Safe Table Webcast
100K Children Campaign - Safe Imaging

Becky DeMers, RN
Dave Wilson, RT

November 14, 2014
Objectives

- Discover concepts of review from recent literature on pediatric head injury and how it relates to clinical practice.
- Learn leading practices to establish and implement standards of care for providing initial management of the child with minor head trauma and no loss of consciousness.
- Evaluate three different tools that can help you decide whether you should order a computed tomography for the child with minor head trauma: PECARN, CHALICE, and CATCH.
- Hear an update on the 100K Children Campaign and how your facility can participate in this innovative work.

Presented at Washington State Hospital Association Safe Table Webcast 11/14/14
Maximize long-term health of our children by ensuring safe imaging in health care.

**WSHA 100K Children Campaign Overview**

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- **Right Study**
- **Right Order**
- **Right Way**
- **Right Action**
- **Right Report**

- **Observation for Minor Head Trauma Using PECARN Tool**
- **Ultrasound First for Suspected Appendicitis**
- **Single Phase CT**
- **Optimization of Radiation Dose**

- **Sign Up and Participate in 100K Children through WSHA**
- **Attend Monthly Meetings WebEx/Calls**
- **Monthly Data Submission to WSHA QBS**
- **Implement Strategies**
- **Share Commitment to Using Pediatric Protocols on Organization’s Website.**
- **Share Information with Quality Committees and Board**

- **Safe Table Kick-off**
- **Lead Monthly Meetings**
- **Provide Meaningful Reports for Comparison**
- **Provide Implementation Resources and Best Practices**
- **Provide Local and National Experts**
- **Assist Organizations Overcome Challenges**

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Participating Hospitals

CDI Radiology – Kirkland
EvergreenHealth
Group Health Cooperative
Harrison Medical Center
Lincoln Hospital
MultiCare Health System Auburn Medical Center
MultiCare Health System Good Samaritan Hospital
MultiCare Health System / Mary Bridge Health System
Providence Holy Family Hospital
Providence Sacred Heart Medical Center
& Children’s Hospital
Providence Centralia Hospital
Providence St. Peter Hospital
Pullman Regional Hospital
Snoqualmie Valley Hospital
Swedish Medical Center First Hill
Swedish Medical Center Ballard
Quincy Valley Hospital
Trios Health Southridge Hospital
Yakima Valley Memorial Hospital

The Washington State Hospital Association is committed to safe imaging for children. Their members are participating in the 100K Children campaign. Click on the pins to learn more about each site.

http://www.100kchildren.org/washington-state-hospital-association.html

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Pediatric Head Trauma:
When to Image

Christian Rocholl, MD
Medical Director Pediatric Emergency Department
Sacred Heart Children’s Hospital

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Objectives

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• Learn leading practices to establish and implement standards of care for providing initial management of the child with minor head trauma and no loss of consciousness.

• Evaluate three different tools that can help you decide whether you should order a computed tomography for the child with minor head trauma: PECARN, CHALICE, and CATCH.
Technical Report: Minor Head Injury in Children

• Charles J. Homer and Lawrence Kleinman

• Pediatrics 1999;104;e78 DOI: 10.1542/peds.104.6.e78

• 1966-1997: 108 articles

• “The literature on mild head trauma does not provide a sufficient scientific basis for evidence-based recommendations about most of the key issues in clinical management. More consistent definitions and multisite assessments are needed to clarify this field”
AMERICAN ACADEMY OF PEDIATRICS
Clinical Practice Guideline:
The Management of Minor Closed Head Injury in Children

• 1999 Pediatrics

• Thorough review of the literature and expert consensus
  • 64 articles were included for review
  • 549 articles initially identified

• Options: Observation, Skull Radiographs, Cranial CT, MRI
• Previously neurologically healthy child

  • Minor closed head injury

  • Temporary loss of consciousness (<1 min)

  • Impact seizure

  • Vomited

  • Headache or Lethargy
Minor Closed Head Injury

- Normal mental status at the initial examination
- No abnormal or focal findings on neurologic examination (including fundoscopic)
- No physical evidence of skull fracture
- Evaluation within 24 hrs
Not intended for.....

- Multiple system trauma
- Children with unobserved loss of consciousness
- Known or suspected cervical spine injury
- Patients with a history of bleeding diatheses, neurologic disorders potentially aggravated by trauma (arteriovenous malformations or shunts), intentional head trauma (suspected child abuse), language barrier, intoxicated patients
Initial Management of the Child With Minor Closed Head Injury and **No** Loss of Consciousness

- No Imaging Required
- Observation appropriate
- In special clinical scenario where imaging is required CT is preferred modality
Minor Head Injury without loss of consciousness

- Subcommittee believed that the marginal benefits of early detection of intracranial injury afforded by routine brain imaging studies such as CT or MRI were outweighed by considerations of:
  - Cost, Inconvenience, Resource allocation, Possible side effects attributable to Sedation and Inappropriate interventions, (medical, surgical, or other Interventions based on incidental CT findings in asymptomatic children)
- NO mention of radiation exposure
Initial Management of the Child With Minor Closed Head Injury and Brief Loss of Consciousness

- Asymptomatic Child: Observation
  - Up to 24 hours
    - Parent education to watch carefully for several days
- Skull Radiographs have a limited role and most of this would be when CT is unavailable
- CT has substantial advantages over MRI in the acute care of children
Initial Management of the Child With Minor Closed Head Injury and Brief Loss of Consciousness

• CT itself is a safe procedure. However, some healthy children require sedation or anesthesia, and the benefits gained from cranial CT should be carefully weighed against the possible harm of sedating and/or anesthetizing a large number of children.

• Based on limited evidence that for children who are neurologically normal after minor closed head injury with loss of consciousness, cranial CT scanning along with observation was also an acceptable management option.
Parental Involvement

• Does physician in consultation with patient or parents, choose observation?

- Guidelines Retired January 2012 without plan to replace
- Referred to CDC for guidelines
  - traumatic brain injury guidelines and pocket cards for evaluation of adults
  - initiatives regarding concussions

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Head CT Utilization Rates

• The use of CT increased from 12.8% to 22.4% from 1995 to 2003, with a peak of 28.6% in 2000
  
  
• Between 1995 and 2005, CT use more than doubled
  
  
• Rates and Visits have increased
Rates of TBI-related Emergency Department Visits by Age Group — United States, 2001–2010

National Hospital Ambulatory Medical Care Survey — United States, 2001–2010 (Emergency Department Visits)
National Hospital Ambulatory Medical Care Survey — United States, 2001–2010 (Emergency Department Visits)

(Deaths)

Presented at Washington State Hospital Association Safe Table Webcast 11/14/14
Estimated Average Annual Rates of Traumatic Brain Injury-Related Emergency Department Visits, Hospitalizations, and Deaths, by Age Group, United States, 2002-2006

Children, older adolescents, and adults ages 65 years and older are more likely to sustain a TBI

Traumatic Brain Injury In The United States: Emergency Department Visits, Hospitalizations and Deaths 2002–2006, U.S. Department Of Health and Human Services, Centers for Disease Control and Prevention, National Center for Injury Prevention and Control

www.cdc.gov/TraumaticBrainInjury MARCH 2010

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Pediatric Traumatic Brain Injury
Children Age 0 - 14 years

- Over 473,943 emergency department visits / year
- Over 35,136 hospital admissions / year
- 2174 deaths / year


MARCH 2010

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# Glasgow Coma Score (Pediatric)

## Eye Opening (E)
- **4** = spontaneous
- **3** = to voice
- **2** = to pain
- **1** = none

## Verbal Response (V)
- **5** = normal conversation (Coos and Babbles)
- **4** = disoriented conversation (Irritable Cry)
- **3** = words incoherent (Cries in Response to Pain)
- **2** = incomprehensible sounds (Moans in Response to Pain)
- **1** = none

## Motor Response (M)
- **6** = normal (Obeys Commands)
- **5** = localize to pain (Responds to Pain)
- **4** = withdraws to pain
- **3** = decorticate posturing / abnormal flexion
- **2** = decerebrate posturing / abnormal extension
- **1** = none

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Glasgow Coma Score (GCS)

- For patients with a history of head trauma, the classification is as follows:
  - mild injury for a GCS of 13 to 15
  - moderate injury for a GCS of 9 to 12
  - severe head injury for a GCS of 3 to 8
Derivation of the children’s head injury algorithm for the prediction of important clinical events
Decision rule for head injury in children

• CHALICE: Children’s Head injury ALgorithm for the prediction of Important Clinical Events study

CHALICE

• 22,772 children attending the emergency departments of 10 hospitals in the UK

• Prospective form completion of 40 clinical variables pertaining to head injury, including variables on the mechanism of injury, symptoms, signs and management of the patient

• The only exclusion criterion was refusal to consent to entry into the study
CHALICE:
A computed tomography scan is required if any of the following **history** criteria are present:

- Witnessed loss of consciousness of >5 min duration
- History of amnesia (either antegrade or retrograde) of >5 min duration
- Abnormal drowsiness (defined as drowsiness in excess of that expected by the examining doctor)
- ≥3 vomits after head injury (a vomit is defined as a single discrete episode of vomiting)
- Suspicion of non-accidental injury (NAI, defined as any suspicion of NAI by the examining doctor)
- Seizure after head injury in a patient who has no history of epilepsy
CHALICE:
A computed tomography scan is required if any of the following examination criteria are present:

- Glasgow Coma Score (GCS)<14, or GCS<15 if <1 year old
- Suspicion of penetrating or depressed skull injury or tense fontanelle
- Signs of a basilar skull fracture (defined as evidence of blood or cerebrospinal fluid from ear or nose, panda eyes, Battles sign, hemotympanum, facial crepitus or serious facial injury)
- Abnormal neurologic exam (defined as any focal neurology, including motor, sensory, coordination or reflex abnormality)
- Presence of bruise, swelling or laceration >5 cm if <1 year old

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CHALICE:
A computed tomography scan is required if any of the following mechanism criteria are present:

• High-speed road traffic accident either as pedestrian, cyclist or occupant (defined as accident with speed >40 miles/hr)
• Fall of >3 m in height
• High-speed injury from a projectile or an object
CHALICE

• If none of the variables are present, the patient is at low risk of intracranial pathology
  • if any are present the patient requires a CT
• The goal of this study was to determine who **needs** a CT Scan
Identification of children at very low risk of clinically-important brain injuries after head trauma:
A prospective cohort study

PECARN

• Pediatric Emergency Care Applied Research Network
• Federally-funded multi-institutional network
• Meaningful and rigorous multi-institutional research
• Promote the health of children
PECARN

• Aim was to identify children at very low risk of clinically-important traumatic brain injuries (ciTBI) for whom CT might be unnecessary.

• Derive and validate a prediction rule
Inclusions

- Patients younger than 18 years
- Presenting within 24 h of head trauma
- Glasgow Coma Scale scores of 14–15
- 25 North American emergency departments
- Clinically Important Traumatic Brain Injury (ciTBI)
3 Categories of injury mechanism

- Severe: motor vehicle crash with patient ejection, death of another passenger, or rollover; pedestrian or bicyclist without helmet struck by a motorized vehicle; falls of more than 1.5 m (5 feet) for children aged 2 years and older and more than 0.9 m (3 feet) for those younger than 2 years; or head struck by a high-impact object

- Mild: ground-level falls or running into stationary objects

- Moderate: any other mechanism
Exclusions: too well

- Excluded children with trivial injury mechanisms
  - ground-level falls
  - walking or running into stationary objects
  - no signs or symptoms of head trauma other than scalp abrasions and lacerations
Exclusions: too sick

- penetrating trauma
- known brain tumors
- pre-existing neurological disorders complicating assessment
- neuroimaging at an outside hospital before transfer
- ventricular shunts, bleeding disorders, and GCS scores less than 14 were enrolled but are analyzed separate
Documented information about Each injury

- Mechanism of injury
- Clinical variables: history and symptoms
- Clinical variables: physical examination findings
Other information collected on case report form

- Any signs of trauma above the clavicles (and location): including lacerations, abrasions, and hematomas

- Presence of other substantial (non-cranial) trauma: fractures, intra-abdominal injuries, intra-thoracic injuries, or lacerations requiring operating-room repair

- Was the patient observed in the emergency department after initial evaluation to decide whether to obtain CT?

- Indications for CT scan (if CT obtained)

- Disposition: home, general ward, intensive care unit, operating room, death
ciTBI defined

- Death from traumatic brain injury
- Neurosurgery
- Intubation for more than 24 h for traumatic brain injury
- Hospital admission of 2 nights or more associated with traumatic brain injury on CT
Numbers from the Study

- 43,904 enrolled of 57,030 eligible patients
- 33785 patients used in the Derivation of Rule
- 8627 patients used in the Validation of Rule
- 10,718 Patients < 2 year old evaluated separately
ciTBI Predictors Age < 2 yo:
Who not to CT

- No Altered Mental Status
- Scalp Hematoma: Frontal
- Not Occipital, Parietal, or Temporal
- No Loss of Consciousness >5 seconds
  - Mild or Moderate Mechanism of Injury
- No Palpable Skull Fracture
- Acting Normally per Parent

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ciTBI Predictors Age > 2 yo

- No Altered Mental Status
- No Loss of Consciousness
- No Vomiting
- Mild or Moderate Mechanism of Injury
- No Clinical Signs of Basilar Skull Fracture
- No Severe Headache

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PECARN

- The two rules are simple and intuitive, consist of readily available findings, and have a very high negative predictive value for identifying children without ciTBIs for whom CT scans could be omitted.

- Among all children enrolled, those with none of the six variables in the rules for whom CT scans could routinely be avoided accounted for 25% of CTs in those younger than 2 years and 21% of CTs in those aged 2 years and older (15,000 CTs performed......at 21% reduction that would be 3,150 less CT’s)

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Children younger than 2 years

- Most sensitive to radiation
- Clinician’s confidence is also usually lower than for older patients
- May have ciTBI despite being asymptomatic
- Rates of CT in Pediatric Hospitals are lower than those in non-children's hospitals
- Most children are evaluated in General Emergency Departments
ciTBI is a rare outcome with minor head injuries

- Rule was chosen to have a high sensitivity/NPV, somewhat at the expense of specificity/PPV

- The rule is not so much of a "whom SHOULD I CT" rule, but a "whom can I safely NOT CT" rule

- The PECARN rules were meant to identify patients at very low risk for ciTBI who do NOT need a CT. Those with none of the PECARN risk factors
Science can not tell us the whole story
Inherent limitations of the rule

- The rules were not meant to imply that if you have one PECARN risk factor that you should obtain a CT. There are two "high risk" factors among the PECARN risk factors: Altered mental status and signs of skull fracture (basilar or otherwise) 4.3%

- For the other risk factors, one factor (at the time of ED presentation), then risk of a ciTBI is <1%. After a period of ED observation, with resolution of the symptom or sign, or no further progression, that risk likely goes down substantially

- No Risk Factors: 0.02% < 2yo - 0.05% > 2yo
CATCH: a clinical decision rule for the use of computed tomography in children with minor head injury

- Minor Head injury 0-16 Years
- Pediatric Emergency Research Canada (PERC)
- The rule is designed to identify children at high risk for injury requiring intervention rather than any CT findings

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Canadian Assessment of Tomography for Childhood Head injury: the CATCH rule

- Multiple variables for symptoms, exam, and mechanism of injury

- CT of the head is required only for children with minor head injury and any certain physical findings

- Minor head injury is defined as injury within the past 24 hours associated with witnessed loss of consciousness, definite amnesia, witnessed disorientation, persistent vomiting (more than one episode) or persistent irritability (in a child under two years of age) in a patient with a Glasgow Coma Scale score of 13–15.
CATCH

• Prospectively enrolls patients with acute minor head injuries

• Patients were excluded if they had obvious penetrating skull injury or obvious depressed fracture, acute focal neurologic deficit, chronic generalized developmental delay or head injury secondary to suspected child abuse
Catch

- 26 standardized clinical findings from the history, examination, and neurologic status

- Primary outcome was need for neurologic intervention
  - death, surgery, intubation

- Secondary outcome was brain injury on CT

- Patients underwent CT or telephone follow-up
The Catch Rule
High risk (need for neurologic intervention)

- Glasgow Coma Scale score < 15 at two hours after injury
- Suspected open or depressed skull fracture
- History of worsening headache
- Irritability on examination
The CATCH rule
Medium risk (brain injury on CT scan)

- Any sign of basal skull fracture (e.g., hemotympanum, “raccoon” eyes, otorrhea or rhinorrhea of cerebrospinal fluid, Battle’s sign)

- Large, boggy hematoma of the scalp

- Dangerous mechanism of injury (e.g., motor vehicle crash, fall from elevation ≥ 3 ft [≥ 91 cm] or 5 stairs, fall from bicycle with no helmet)
The Effect of Observation on Cranial Computed Tomography Utilization for Children After Blunt Head Trauma

- Lise E. Nigrovic, Jeff E. Schunk, Adele Foerster, Arthur Cooper, Michelle Miskin, Shireen M. Atabaki, John Hoyle, Peter S. Dayan, James F. Holmes, Nathan


- Pediatrics (2011).127 (1067). originally published online May 9, 2011; DOI: 10.1542/peds. 2010-3373

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40 113 (95%)
Observation status documented

34 680 (86%)
Not observed

22 532 (65%)
No cranial CT

12 148 (35%)
Cranial CT

5433 (14%)
Observed

3744 (69%)
No cranial CT

1689 (31%)
Cranial CT

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PECARN + Observation

- 3.9% decrease in CT rate
  - With PECARN > 2yo a 25 % reduction (21% + 3.9%)
- Similar rate of ciTBI
- Observed for persistent or worsening symptoms
- Question not answered was How Long to Observe?
  - Others recommend 4 - 6 hours from event
Who to Observe?
Intermediate Risk Group

- No abnormal mental status or evidence of Skull Fracture
- < 2yo: Non-frontal Scalp Hematoma, LOC > 5 sec, Severe mechanism, not acting normally per parent
- >2 yo: Hx of LOC, vomiting, severe mechanism, severe headache
PECARN + Observation

• If PECARN rule was augmented by observation as part of the rule than there may have been a greater reduction in CT
  • More than the 14% of patients in study may have been able to have been observed
So What Do We Do?
Up to Date
Summarizes these and other Studies

• Minor head trauma in infants and children: Evaluation

• **Author:** Sara Schutzman, MD

• **Section Editors:** Richard G Bachur, MD & Douglas R Nordli, Jr, MD

• **Deputy Editor:** James F Wiley, II, MD, MPH

• All topics are updated as new evidence becomes available and our peer review process is complete. Literature review current through: May 2014. | This topic last updated: Apr 01, 2014
< 2 yo Perform Neuroimaging

- Suspicion of child abuse
- Focal neurologic findings
- Acute skull fracture, including depressed or basilar fracture
- Altered mental status change (e.g., lethargy or irritability)
- Bulging fontanelle
- Persistent vomiting
- Seizure following injury
- Definite loss of consciousness
< 2 yo Observe or Perform Neuroimaging

- Vomiting that is self-limited
- Loss of consciousness that is uncertain or very brief (less than a few seconds)
- History of lethargy or irritability, now resolved
- Behavioral change reported by caregiver
- Injury caused by high-risk mechanism of injury (eg, fall more than three feet, patient ejection, death of a passenger, rollover, high-impact head injury)
< 2 yo intermediate continued

- Scalp hematoma (particularly non-frontal)
- Skull fracture more than 24 hours old (non-acute)
- Unwitnessed trauma of concern (e.g. fall heard in adjacent room with possible loss of consciousness)
- Age younger than three months with nontrivial trauma
< 2 yo Do not perform neuroimaging

- Normal mental status
- No parietal, occipital or temporal scalp hematoma
- No loss of consciousness >5 seconds
- No evidence of skull fracture
- Normal behavior according to the routine caregiver
- No high-risk mechanism of injury (severe mechanisms: fall >0.9 m (3 feet); head struck by high impact object; motor vehicle collision with patient ejection, death of another passenger, or rollover)
> 2 yo Perform Neuroimaging

- Focal neurologic findings
- Skull fracture, especially findings of basilar skull fracture
- Seizure
- Persistent altered mental status (agitation, lethargy, repetitive questioning, or slow response to verbal questioning)
- Prolonged loss of consciousness
> 2 yo Observe or perform neuroimaging

- Vomiting
- Headache
- Questionable or brief loss of consciousness
- Injury caused by high-risk mechanism of injury
> 2 yo Do not perform neuroimaging

- Normal mental status
- No loss of consciousness
- No vomiting
- No signs of basilar skull fracture
- No severe headache

- No high-risk mechanism of injury (severe mechanisms: fall >1.5 m (5 feet); head struck by high impact object; motor vehicle collision with patient ejection, death of another passenger, or rollover; pedestrian or bicyclist without a helmet struck by a motorized vehicle)
Prior to the ED

• Send patients to ED for evaluation, not for a Head CT

• Prepare patients that they may go to the ED to hurry up and wait!
While in the ED

• Rules are not intended to replace clinical judgement

• Resist the Pressure to reduce healthcare times

  • challenge to keeping patient in the ED for 4 to 6 hours

• Observation in the ED allows for access to CT and definitive care if necessary

• Increasing numbers of observed patients by neurosurgery including small epidurals when patients are neurologically intact

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Outside the ED

• What is the harm in missing a non ciTBI or nondepressed skull fracture

• Inform families that the easier thing to do for the physician is to order the test, but this may not be the best thing for the patient

• Discussion with parents: Consent for CT?

• We all need to understand that there is a reason to reduce medical radiation and educate Patient, Families, Communities
**Observation for Minor Head Trauma**

100K Children Campaign for Safe Imaging

**Child**

**Definition:** Percent of Pediatric Patients Receiving Observation for Minor Head Trauma

- **Numerator:** Number of pediatric patients treated in the emergency department for minor head trauma in the month that did not receive a head CT.
- **Denominator:** Number of pediatric patients treated in the emergency department in the month for minor head trauma.

**Data Source:** Facility direct report to WSHA

**Number of Reporting Facilities:** 10

**Figure Updated:** 10/21/2014 9:17:16 AM
Definition: Percent of Pediatric Patients Receiving Observation for Minor Head Trauma
Numerator: Number of pediatric patients treated in the emergency department for minor head trauma in the month that did not receive a head CT.
Denominator: Number of pediatric patients treated in the emergency department in the month for minor head trauma.
Data Source: Facility direct report to WSHA.
Single Phase Head CT
100K Children Campaign for Safe Imaging
Child Head CT

Definition: Percent Pediatric Single Phase Head CT (with or without contrast)
Numerator: Number of pediatric inpatient and outpatient single phase head CTs performed in the month.
Denominator: Number of pediatric inpatient and outpatient single phase and dual phase head CTs performed in the month.
Data Source: Facility direct report to WSHA.
Number of Reporting Facilities: 10
Figure Updated: 10/21/2014 9:17:15 AM
Single Phase Head CT

100K Children Campaign for Safe Imaging

Definition: Percent Pediatric Single Phase Head CT (with or without contrast)
Numerator: Number of pediatric inpatient and outpatient single phase head CTs performed in the month.
Denominator: Number of pediatric inpatient and outpatient single phase and dual phase head CTs performed in the month.
Data Source: Facility direct report to WSHA.
Get Started Today

Join 100K Children Campaign and WSHA! When it comes to children and radiation, less is better.

*Put your organization on the map!* Celebrate the number of good imaging choices you are making for our children by submitting data at WSHA QBS.

100KChildren.org

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Data Submission

Washington State Hospital Association (WSHA) **Quality Benchmarking System (QBS).**

Includes data beginning August 1, 2014.

Baseline data: **TBD.**

Ongoing: Monthly data to be submitted to QBS by 45 days after the end of the prior month.

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<tr>
<td>January</td>
<td>March 15th</td>
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Questions?

WSHA Contacts

Amber Theel at AmberT@wsha.org or (206) 577-1820
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Dave Wilson at DaveW@wsha.org or (206) 577-1805
Brandon Wong (QBS) at BrandonW@wsha.org or (206) 216-2524
Appendix
Patient and Family Resources
Image Gently
Choosing Wisely
Centers for Disease Control and Prevention

Available on the
WSHA 100K Children Campaign
Patient and Family Resources

One Size Does Not Fit All...

There's no question — CT helps us save kids' lives! But... radiation matters! So, when we image, let's image gently.

More is often not better. When CT is the right thing to do:
- Child size the kVp and mA
- One scan (single phase) is often enough
- Scan only the indicated area

Visit www.imagegently.com
Learn More about Concussions

- What are the signs and symptoms of concussion?
- What should I do if a concussion occurs?
- What can I do to help feel better after a concussion?
- What can I do to help prevent concussion and other forms of TBI?
- Where can I find videos, podcasts, and other media?
- Where can I find support and additional resources?

What Is A Concussion?

CDC Heads Up to Concussion

CDC has created free tools and materials for youth and high school sports coaches, parents, athletes, teachers, school nurses, and health care professionals that provide important information on preventing, recognizing, and responding to a concussion.

Learn more about Heads Up »

Concussion and Mild Brain Injury

Presented at Washington State Hospital Association Safe Table Webcast 11/14/14
Supporting Materials

Download a badge to use on your website:

Committed to Safe Imaging For Children!

100K Children Campaign
Safe Imaging
Washington State Hospital Association

198px x 157px

<!-- Copy this HTML and
<a href="http://www.wsaha"

“Maximizing long-term health of our children by ensuring safe imaging in health care.”

100K Children Campaign WSHA Toolkit

August 2014

Presented at Washington State Hospital Association Safe Table Webcast 11/14/14
Supporting Materials

RLQ Ultrasound Technologist Worksheet: Appendicitis

| Patient’s Name: ___________________ | History: ___________________ | Radiologist: ___________________
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MRN: ___________________</td>
<td>Sonographer: ___________________</td>
<td>___________________</td>
</tr>
<tr>
<td>Date: ___________________</td>
<td></td>
<td>___________________</td>
</tr>
</tbody>
</table>

**VISUALIZATION**

- Entire Appendix Seen? (Yes, Partial, Not Visualized)
- Appendix seen originating from cecum? (Yes, No)

**FINDINGS**

- Origin

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Appendicitis Diagnosis Guideline

- Children 2 years with suspected appendicitis
  - Low clinical suspicion (i.e., PAS 1-3)
  - Moderate clinical suspicion (i.e., PAS 4-7)
  - High clinical suspicion (i.e., PAS 8-10)

- Ultrasound

- Explore alternative diagnosis
  - Normal appendix
  - Indeterminate
  - Positive/Complicated appendicitis

- Supportive observation (i.e., surgery)

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http://www.acep.org/Continuing-Education-top-banner/Focus-On--Ultrasound-for-Appendicitis/
Table II: mAs Reduction Factors for the Pediatric Head

<table>
<thead>
<tr>
<th>PA Thickness (cm)</th>
<th>Approx Age</th>
<th>kVp</th>
<th>mA</th>
<th>Time (sec)</th>
<th>Pitch</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>newborn</td>
<td>fill in</td>
<td>fill in</td>
<td>fill in</td>
<td>fill in</td>
</tr>
<tr>
<td>16</td>
<td>2 yr</td>
<td>fill in</td>
<td>fill in</td>
<td>fill in</td>
<td>fill in</td>
</tr>
<tr>
<td>17</td>
<td>6 yr</td>
<td>fill in</td>
<td>fill in</td>
<td>fill in</td>
<td>fill in</td>
</tr>
<tr>
<td>19</td>
<td>med adult</td>
<td>fill in</td>
<td>fill in</td>
<td>fill in</td>
<td>fill in</td>
</tr>
</tbody>
</table>

1. Type in baseline head techniques and mAs in yellow cells
2. Spreadsheet will calculate mAs estimated for pediatric patients of varying sizes

CT Dose Monitoring Protocol

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Measure Definition Sheets

Safe Imaging – Percent Pediatric Patients Receiving Ultrasound for Suspected Appendicitis

Data Definition – Percent Pediatric Patients Receiving Ultrasound for Suspected Appendicitis
Numerator: Number of pediatric patients in the month who had an ultrasound performed within 30 days prior to the diagnosis related to appendicitis.
Denominator: Number of pediatric patients with a primary or secondary diagnosis related to appendicitis in the month.

Data Submission
1. Data will be submitted monthly to the Washington State Hospital Association (WSHA) Quality Benchmarking System (QBS). Submissions will be available starting August 1, 2014. The department code for this measure is Imaging. Current users may log in with their QBS credentials. If you need access to QBS, contact WSHA Decision Support at decisionsupport@wsaha.org.
2. Baseline data: TBD.
3. Ongoing: Monthly data to be submitted to QBS by 45 days after the end of the prior month.

<table>
<thead>
<tr>
<th>Data Month</th>
<th>Submit By</th>
<th>Data Month</th>
<th>Submit By</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>March 15th</td>
<td>July</td>
<td>September 15th</td>
</tr>
<tr>
<td>February</td>
<td>April 15th</td>
<td>August</td>
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<td>June</td>
<td>August 15th</td>
<td>December</td>
<td>February 15th</td>
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</table>

Inclusion Criteria
Pediatric inpatients and outpatients including emergency department patients 0-17 years of age, with a primary or secondary diagnosis related to appendicitis (ICD-9-CM 540.0, 540.1, 541.0, 541.1, 541.20, 541.2, 541.3, 541.9).
Pediatric inpatients and outpatients including emergency department patients, 0-17 years of age receiving an ultrasound (CPT Code: 76700, 76705, 76830, 76835, 76837).

Exclusion Criteria
None.

Percent Pediatric Patients Receiving Ultrasound for Suspected Appendicitis

Safe Imaging – Optimize Radiation Dose for Pediatric Head Computed Tomography (CT)

Data Definition – Optimize Radiation Dose for Pediatric Head Computed Tomography (CT)
Numerator: Total Dose Length Product (DLP) for all pediatric head CTs performed in the month.
Denominator: Number of pediatric head CTs with recorded DLP performed in the month.

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<td>February 15th</td>
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Inclusion Criteria
Pediatric inpatients and outpatients including emergency department patients, 0-17 years of age, who receive a head CT with CPT codes 70450, 70460, and 70470.

Exclusion Criteria
None.

Optimize Radiation Dose for Pediatric Head CT

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Quality Benchmarking System

The Quality Benchmarking System (QBS) is a secure web-based application that allows hospitals to input data and then track, compare, and analyze the data for use in quality improvement.

QBS Home Page: [http://www.onehealthport.com/content/washington-state-hospital-association](http://www.onehealthport.com/content/washington-state-hospital-association)
### Starting the Data Submission Process

<table>
<thead>
<tr>
<th>Are you from a hospital?</th>
<th>Does anyone at your hospital have a QBS account?</th>
<th>Do you have a personal QBS account?</th>
<th>Action Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>-</td>
<td>-</td>
<td>Please contact WSHA</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>-</td>
<td>Send WSHA the hospital’s tax ID number and user’s contact information</td>
</tr>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Please contact your hospital’s QBS account administrator</td>
</tr>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>You may begin submitting data to QBS</td>
</tr>
</tbody>
</table>

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QBS Spreadsheet for Uploading Data

<table>
<thead>
<tr>
<th>Month</th>
<th>Unit</th>
<th>Number of Observations</th>
<th>Children With Minor Head Trauma</th>
<th>Number of Ultrasounds</th>
<th>Children With Appendicitis</th>
<th>Number of Single Phase Head CTs</th>
<th>Percent Pediatric Single Phase Head Computed Tomography (CT)</th>
<th>P for All CTs</th>
<th>Head CTs With Recorded DLP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug-14</td>
<td>Imaging</td>
<td>5</td>
<td>7</td>
<td>10</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Please note:** If your facility is not submitting data for a particular measure, please enter zero for both numerator and denominator.