin.[27] Given the unique features and treatments, as well as risk of underlying anatomic causes, any child with a TAC should be referred to Neurology.

Primary Stabbing Headache

These headaches are very brief episodes of stabbing pain without other associated symptoms.[18] The pain is often severe but does not require treatment unless events are frequent.[28] These events typically occur in children and adolescents with other primary headache disorders, such as migraine.[12]

TREATMENT

When patients believe in the effectiveness of their treatment, the treatment is more likely to work. Including the patient in decision-making when developing the treatment strategy may increase the chances of a satisfactory outcome.[29]

The primary care clinician should focus on three major areas when developing a treatment plan for children and adolescents with primary headaches — of which the majority will be migraine — including lifestyle modifications, rescue medications, and preventative agents.

Complementary therapies may be considered as well. Headache specialists may consider other treatment strategies, such as calcitonin gene-related peptide (CGRP) inhibitors or procedures such as nerve blocks and Botox injections, for patients whose symptoms are refractory.

Lifestyle Modifications

Clinicians should counsel patients that lifestyle modifications can be an important part of the treatment plan to decrease headache frequency, regardless of the exact diagnosis.[8] Sleep, hydration and nutrition, activity levels, and behavioral health should all be addressed; if these aspects cannot be optimized, obtaining good headache control may be challenging.[12,19,30-32]

However, patients and their families may have difficulties making changes. Providing practical, realistic advice to families is important; neither patients nor their families should be blamed for the headache syndrome.[33]

All patients with headache should be asked about their sleep pattern in detail.[19,32] Children 3-5 years of age should sleep 10-13 hours per day, children 6-12 years of age should sleep 9-12 hours per day, and adolescents should sleep 8-10 hours per day.[34] Issues with sleep onset may suggest poor sleep hygiene or anxiety. Not staying asleep may suggest sleep apnea or could indicate depression. The importance of good sleep should be reiterated, and barriers to good sleep should be addressed. If improving hygiene is not effective, melatonin can be considered.[13]

Meal irregularity is associated with frequent headaches in children and adolescents.[32] Eating regular meals may reduce the incidence of headaches; fasting can be a migraine trigger. Clinicians should also advise that children older than 9 years of age should consume eight or more cups of water per day.[35]

Sedentary adolescents may have an increased migraine prevalence.[31] Exercise is a beneficial treatment strategy for adults; assessing activity levels and suggesting an active lifestyle in children and adolescents may reduce headaches.[36]

Between 30% and 40% of children and adolescents with migraine have psychiatric comorbidities, with anxiety and depression being the most common.[37-39] Many patients with migraine indicate stress and anxiety are their most common trigger, suggesting treatment for anxiety may be the most important component of migraine treatment. Addressing emotional concerns may help improve headaches in children and adolescents.[40] Cognitive-behavioral therapy has been shown to help improve migraine syndromes in children and adolescents.[41]

Screening for medication overuse is an important part of caring for children and adolescents with headaches. Treatment consists of stopping these medications for a period of about two weeks, followed by reintroduction at an appropriate frequency.[19] Studies in adults suggest starting a daily preventative medication should be considered.[42]

Rescue Medications

All children and adolescents with the diagnosis of migraine should receive a migraine action plan (MAP).[43] The patient's school should be provided with the acute treatment strategy of the MAP, allowing the patient to utilize rescue medications while at school.[12,44]

Practice guidelines recommend ibuprofen 7.5 mg/kg to 10 mg/kg be used three times daily as needed as the first-line treatment for all children and adolescents with headaches.[7] A randomized placebo-controlled trial found ibuprofen to achieve headache relief about 50% of the time, compared to 8% in the placebo group.[44]

If ibuprofen is insufficient, a triptan can be tried in patients diagnosed with migraines.[7] While there are several triptans available, rizatriptan is approved for children 6 years of age and older by the Food and Drug Administration; it is available in a dissolvable tablet, which may be useful in the setting of nausea. Nasal sumatriptan or zolmitriptan, which rely less on enteral absorption, may be helpful for patients who experience severe nausea or vomiting.

Utilizing an antiemetic medication in children and adolescents with headaches and nausea/vomiting should be considered. Metoclopramide, which blocks dopamine, may also help with migraine, but ondansetron can be used as well.[12]

Opioids should not be used for acute or chronic treatment of migraines in children and adolescents.

Preventative Approaches

Preventative treatment should be considered when headaches are frequent and/or life is being disrupted or altered, such as when patients are missing school, activities, or social events. The goals of treatment should be to reduce headache frequency and severity, while also increasing the effectiveness of rescue medications. Shared decision-making between clinicians and families when deciding on a preventative agent is recommended.[8]

Cognitive behavioral therapy for migraine has been shown to reduce headache frequency and migraine disability assessment, regardless of comorbid anxiety and depression, with few adverse events.[45]

Supplements, such as magnesium, riboflavin, and CoQ10, are relatively safe and may be useful for all headache syndromes. Magnesium may help with constipation and anxiety, but should not be used in children with renal insufficiency.[13] Riboflavin may turn the urine bright yellow and should be taken with food to reduce the risk of belly discomfort.[13] CoQ10 may cause upset stomach and difficulty sleeping, so should be given in the morning with food.[13] These agents may be used as a first-line treatment strategy or as an adjunctive strategy for those taking another medication.[19] Scan the QR code on page 67 to access dosing information.

It is important to note that most preventative medication options are no more effective than placebo; studies reveal placebos often improve headache experience compared to no treatment and at rates similar to medications.[8] Nevertheless, clinicians may recommend topiramate, propranolol, and amitriptyline.[8] Cyproheptadine is also often used as a first-line preventative choice, particularly in younger children.[19] When considering a medication for migraine prevention, the clinician should also consider other symptoms and comorbidities, as well as the risks and side effects.

Amitriptyline may help initiate sleep onset, as it may often cause drowsiness. Patients should be informed that amitriptyline may increase the risk of suicide.[8] Some clinicians will obtain an EKG prior to starting amitriptyline.

Propranolol should not be used in patients with asthma or diabetes and may decrease athletic performance. Propranolol may be useful in patients with anxiety but has the potential to worsen depression.

Topiramate can reduce appetite and may be useful in patients with a high BMI interested in decreasing their weight. However, mental fogginess and word-finding difficulties may develop, and topiramate should be avoided in patients with glaucoma or kidney stones. Clinicians must counsel that topiramate can have teratogenic effects and prescribe daily folic acid supplementation to patients of childbearing potential who take topiramate.[8]

Cyproheptadine can cause drowsiness and may be useful in patients with sleep onset difficulties. It can also stimulate the appetite and might be useful in patients who are underweight.

Finally, patients with an aura should avoid oral contraceptives that contain estrogen.

CONCLUSION

The primary care clinician can help many patients with headache by performing a thoughtful and directed evaluation, and initiating some basic, but very important treatment strategies. The sample case on the next page is offered as a reference for readers.

SAMPLE CASE

History and Exam

A 12-year-old male presents with a chief complaint of headache that started about eight months ago, a few months after his last well-child visit when he was doing well, with no concerns. Headaches seem to occur a few times per week but are not getting worse. They usually occur in the afternoon and can last for two to four hours. The headaches occur in the frontal region of his head and often on the left side. The discomfort is throbbing in nature and generally associated with light and noise sensitivity. With the more severe headache, he often describes nausea. The headaches seem to occur more often when he has not had a good night sleep the night before.

Headaches do not wake him from sleep, and he does not wake up in the morning with headaches. He also denies any neurological concerns such as weakness or issues with his balance. Ibuprofen and lying down in a dark quiet room help, and if he falls asleep, the headache is usually gone when he wakes up. He has not missed any full days of school but has needed to leave school early a few times and has missed a few basketball practices because of a headache. When he does not have a headache, he feels well and has no other medical concerns.

He has no significant past medical history. His parents divorced about four years ago, and he had received some counseling during that time. There is a family history of migraines. His general and neurological exams, including fundoscopic evaluation, are normal.

Assessment

Based on history and exam, concern for a secondary headache is low. The diagnosis of migraine without aura is made.

Plan

1. Lifestyle Modifications
    a. Sleep appears to be a trigger, and on further questioning, this might improve with attention to his sleep hygiene, specifically when he is at his father's house.
    b. This patient's anxiety can be a trigger, and therapy is recommended.
    c. Education is added regarding the need for regular meals and drinking plenty of fluids.
2. Rescue Medications
    a. Rizatriptan is added to the ibuprofen for use when headaches develop.
    b. Documentation regarding his migraine action plan is provided so he can take the rescue medications while at school as soon as the headache starts.
3. Prevention
    a. Headache prevention strategies are discussed. For now, he may consider using over-the-counter magnesium 200 mg and riboflavin 200 mg nightly. If initial strategies don't suffice, prevention medications may be prescribed.

Follow-Up

He returns for follow-up in a few months and indicates the headaches are improved. They are less frequent and less severe when he gets them. He is doing much better with his sleep at his father's house. He has an initial appointment for counseling in the next few weeks. The rizatriptan appears to be working well and resolves the headache in about 20 minutes. He is taking magnesium and riboflavin most days and feels this is helping. He has not missed any school or activities since the last appointment.

REFERENCES

1. Onofri A, Pensato U, Rosignoli C, et al. Primary headache epidemiology in children and adolescents: a systematic review and meta-analysis. *J Headache Pain.* 2023;24(1):8.
2. Arruda MA, Bigal ME. Behavioral and emotional symptoms and primary headaches in children: a population-based study. *Cephalalgia.* 2012;32(15):1093-1100.
3. Victor TW, Hu X, Cambell JC, et al. Migraine prevalence by age and sex in the United States: a life-span study. *Cephalgia.* 2010;30(9):1065-1072.
4. Stang PE, Osterhaus JT. Impact of migraine in the United States: data from the National Health Interview Survey. *Headache.* 1993;33(1):29-35.
5. Onofri A, Olivieri L, Silva P, et al. Correlation between primary headaches and learning disabilities in children and adolescents. *Minerva Pediatr (Torino).* 2022;74(1):1-6.
6. Elser H, Farkas DK, Fuglsang CH, Sørensen ST, Sørensen HT. Risk of attempted and completed suicide in persons diagnosed with headache. *JAMA Neurol.* 2025;82(3):276-284.
7. Oskoui M, Pringsheim T, Holler-Managan Y, et al. Practice guideline update summary: acute treatment of migraine in children and adolescents: report of the Guideline Development, Dissemination, and Implementation Subcommittee of the American Academy of Neurology and the American Headache Society. *Neurology.* 2019;93(11):487-499.

8. Oskoui M, Pringsheim T, Billinghurst L, et al. Practice guideline update summary: pharmacologic treatment for pediatric migraine prevention: report of the Guideline Development, Dissemination, and Implementation Subcommittee of the American Academy of Neurology and the American Headache Society. *Neurology.* 2019;93(11):500-509.
9. Ravishankar K. Which headache to investigate, when, and how? *Headache.* 2016;56(10):1685-1697.
10. Kernick D, Stapely S, Campbell J, et al. What happens to new-onset headache in children that present to primary care? A case-cohort study using electronic primary care records. *Cephalalgia.* 2009;29(12):1311-1316.
11. Phu T, Remmers A, Schytz H, et al. Red and orange flags for secondary headaches in clinical practice. *Neurology.* 2019;92(3):134-144.
12. Szperka C. Headache in children and adolescents. *Continuum.* 2021;27 (3):703-731.
13. Primary Care Clinical Pathway for Evaluation and Management of Child with Headache. Children's Hospital of Pennsylvania. October 2023. Accessed February 16, 2025. https://pathways.chop.edu/clinical-pathway/headache-primary-care-clinical-pathway
14. Lewis D, Ashwal S, Dahl G, et al. Practice parameter: evaluation of children and adolescents with recurrent headaches: report of the Quality Standards Subcommittee of the American Academy of Neurology and the Practice Committee of the Child Neurology Society. *Neurology.* 2002;59(4):490-498.
15. Clarke C, Edwards J, Nicholl D, et al. Imaging results in a consecutive series of 530 new patients in the Birmingham Headache Service. *J Neurol.* 2010;257(8):1274-1278.
16. Kernick D, Ahmed F, Bahra A, et al. Imaging patients with suspected brain tumour: guidance for primary care. *Br J Gen Pract.* 2008;58(557): 880-885.
17. Tsushima Y, Endo K. MR imaging in the evaluation of chronic or recurrent headache. *Radiology.* 2005;235(2):575-579.
18. Headache Classification Committee of the International Headache Society (HIS). The International Classification of Headache Disorders, 3rd edition. *Cephalalgia.* 2018;38(1):1-211.
19. Klein, J, Koch T. Headache in children. *Pediatr Rev.* 2020;41(4):159-171.
20. Powers S, Patton S, Hommel K, et al. Quality of life in childhood migraines: clinical impact and comparison to other chronic illnesses. *Pediatrics.* 2003;112(1)(pt1):e1-e5.
21. Hershey A, Winner P, Kabbouche M, et al. Use of the ICHD-II criteria in the diagnosis of pediatric migraine. *Headache.* 2005;45(10):1288-1297.
22. Wang SJ, Fuh JL, Lu SR, Juang KD. Chronic daily headache in adolescents: prevalence, impact, and medication overuse. *Neurology.* 2006;66 (2):193-197.
23. Lipton RB, Manack A, Ricci JA, et al. Prevalence and burden of chronic migraine in adolescents: results of the chronic daily headache in adolescents study (C-dAS). *Headache.* 2011;51(5):693-706.
24. Szperka CL, Evans M, Patterson Gentile C, et al. Headache trajectories in children and adolescents with new onset continuous headache. *Cephalalgia.* 2024;44(10):3331024241282803.
25. Bigel M, Lipton R, Tepper S. Primary chronic daily headache and its subtypes in adolescents and adults. *Neurology.* 2004;63(5):843-847.
26. Fuh J, Wang S, Lu S, et al. Headache disability among adolescents: a student population-based study. *Headache.* 2010;50(2):210-218.
27. Myers KA, Barmherzig R, Raj NR, et al. The spectrum of indomethacin-responsive headaches in children and adolescents. *Cephalalgia.* 2022; 42(8):793-797.
28. Abu-Arafeh I, Howells R. Primary headaches in children under the age of 7 years. *Curr Pain Headache Rep.* 2014:18(3):401.
29. Szperka C, Kellier D, Raj N, et al. Validation of measures of treatment expectancy in children and adolescents with headache (P6-2.003). *Neurology.* 2022;98(18):S1877.
30. Torres-Ferrus M, Vila-Sala C, Quintana M, et al. Headache, comorbidities, and lifestyle in an adolescent population (the TEENs Study). *Cephalalgia.* 2019;39(1):91-99.
31. Nilles C, Williams J, Pattern S, et al. Lifestyle factors associated with frequent recurrent headaches in children and adolescents. *Neurology.* 2024;102(6):e209160.
32. Shimomura H. Emotional problems in pediatric headache patients. *Curr Pain Headache Rep.* 2022;26(6):469-474.
33. Gelfand A, Irwin S. Lifestyle advice for pediatric migraine: blaming the patient, or evidence based? *Semin Neurol.* 2020;40(3):277-285.
34. Paruthi S, Brooks LJ, D'Ambrosio C, et al. Recommended amount of sleep for pediatric populations: a consensus statement of the American Academy of Sleep Medicine. *J Clin Sleep Med.* 2016;12(6):785-786.
35. Institute of Medicine. *Dietary Reference Intakes for Water, Potassium, Sodium Chloride, and Sulfate.* The National Academies Press; 2005.
36. Lemmens J, De Pauw J, Van Soom T, et al. The effect of aerobic exercise on the number of migraine days, duration and pain intensity in migraine: a systematic literature review and meta-analysis. *J Headache Pain.* 2019;20(1):16.
37. Ziplow J. The psychiatric comorbidities of migraine in children and adolescents. *Curr Pain Headache Rep.* 2021;25(11):69.
38. Pakalnis A, Gibson J, Colvin A. Comorbidity of psychiatric and behavioral disorders in pediatric migraine. *Headache.* 2005;45(5):590-596.
39. Oztop DB, Tasdelen BI, Poyrazoglu H, et al. Assessment of psychopathology and quality of life in children and adolescents with migraine. *J Child Neurol.* 2016;31(7):837-842.
40. Shimomura H. Emotional problems in pediatric headache patients. *Current Pain Headache Rep.* 2022;26(6):469-474.
41. Powers S, Kashikar-Zuck S, Allen S, et al. Cognitive behavioral therapy plus amitriptyline for chronic migraine in children and adolescents: a randomized clinical trial. *JAMA.* 2013;310(24):2622-2630.
42. Chiang CC, Schwedt TJ, Wang SJ, Dodick DW. Treatment of medication-overuse headache: a systematic review. *Cephalalgia.* 2016;36 (4):371-386.
43. Turner S, Rende E, Szperka C, et al. The development of the pediatric migraine action plan (Ped-MAP). *Headache.* 2019;59(10):1671-1672.
44. Misra U, Kalita J, Yadav R. Rizatriptan vs. ibuprofen in migraine: a randomized placebo-controlled trial. *J Headache Pain.* 2007;8(3):175-179.
45. Bae J, Sung H, Kwon N. Cognitive behavioral therapy for migraine headache: a systemic review and meta-analysis. *Medicina.* 2021;58(1):44.

Harry Bramley, DO, FAAP
Lancaster General Hospital
555 N. Duke St.
Lancaster, PA 17602
Harry.Bramley1@pennmedicine.upenn.edu

Christina Szperka, MD
Children's Hospital of Philadelphia
3401 Civic Center Blvd.
Philadelphia, PA 19104
Szperka@chop.edu

Carlyn Patterson, MD
Children's Hospital of Philadelphia
3401 Civic Center Blvd.
Philadelphia, PA 19104
PattersonC@chop.edu