

**Table 8: Evidence Regarding Overuse of Computed Tomography Imaging for Atraumatic Headache in Children**

TYPE OF EVIDENCE	KEY FINDINGS	LEVEL OF EVIDENCE (USPSTF RANKING*)	CITATION(S)
<b>Appropriateness criteria</b>	The ACR has completed multiple comprehensive, evidence-based reviews of radiologic literature, clinical practice literature, and expert consultation. In summary, the ACR has advised that headaches in the absence of documented neurologic signs or symptoms that suggest intracranial hemorrhage usually do not require evaluation with imaging.	III	American College of Radiology Expert Panel on Pediatric Imaging: Hayes LL, Coley BD, Karmazyn B, et al. ACR Appropriateness Criteria: Headache — child. American College of Radiology, revised 2012. Available at: <a href="https://acsearch.acr.org/docs/69439/Narrative/">https://acsearch.acr.org/docs/69439/Narrative/</a> accessed April 21, 2015.
<b>Retrospective observational study</b>	DeVries et al. conducted a retrospective, observational cohort analysis using more than 15,000 commercial claims related to the care of children ages 3 to 17 years old with recurrent headache compiled from HealthCore. One quarter of children with recurrent headache in the cohort underwent CT imaging. Twenty-three percent of children in the cohort underwent MRI during the study period. Although emergency department visits were associated with CT scans, two-thirds of patients with CT scans had no emergency department use. There were a variety of provider types seen for the index diagnosis of headache including pediatrics (43%), family medicine (30%), neurology (3%) and other (23%).	II	DeVries A, Young PC, Wall E, et al. CT scan utilization patterns in pediatric patients with recurrent headache. <i>Pediatrics</i> 2013; 132(1):e1-e8.
<b>Retrospective observational study</b>	Lateef et al. examined the records of 364 children 2 to 5 years of age who presented with headache to a large urban emergency department between July 1, 2003 and June 30, 2006. Of these children, 58 (16%) had a primary headache. CT imaging was obtained in 16 of the 58 children with primary headache; only one CT scan yielded abnormal results. The child with abnormal results on the CT scan also had abnormalities on neurologic examination.	II	Lateef TM, Grewal M, McClintock W, Chamberlain J, Kaulas H, Nelson KB. Headache in young children in the emergency department: Use of computed tomography. <i>Pediatrics</i> 2009; 124:1 e12-e17.

TYPE OF EVIDENCE	KEY FINDINGS	LEVEL OF EVIDENCE (USPSTF RANKING*)	CITATION(S)
<b>Practice parameter</b>	<p>Lewis et al. reviewed the available evidence on diagnostic testing of the child with recurrent headaches and made recommendations for evaluation of children, 3 to 18 years old with headaches, based on this evidence. The authors concluded that headaches occur commonly in children and are diagnosed on a clinical basis. They specifically recommend the following regarding neuroimaging:</p> <ol style="list-style-type: none"> <li>1) Obtaining a neuroimaging study on a routine basis is not indicated in children with recurrent headaches and a normal neurologic examination.</li> <li>2) Neuroimaging should be considered in children with an abnormal neurologic exam (e.g., focal findings, signs of increased intracranial pressure, significant alteration of consciousness), the coexistence of seizures, or both.</li> <li>3) Neuroimaging should be considered in children in whom there are historical features to suggest the recent onset of severe headache, change in the type of headache, or if there are associated features that suggest neurologic dysfunction.</li> </ol>	III	Lewis DW, 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. <i>Neurology</i> 2002; 59(4):490-498.
<b>Retrospective analysis</b>	<p>Chu et al. reviewed charts of 104 children with onset of headaches before 7 years of age who were seen by a neurologist before 10 years of age between July 1983 and July 1989. Migraine was the predominant headache type, present in 75% of cases where headaches could be classified. Thirty children underwent CT scans (n=23) or MRI (n=7) and abnormalities were found in five cases. Three of the five cases had previous abnormal CT scans.</p>	II	Chu ML, Shinnar SI. Headaches in children younger than 7 years of age. <i>Arch Neurol</i> 1992; 49(1):79-82.

*Note:* USPSTF criteria for assessing evidence at the individual study level are as follows: I) Properly-powered and conducted randomized controlled trial (RCT); well-conducted systematic review or meta-analysis of homogeneous RCTs. II) Well-designed cohort or case-control analytic study. III) Opinions of respected authorities, based on clinical experience; descriptive studies or case reports; reports of expert committees.