

# Implementing Pediatric CT Protocols Throughout a Large, Diverse Multihospital Healthcare System

## SYNOPSIS

- Reliable and widespread implementation of best practices remains elusive 15 years after the Institute of Medicine reported that our health care system does not provide consistent, high quality medical care to all people<sup>1</sup>
- In our enterprise, neither the Image Gently campaign nor installation of a dose monitoring system led to routine use of pediatric CT protocols
- A data-driven improvement initiative has led to increased compliance

## BACKGROUND

### Needed to improve imaging throughout a large diverse enterprise

- Optimal use of ionizing radiation as an improvement target
  - Builds on awareness created by Image Gently campaign<sup>2</sup>
  - However, needed to go beyond simple awareness and agreement<sup>3</sup>
  - Use data to demonstrate measurable improvement<sup>4</sup>

### Needed framework for driving large scale change<sup>5</sup>

- Burning platform: New Joint Commission<sup>6</sup> & CMS<sup>7</sup> requirements
- Guiding coalition: Radiology Clinical Expert Council
- Guiding vision: "Every child deserves a pediatric CT protocol"
- Focus on small wins: Monitoring use of pediatric CT protocols

### Potential conflicts which could create barriers to change

- Diverse enterprise: Tertiary vs community hospitals
- Trust: Private practice vs academic radiology groups
- Organizational structure: Medical staff vs hospital administration

- BJC Health Care System has a Center for Clinical Excellence, that is intended to be a neutral territory where ideas from stakeholders across the system can be discussed and designed for implementation
- The Center for Clinical Excellence acts as a "trusted agent" to drive quality of care through:
  - Facilitating collection, evaluation, and dissemination of data and quality metrics
  - Providing expertise in informatics, change management, and implementation
  - Driving horizontal collaboration across the enterprise

### Radiology Clinical Expert Council



- The BJC Clinical Expert Councils (CECs) were designed to improve overall physician engagement and provide a forum where stakeholders from across the system could participate on a regular basis. They are multi-disciplinary teams consisting of clinical, administrative and technical staff.
- The councils allow collaboration in a complex multi-hospital health system that is comprised of academic, private practice, tertiary, and a diverse medical staff community
- The council structure allows for both horizontal and vertical collaboration across the system to share information and work to increase consistency of gold standard practices system-wide

### Governance & Timeline



- As part of the overall physician engagement strategy the Radiology CEC was launched in May 2014
- Council members meet quarterly but substantial work is accomplished between the meetings
- Each facility is represented by lead physicians and technical leaders
- An initial driver was compliance with Joint Commission requirements
  - To develop and implement best practices throughout the system
  - CEC members vote to approve policies and procedures on a regular basis

### Six Drivers for CECs



- At each CEC meeting the goal is to address the following **Six** drivers:
- Patient Safety
  - Informatics & Data Dashboards
  - Quality Improvement
  - Efficiencies & Workflows
  - Education & Competency
  - Communication & Engagement

Figure 1: The BJC Center for Clinical Excellence and its Clinical Expert Councils provided the infrastructure needed to promote change across the enterprise

## ACKNOWLEDGEMENTS

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## METHODS

### Project Milestones

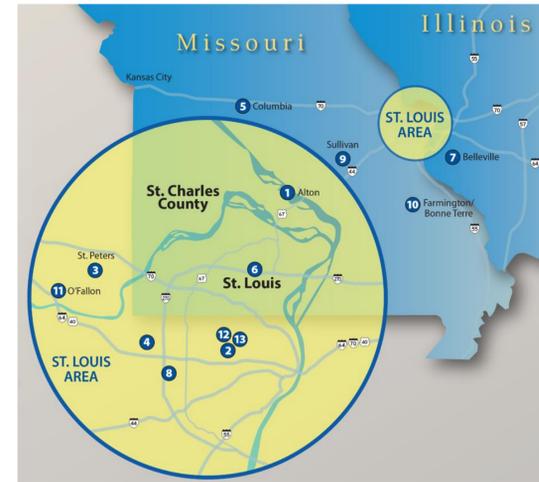
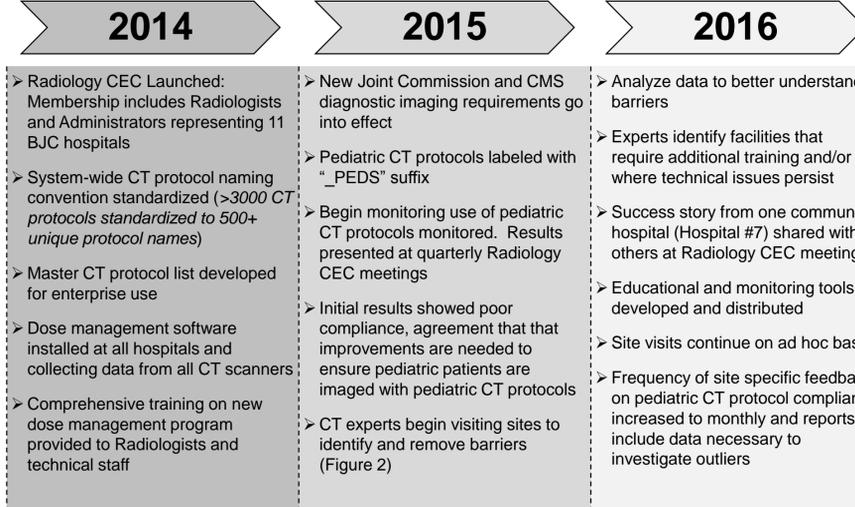


Figure 2: Enterprise map. Of these 13 locations, 12 have participated in the Radiology CEC. The numbers used in this map do not correspond to the numbers used in Figure 3. Over the last 15 months, CT experts have conducted over 60 site visits to help implement pediatric CT protocols throughout the enterprise. When including travel time, the typical site visit requires more than 2-3 hours and mainly consists face-to-face meetings with Department heads and CT technologists. Key discussion items: Establish pediatric protocols on each CT scanner, set up training and accountability measures, utilization and training on the dose monitoring system, reminder cards were attached to scanner monitors to remind staff of proper protocol selection, follow-up visit to look for opportunities for improvement, share monthly progress graphs with each site.

## RESULTS

### Pediatric CT Protocol Use

- Baseline data (Jan 2015-June 2015) demonstrated that compliance was poor at most sites
- Indicates that awareness, agreement and passive monitoring were not sufficient to drive change

### Barriers

- "We don't image pediatric patients"
- "We already use pediatric protocols"
- Lack of feedback and accountability

### Addressing barriers

- Provided data showing that all sites image children (defined as patients <18yrs old)
- Provided data showing impact of routinely using pediatric protocols (Figure 4)
- Site visits for face-to-face staff education (Figure 2)
- Frequent & specific feedback (Case Studies below)

### Case Studies: Change management at two community hospitals (Hospitals 7 and 8)

- Educating the technologists (direct communication, group emails, department meetings, posting reminders and signs at the scanners)
- Monitoring local performance on a monthly basis by reviewing every pediatric CT scan to determine if a pediatric protocol was used
- Identifying the fallouts and investigating the cases, finding common underlying causes (e.g. patient age close to adult range, weekend and night shift technologists, etc), providing feedback to staff and appropriate training
- Increase monitoring frequency to a weekly basis, one on one interaction with technologists by their supervisors per case to change behavior and emphasize importance
- Providing positive feedback to the team by posting the performance rates and comparing our results with other centers within the enterprise
- Ongoing monitoring to determine if changes led to improvement

### Figure 3: Pediatric CT Protocol Use 1/1/15 - 9/30/16

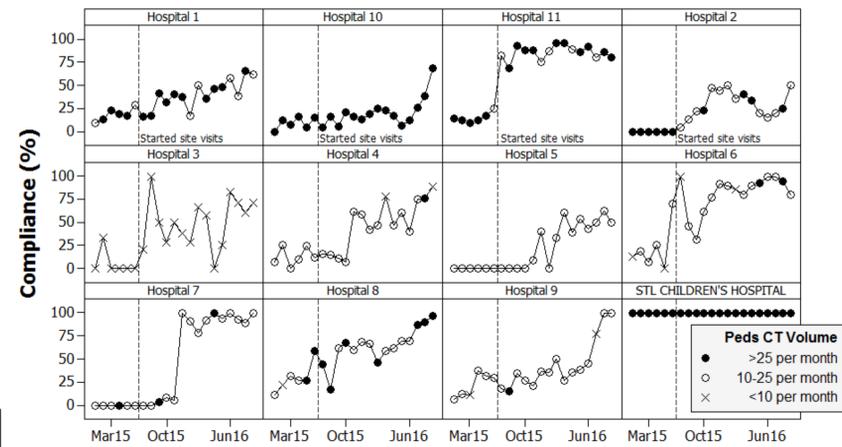
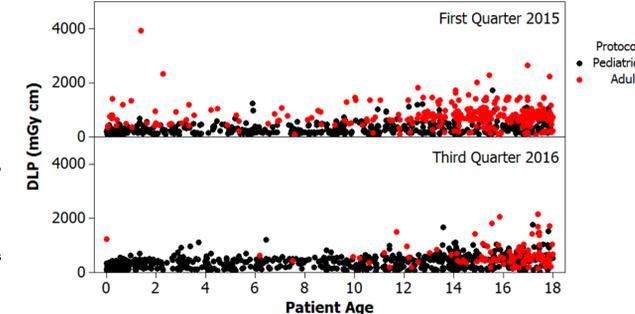


Figure 3 (above): The fraction of CTs performed using pediatric protocols was calculated monthly for each site. As described in Methods, a series of different interventions have led to improved performance over the last 15 months at most sites.

Figure 4 (right): The observed DLPs for pediatric head CTs is plotted to illustrate the impact of using pediatric CT protocols. Baseline data shows that children, including many infants, were being imaged using adult protocols and this led to substantially higher DLP values than children imaged with pediatric protocols. While this has improved, it is still relatively common that older children are imaged with adult protocols

### Figure 4: Pediatric Head CT Scans



## DISCUSSION

### Why the poor performance at baseline?

- Image Gently and other initiatives are just steps in a larger process
  - Four steps to compliance with clinical guidelines<sup>3</sup>



- Difficulty to reliably achieve adoption and adherence with low frequency events
  - Pediatric patients are relatively rare at many sites. A worklist of 20 adults then 1 child followed by another 20 adults creates an inherent bias towards using an adult protocol when imaging the child
    - It is also relatively easy to justify using the adult protocol when the child is 16 years old and as large as an adult

### Why is widespread implementation so difficult?<sup>8</sup>

- We glorify discovery – usually at the expense of implementation
- We believe in the myth of natural diffusion – since diffusion eventually works
- We reinforce inequity – because inequity provides a competitive advantage

### Why aren't we at 100% yet? What are the remaining barriers?

- Competing priorities and this task is given a low priority because "we don't image many children and the children we do image are often as big as adults"
- Can justify deviations such as trauma patients where age isn't known prior to CT

### What have we learned?

- Need to collaborate across a diverse enterprise comprised of both academic and private practice physicians operating within a spectrum of rural critical access to tertiary institutions with a large medical staff community
- Importance of operational definitions
- Define child as any patient less than 18 years old at the time of the CT scan
  - Define pediatric protocol as one containing the "-peds" suffix
- Principles of change management<sup>5</sup>
- Difficulty of implementation and spread<sup>8</sup>
- These problems are not new, Doris Lessing observed
 

"I think when people look back at our time, they will be amazed at one thing more than any other. It is this—that we do know more about ourselves now than people did in the past, but that very little of this knowledge has been put into effect."

## CONCLUSIONS

### Reliable use of pediatric CT protocols is an important goal

- Challenging to achieve throughout a large, diverse enterprise

### Importance of a robust improvement structure

- The BJC Center for Clinical Excellence served as a "trusted agent" to promote change across the system.
  - Established the Radiology CEC as a neutral territory ("Switzerland")
  - Collected and analyzed data
 

"If we have data, let's look at the data. If all we have are opinions, let's go with mine." Jim Barksdale, CEO of Netscape
  - Site visits provide face-to-face interactions with frontline personnel
  - CEC meetings were a forum for feedback and celebrating successes

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