Washington State Hospital Association
Safe Table Webcast
100K Children Campaign – Safe Imaging
September 15, 2014
Objectives

• Hear an update on the 100K Children Campaign and how your facility can participate in this innovative work.

• Learn best practices in Washington related to using ultrasound before computed tomography (CT) for suspected appendicitis.

• Learn leading practices for reducing radiation dose in CT and how to use CT dose data to drive quality and safer care in pediatric patients.

• Understand the new safe imaging measures definitions for ultrasound for appendicitis and CT dose reduction.

• Review new available tools and resources to assist with best practice implementation.

Presented at Washington State Hospital Association Safe Table Webcast 09/15/14
Maximize long-term health of our children by ensuring safe imaging in healthcare.

### Strategies
- Ensure that Children Across the State Receive Minimal Radiation
- Provide Meaningful Measurement for Comparison
- Provide Implementation Resources and Best Practices

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

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

### Participation
- **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**

### WSHA Support
- 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

Presented at Washington State Hospital Association Safe Table Webcast 09/15/14
100K Children Campaign Experts

James R. Duncan, M.D., Ph.D.
Professor of Radiology and Surgery,
Washington University School of Medicine
and Chief, Quality and Safety Mallinckrodt
Institute of Radiology

Stephen J. Swensen, M.D., F.A.C.R.
Medical Director for Leadership and
Organization Development and a Professor in
the Mayo Clinic College of Medicine

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Intent of 100K Children

• Promote adoption and measure adherence
  • Measurement and transparency as drivers
• Emphasize the positive
  • Recognize the good decisions that frontline teams make every day when caring for children
• Foster a productive conversation
  • What exactly do we mean by ___________
  • Include patients/families in this conversation

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Participating Hospitals

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.

Participants in 100K Children (in alphabetical order)

Click on the site’s name to learn more about their efforts to improve imaging for children.

- EvergreenHealth
- Lincoln Hospital
- MultiCare Allenmore Hospital
- MultiCare Auburn Medical Center
- MultiCare Good Samaritan Hospital
- MultiCare Mary Bridge Children's Hospital & Health Center
- Providence Holy Family Hospital
- Providence Sacred Heart Medical Center and Children's Hospital
- Quincy Valley Hospital
- Swedish Medical Center
- Yakima Valley Medical Center

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

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National Updates

- The Joint Commission - Revised CT recommendations

- CMS - Imaging efficiency measures
Safer Imaging Using Ultrasound: A statewide collaborative to improve the care of children with appendicitis

Morgan Richards, MD
WSHA 100K Children Campaign
September 15, 2014
For more information or to join this collaborative, please contact via email: safeandsound2014@gmail.com

Click the icons or the link below to be directed to the websites

http://www.becertain.org/patients/safe_and_sound
http://www.becertain.org/
Pediatric Appendicitis

• Most common acute abdominal condition
  – 70,000 per year

• 5-10% of all ED visits

• Diagnostic imaging reduces negative appendectomy rates
  – Increasing use
Computed tomography (CT) scans are not necessary in the routine evaluation of abdominal pain.
Specific Aims

• Research Question
  – Current patterns of imaging use
  – Factors associated with CT use

• Previous Research
  – Only Pediatric Centers
  – Administrative Data
  – Tertiary Academic Center Referrals
Methods

- **Surgical Care & Outcomes Assessment Program (SCOAP)**
  - Collaborative of 55 hospitals in Washington State
  - Children ≤ 18 undergoing appendectomy

- **Metrics:**
  - First imaging modality
  - Second imaging modality
  - Concordance between imaging and pathology
  - Outcomes
Results

• 2538 children
  – Mean age 11.3 years (± 4.1)
  – Perforation rate: 21.7%

• 99.7% underwent pre-operative imaging

• 52.7% had a CT scan first
# Rates of CT Use

**Hospital Type**  
- Pediatric  
- Non-Pediatric

**BMI**  
- Normal  
- Overweight  
- Obese

**Sex**  
- Male  
- Female

**Age**  
- ≤5  
- 5-10  
- >10

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Rates of CT Use

<table>
<thead>
<tr>
<th>Age</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤5</td>
<td></td>
</tr>
<tr>
<td>5-10</td>
<td></td>
</tr>
<tr>
<td>&gt;10</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sex</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BMI</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>Overweight</td>
<td></td>
</tr>
<tr>
<td>Obese</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hospital Type</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pediatric</td>
<td></td>
</tr>
<tr>
<td>Non-Pediatric</td>
<td></td>
</tr>
</tbody>
</table>

Presented at Washington State Hospital Association Safe Table Webcast 09/15/14
Rates of CT Use

- Age:
  - ≤5
  - 5-10
  - >10

- Sex:
  - Male
  - Female

- BMI:
  - Normal
  - Overweight
  - Obese

- Hospital Type:
  - Pediatric
  - Non-Pediatric

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Rates of CT Use

- **Age**
  - ≤5
  - 5-10
  - >10

- **Sex**
  - Male
  - Female

- **BMI**
  - Normal
  - Overweight
  - Obese

- **Hospital Type**
  - Pediatric
  - Non-Pediatric

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Factors associated with CT Scan

- **Age**
  - 5 < Age ≤ 10
  - Age > 10

- **Sex**
  - Male
  - Female

- **BMI**
  - Overweight
  - Obese

- **Type**
  - Non-Peds

Odds Ratio

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Why?

- Availability
- Training
- Quality

<table>
<thead>
<tr>
<th></th>
<th>Non-Pediatric</th>
<th>Pediatric</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT Scan</td>
<td>89.1</td>
<td>87.5</td>
<td>0.64</td>
</tr>
<tr>
<td>Ultrasound</td>
<td>60.1</td>
<td>77.3</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>
Conclusions

• Over 50% of children get a CT scan first

• Concordance varies for US

• Non-pediatric hospital associated with CT
Standardized Reporting
Pre-Operative Protocol
Web-access to Tips and Tricks
Standardized Reporting
Collaborative Meetings
Ultrasound Training
Quarterly Reports

Presented at Washington State Hospital Association Safe Table Webcast 09/15/14
Radiology Subgroup

• Completed
  – Worksheet for ultrasonographers
  – Template for radiologists

• In process
  – Preoperative protocol (WSHA)
  – US training curriculum
  – RLQ US training in certified US schools
  – Anytime access to reference materials on:
    http://www.becertain.org/hospitals/safe_and_sound
Radiology Subgroup

• Standardized Reporting: Nationwide Children’s
  – Four Categories:
    • Category 1: Normal Appendix
    • Category 2: Not fully visualized WITHOUT secondary signs
    • Category 3: Not fully visualized WITH secondary signs
    • Category 4: Appendicitis
  – Results:
    • Inconclusive exams decreased: 47.8% before $\rightarrow$ 0.23% after (p<0.001)
    • Sensitivity increased: 68.4% before $\rightarrow$ 92.4% after (p<0.001)
    • Specificity: 97.0% before $\rightarrow$ 98.3% after (p=0.26)
    • Negative predictive value for cat 1 and 2: 96.7% and 99.6%
    • CT Utilization decreased: 43% before $\rightarrow$ 21.7% after (p<0.001)

• Safe and Sound $\rightarrow$ Standardized Worksheet/Template
# RLQ Ultrasound Technologist Worksheet: Appendicitis

<table>
<thead>
<tr>
<th>Patient's Name:</th>
<th>History:</th>
<th>MRN:</th>
<th>Sonographer:</th>
<th>Radiologist:</th>
<th>Date:</th>
</tr>
</thead>
</table>

## VISUALIZATION

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>Partial</th>
<th>Not Visualized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire Appendix Seen?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix seen originating from cecum?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## FINDINGS

<table>
<thead>
<tr>
<th></th>
<th>Origin</th>
<th>Mid</th>
<th>Tip</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Outer Diameter (mm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wall Thickness (mm)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Absent</th>
<th>Present</th>
<th>Unable to Assess</th>
</tr>
</thead>
<tbody>
<tr>
<td>Echogenic Fat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mural Hyperemia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compressibility</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fecalith</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal Appendiceal Contents</td>
<td>Hypoechoic</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Absent</th>
<th>Present</th>
<th>Unable to Assess</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complex Free Fluid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simple Free Fluid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lymphadenopathy (&gt;8mm short axis)</td>
<td>Absent</td>
<td>Present</td>
<td>Unable to Assess</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Absent</th>
<th>Present</th>
<th>Unable to Assess</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenderness on Exam</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## ADDITIONAL FINDINGS / SONOGRAPHER COMMENTS

(Consider: Bowel, Bladder, Gallbladder, Right Kidney, Intussusception, Ovarian Pathology)

---

*This worksheet is intended for sonographer to radiologist communication only and should not be used in place of the radiologist’s final interpretation in the report.*

For more information about Safe and Sound visit www.becertain.org/hospitals/safe_and_sound

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EXAMINATION: [Abdominal ultrasound, limited].

DATE: [Exam Date].

COMPARISON: [Prior Date].

TECHNIQUE: Grayscale sonographic image acquisition of the right lower abdomen was performed.

CLINICAL HISTORY: [Clinical History]

FINDINGS:

Visualization: [The appendix is visualized in its entirety. / The appendix is partially visualized. / The appendix is not visualized.] [The appendix is seen originating from the cecum. / The appendix is not seen originating from the cecum.]

Maximum Outer Diameter (in mm, normal <7mm)
Origin: [Size]
Midportion: [Size]
Tip: [Size]

Wall Thickness (in mm, normal <1.7mm): Measures up to [thickness / location] mm seen in the [transverse / longitudinal plane].

Echogenic Fat: [Absent / Present / Unable to Assess]

Appendiceal Mural Hyperemia: [Absent / Present / Unable to Assess]

Compressibility: [Absent / Present / Unable to Assess]

Fecalith: [Absent / Present / Unable to Assess]

Internal Appendiceal Contents: [Hypoechoic / Echogenic / Unable to Assess]

Fluid Collection: [Collection: Absent / Present]

Enlarged Mesenteric Lymph Nodes (>8mm short axis): [Absent / Present / Unable to Assess]

Tenderness on Exam: [Absent / Present]

Incidental Findings: [Urinary bladder / Gallbladder / Right kidney / Bowel / Intussusception / Ovarian Pathology / Other]

IMPRESSSION:

 peny Appendix.

 Appendix not visualized or partially visualized without secondary signs of appendicitis. Based on the absence of inflammatory signs there is low likelihood of acute appendicitis.

Appendix not visualized or partially visualized with secondary signs of appendicitis. Based on the presence of [x | y | z] there is a high likelihood of acute appendicitis. Recommend surgical consultation for further evaluation.

 Acute appendicitis

[Primary diagnostic features indicating appendicitis include the following: appendiceal diameter 7 mm or greater, wall thickness 1.7 mm or greater and lack of compressibility.

Secondary diagnostic features shown to be associated with appendicitis include the following: periappendiceal echogenic fat, appendiceal wall hyperemia, fecalith, complex fluid and/or fluid collection.

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Preoperative Protocol

• WSHA
  – Pre/post operative protocol
  – Nearing completion
    • Data collection
    • US templates to be included in roll-out
Children ≥ 2 years with suspected appendicitis

- **Low clinical suspicion (i.e. PAS 1-3)*:**
  - Explore alternative diagnosis
- **Moderate clinical suspicion (i.e. PAS 4-7)*:**
  - Ultrasound
  - Normal appendix
  - Indeterminate
  - Positive/Complicated appendicitis
  - Surgery consult
  - Imaging
  - Delayed operation
  - Urgent operation
- **High clinical suspicion (i.e. PAS 8-10)*:**
  - Supportive observation (home/hospital) and reevaluate as needed

*Note: PAS stands for Pediatric Appendicitis Score, a clinical decision tool used to assess the likelihood of appendicitis in children.
Thank you, Questions?

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## Pediatric Appendicitis Score (PAS)

<table>
<thead>
<tr>
<th>Sign/Symptom</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cough/percussion/heel tapping – tenderness at RLQ</td>
<td>2</td>
</tr>
<tr>
<td>Anorexia</td>
<td>1</td>
</tr>
<tr>
<td>Low grade fever ≥38.0</td>
<td>1</td>
</tr>
<tr>
<td>Nausea/emesis</td>
<td>1</td>
</tr>
<tr>
<td>RLQ tenderness on light palpation</td>
<td>2</td>
</tr>
<tr>
<td>Leukocytosis (&gt;10,000/mm³)</td>
<td>1</td>
</tr>
<tr>
<td>Left shift (&gt;75% neutrophilia)</td>
<td>1</td>
</tr>
<tr>
<td>Migration of pain to RLQ</td>
<td>1</td>
</tr>
</tbody>
</table>
Improving US First

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CT Use Remains High

![Graph showing the percentage of patients with any CT scan from 2011 to 2014. The percentage has remained high across these years.]

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Dose Optimization

Dave Wilson, RT
Director, Radiologic Technologist, LEAPT
Washington State Hospital Association

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Starting the Process

- CT Lead or Supervisor
- Involve key stakeholders
- Review current DLP per protocol
- Use vendor specific protocols as a starting point
Dose Reduction Process Flow Diagram

1. Prepare building
   - Obtain initial vendor apps
   - Training

2. Basic protocol build
   - Set dose watch parameters
   - Remove 140 kVp protocols
   - Enable dose modulation
   - Build protocols
   - Label protocols “adult” and “pediatric”

   Body Scan?
   - No
   - Enable iterative construction
   - Create written protocol
   - Yes
   - Increase pitch for body exams

3. Reduce radiation dose
   - Increase noise index by 5% increments
   - Perform phantom test to ensure quality
   - Begin performing studies
   - Radiologist provides feedback on study quality
   - Quality image?
     - No
     - Adjust to previous setting
     - Yes

4. Update protocol
   - Radiologist reviews and approves final protocol
   - Update written protocol
   - Educate and implement new protocols

---

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### Pediatric Dose Reduction Calculator

**Table II: mAs Reduction Factors for the Pediatric Head**

<table>
<thead>
<tr>
<th>Room #:___________</th>
<th>CT Unit:___________</th>
<th>Date:__________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head Baseline:</td>
<td>kVp</td>
<td>mA</td>
</tr>
<tr>
<td>fill in</td>
<td>fill in</td>
<td>fill in</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PA Thickness (cm)</th>
<th>Approx Age</th>
<th>mAs Reduction Factor (RF)</th>
<th>Estimated mAs = BL x RF</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>newborn</td>
<td>0.74</td>
<td>#VALUE!</td>
</tr>
<tr>
<td>16</td>
<td>2 yr</td>
<td>0.86</td>
<td>#VALUE!</td>
</tr>
<tr>
<td>17</td>
<td>6 yr</td>
<td>0.93</td>
<td>#VALUE!</td>
</tr>
<tr>
<td>19</td>
<td>med adult</td>
<td>1</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

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Dose Optimization

Undue Exposure to Radiation: Child Head CT Dosage

Definition:
- Numerator: Total dose length product (DLP) for all head CTs (child)
- Denominator: Total number of CTs with recorded DLP (child)
- Data Source: Facility direct report to WSHA

Presented at Washington State Hospital Association Safe Table Webcast 09/15/14
Dose Optimization

Undue Exposure to Radiation - Adult and Child Head CT Dosage

Data Source: Facility direct report to WSHA
Definitions: Average DLP per head CT (mGy-cm); Average Total Dose (DLP) per Head CT (mGy-cm)
Baseline period: Q4 2013
Baseline: Adult head CT 250 mGy-cm; Child head CT 451 mGy-cm

Measure:
- Adults
- Children
Observation for Minor Head Trauma

Radiation Safety - Supplemental Measures

Right Study Hospitals

Percent Pediatric Patients Receiving Observation for Minor Head Trauma

Definition: 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 for minor head trauma.
Data Source: Facility direct report to WSHA.
Observation for Minor Head Trauma

**Definition:** 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 for minor head trauma.

**Data Source:** Facility direct report to WSHA.
Single Phase Head CT

Radiation Safety - Supplemental Measures

Right Order (Children)  Hospitals

% Single Phase Head CTs (Child)

Oct 13  Nov 13  Dec 13  Jan 14  Feb 14  Mar 14  Apr 14  May 14  Jun 14  Jul 14

Definition: Single instead of dual phase CTs of head for children.
Numerator: Number of single phase head CTs (child).
Denominator: Number of dual phase and single phase head CTs (child).
Data Source: Facility direct report to WSHA.

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Single Phase Head CT

Undue Exposure to Radiation - Supplemental Measures - Right Order (Children)

Definition: Right Order - Single instead of dual phase CTs of head
Numerator: Number of single phase head CTs
Denominator: Number of dual phase and single phase head CTs
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.

<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 15(^{th})</td>
<td>July</td>
<td>September 15(^{th})</td>
</tr>
<tr>
<td>February</td>
<td>April 15(^{th})</td>
<td>August</td>
<td>October 15(^{th})</td>
</tr>
<tr>
<td>March</td>
<td>May 15(^{th})</td>
<td>September</td>
<td>November 15(^{th})</td>
</tr>
<tr>
<td>April</td>
<td>June 15(^{th})</td>
<td>October</td>
<td>December 15(^{th})</td>
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<tr>
<td>May</td>
<td>July 15(^{th})</td>
<td>November</td>
<td>January 15(^{th})</td>
</tr>
<tr>
<td>June</td>
<td>August 15(^{th})</td>
<td>December</td>
<td>February 15(^{th})</td>
</tr>
</tbody>
</table>
Questions?

WSHA Contacts

Becky DeMers at BeckyD@wsha.org or (206) 216-2509
Dave Wilson at DaveW@wsha.org or (206) 577-1805
Brandon Wong (QBS) at BrandonW@wsha.org or (206) 216-2524
Appendix
Supporting Materials

RLQ Ultrasound Technologist Worksheet: Appendicitis

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

**VISUALIZATION**

<table>
<thead>
<tr>
<th>Entire Appendix Seen?</th>
<th>Yes</th>
<th>Partial</th>
<th>Not Visualized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix seen originating from cecum?</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

**FINDINGS**

**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 (home)
  - Surgery

---

http://www.acep.org/Continuing-Education-top-banner/Focus-On--Ultrasound-for-Appendicitis/
Supporting Materials

Table II: mAs Reduction Factors for the Pediatric Head

<table>
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<tr>
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<th>Head Baseline:</th>
<th>kVp</th>
<th>mA</th>
<th>Time (sec)</th>
<th>Pitch</th>
</tr>
</thead>
<tbody>
<tr>
<td>fill in</td>
<td>fill in</td>
<td>fill in</td>
<td>fill in</td>
<td>fill in</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PA Thickness (cm)</th>
<th>Approx Age</th>
<th>mAs Reduction Factor (RF)</th>
<th>Estimated mAs = BL x RF</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>newborn</td>
<td>0.74</td>
<td>#VALUE!</td>
</tr>
<tr>
<td>16</td>
<td>2 yr</td>
<td>0.86</td>
<td>#VALUE!</td>
</tr>
<tr>
<td>17</td>
<td>6 yr</td>
<td>0.93</td>
<td>#VALUE!</td>
</tr>
<tr>
<td>19</td>
<td>med adult</td>
<td>1</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

Presented at Washington State Hospital Association Safe Table Webcast 09/15/14
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

```html
<!-- Copy this HTML and
<a href="http://www.wsha"/>
```

100K Children Campaign
Safe Imaging
Washington State Hospital Association

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

100K Children Campaign WSHA Toolkit
August 2014
Measure Definition Sheets

Safe Imaging – Percent Pediatric Patients Receiving Ultrasound for Suspected Appendicitis
Measure Definition Sheet

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). Submission 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>
<td>October 15th</td>
</tr>
<tr>
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<td>May 15th</td>
<td>September</td>
<td>November 15th</td>
</tr>
<tr>
<td>April</td>
<td>June 15th</td>
<td>October</td>
<td>December 15th</td>
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</tr>
<tr>
<td>June</td>
<td>August 15th</td>
<td>December</td>
<td>February 15th</td>
</tr>
</tbody>
</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, 541.0, 542.0, 543.0, 543.9). Pediatric inpatients and outpatients including emergency department patients, 0-17 years of age receiving an ultrasound (CPT Code: 76700, 76705, 76830, 76856, 76857).

Exclusion Criteria
None.

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

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.

Data Submission
1. Data will be submitted monthly to the Washington State Hospital Association (WSHA) Quality Benchmarking System (QBS). Submission will be available to start 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.

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<td>December</td>
<td>February 15th</td>
</tr>
</tbody>
</table>

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.

Presented at Washington State Hospital Association Safe Table Webcast 09/15/14
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
## 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>

Presented at Washington State Hospital Association Safe Table Webcast 09/15/14
Please note: If your facility is not submitting data for a particular measure, please enter zero for both numerator and denominator.