

Overuse of Imaging

Measure 6: Ratio of Magnetic Resonance Imaging Scans to Computed Tomography Scans for the Evaluation of Children with Atraumatic Headache

Description

This measure assesses the ratio of the number of MRI to the number of CT scans obtained on or within 30 days after the date of evaluation for atraumatic headache among children, ages 4 through 17 years old, within the measurement year. A higher ratio of MRI to CT scans indicates better performance, as reflected by a smaller number of children being exposed to radiation as a result of neuroimaging.

Calculation

This measure requires administrative data and is calculated as follows:

The ratio of the number of MRI scans to the number of CT scans among eligible children for whom imaging of the head (CT or MRI) is obtained on or within 30 days of an atraumatic headache (numerator divided by denominator).

Eligible Population

The determination of eligible population for this measure requires administrative claims data.

Ages	Children at least 4 years old on January 1 of the measurement year but younger than 18 years on December 31 of the measurement year.
Enrollment	Eligible children must be continuously enrolled in their insurance plan during both the measurement year and the year prior to the measurement year.
Event/Diagnosis	Imaging studies of the head (CT or MRI; Table IMG1) for the evaluation of atraumatic headache (Table IMG3) occurring on the day of or up to 30 days prior to imaging. (Note, IMG tables begin on page 53.)

Specification

Denominator	The number of CT scans of the head obtained on or within 30 days after the date of evaluation for atraumatic headache among children, ages 4 through 17 years old, within the measurement year.
Numerator	The number of MRI scans of the head obtained on or within 30 days after the date of evaluation for atraumatic headache among children, ages 4 through 17 years old, within the measurement year.

Exclusions

- Trauma-related headache or pain (Table IMG3) on the day of or within the 7 days prior to imaging
- Head injury by related ICD-9-CM codes (Table IMG9) or by the presence of an E-code on the day of or within the 7 days prior to imaging
- Thunderclap headache (Table IMG3), on the day of or within 365 days prior to imaging
- Vascular disease (Table IMG8) on the day of or within 365 days prior to imaging
- For denominator only: relative contraindications to MRI (Table IMG12) on the day of or within 365 days prior to imaging (Note: Some contraindications are guidelines rather than strict rules. As such, a provider may determine that a child should undergo an MRI despite a contraindication.)

Table 1 [=IMG1]: Codes to Identify Neuroimaging in Administrative Claims

Imaging Modality		
Computerized Tomography (CT) of Brain/Head	Revenue (UB-92)	350, 351, 352, 353, 354, 355, 356, 357, 358, 359
	CPT	70450, 70460, 70470, 70480, 70481,70482
	ICD-9-CM	87.03
Magnetic Resonance Imaging (MRI) of Brain/Head	Revenue (UB-92)	610, 611, 612, 613, 614, 615, 616, 617, 618, 619
	CPT	70551, 70552, 70553
	ICD-9-CM	88.91

Table 2 [=IMG3]: ICD-9-CM Codes to Identify Headache

General Diagnosis		
	Migraine with aura	346.0
	Migraine without aura	346.1
	Variants of migraine, not elsewhere classified (abdominal migraine, cyclical vomiting, ophthalmoplegic migraine, periodic headache syndromes in child or adolescent)	346.2
	Hemiplegic migraine	346.3
	Menstrual migraine	346.4
	Persistent migraine aura w/o cerebral infarction	346.5
	Persistent migraine aura WITH cerebral infarction	346.6
	Chronic migraine without aura	346.7
	Other forms of migraine	346.8
	Migraine, unspecified	346.9
	Tension type headache	339.1x
	Tension headache NOS/related to psych factors	307.81
	Cluster headaches/other trigeminal autonomic cephaligias	339.0x
	Drug induced headache	339.3
	Hypnic headache	339.81
	Primary stabbing headache	339.85
	“Other”	339.89
	Hemicranium continua	339.41
	New daily persistent	339.42
	Primary thunderclap	339.43
	Other complicated	339.44
Post-traumatic headache		339.2x
Acute pain due to trauma		338.11
General Symptoms	Headache	784.0

Table 3 [= IMG9]: ICD-9-CM Codes to Identify Head Trauma and Intracranial Hemorrhage

General Diagnosis		
Post-traumatic headache		339.2x
Concussion	With no loss of consciousness	850.0
	With brief loss of consciousness	850.1
Fracture of skull	Closed w/o mention of intracranial injury	800.0
	Closed with cerebral laceration and contusion	800.1
	Closed with subarachnoid, subdural and extradural hemorrhage	800.2
	Closed with other and unspecified intracranial hemorrhage	800.3
	Closed with intracranial injury of other and unspecified nature	800.4
	Open w/o mention of intracranial injury	800.5
	Open with cerebral laceration and contusion	800.6
	Open with subarachnoid, subdural and extradural hemorrhage	800.7
	Open with other and unspecified intracranial hemorrhage	800.8
	Open with intracranial injury of other, unspecified nature	800.9
	Fracture of skull base	801.x
	Other, unqualified skull fracture	803.x
	Multiple fractures involving skull or face with other bones	804.x
Concussion	With loss of consciousness (LOC) 30min or less	850.11
	With LOC 31 minutes to 59 minutes	850.12
	With moderate LOC (1-24 hours)	850.2
	With prolonged LOC and return to pre-existing conscious level	850.3
	With prolonged LOC, without return to pre-existing conscious level	850.4
	With loss of consciousness of unspecified duration	850.5
	Concussion, unspecified	850.9
	Cerebral laceration and contusion	851.x
	Subarachnoid, subdural, extradural hemorrhage post injury	852.x
	Other/unspecified intracranial hemorrhage following injury	853.x
	Intracranial injury of other and unspecified nature	854.x
	Subarachnoid hemorrhage	430
	Intracerebral hemorrhage	431
	Other and unspecified intracranial hemorrhage	432.x
	Child abuse and neglect	995.5x
	Observation and evaluation for – abuse and neglect	V71.81
	Late effect of fracture of skull and face bones	905.0
	Late effect of intracranial injury without mention of skull fracture	907.0

Table 4 [=IMG8]: ICD-9-CM Codes to Identify Vascular Disease

General Diagnosis		
Hemangioma of unspecified site (includes cavernous malformation)		228.00
Phlebitis/thrombophlebitis of intracranial venous sinuses		325
Occlusion and stenosis of precerebral arteries	Basilar artery	433.0
	Carotid artery	433.1
	Vertebral artery	433.2
	Multiple and bilateral	433.3
	Other specified	433.8
	Unspecified	433.9
Occlusion of the cerebral arteries	Cerebral thrombosis	434.0
	Cerebral embolism	434.1
	Cerebral artery occlusion	434.9
Transient cerebral ischemia	Basilar artery syndrome, vertebral artery syndrome, etc	435.x
Cerebral aneurysm, nonruptured		437.3
Moyamoya disease		437.5
Nonpyogenic thrombosis of intracranial venous sinus		437.6
Other congenital anomalies of the circulatory system	Coarctation of the aorta	747.1
	Other anomalies of the aorta	747.2x
Other specified anomalies of circulatory system (includes arteriovenous malformation)	Cerebrovascular anomalies	747.81
	Other (aneurysm)	747.89
Other venous embolism/thrombosis unspecified site		753.9
Other and unspecified intracranial hemorrhage		432.x
Personal history of other certain diseases	TIA and cerebral infarction	V12.5

Table 5 [=IMG12]: ICD-9-CM Codes to Identify Relative Contraindications to MRI

General Description	Code
Devices	
Programmable shunt	V53.01
Nerve Stimulator	V53.02
Cochlear or Ocular Implant	V53.09
Cardiac Pace Maker	V53.31
AICD	V53.32
Implanted pumps/infusion pumps	V53.91
Bone/spinal fusion stimulator; Coils/stents/filters; IUCs/diaphragms; Halo vests/fixation devices; Ferrous aneurysm clips; Ferromagnetic foreign body	V53.99
Other complications	
Retained (old) intraocular foreign body, magnetic	360.5
Foreign body, magnetic	360.5x
Penetration of eyeball with magnetic foreign body	871.5
Mechanical complication of nervous system device, implant, and graft	996.2
Mechanical complication of internal orthopedic device, implant, and graft	996.4
Due to vascular device, implant and graft	996.62
Due to other internal orthopedic device, implant and graft	996.67
Aftercare involving internal fixation device	V54.0