Nationally Ranked

As one of the Best Children’s Hospital by the U.S. News and World Report for more than 20 years.
This is an extraordinary place. With an optimist’s outlook, a pioneer’s hunger and a celebrated history, we are creating the future of child health.

There’s magic in our energy, our spaces, our people and our discoveries. There’s even magic in our motivation: our unblinking belief that we can eradicate childhood disease — so that one day, like magic, children will no longer need us.

Here, it’s different.
**Kids aren’t small adults**

*They’re growing and changing every day, and their care not only has to address what they need right now; it also has to anticipate where they’ll be in 6 months, 9 months, 10 years. That’s pediatric expertise.*

We treat kids and only kids. Our physicians are board-certified, meaning they exceed state licensing requirements and commit to continually expanding their knowledge in their specialty area. Our nurses are specially trained in pediatrics and hold Bachelor of Science degrees in nursing.

Our expertise shows in our results: each kid we treat, soothe and heal, each kid who gets well enough to walk out our doors. It’s why we do what we do.

---

**An entire hospital, devoted to kids**

*Numbers from 2017*

<table>
<thead>
<tr>
<th>Licensed beds</th>
<th>Emergency and urgent care visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>479</td>
<td>173,085</td>
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<table>
<thead>
<tr>
<th>Inpatient admissions</th>
<th>Employees</th>
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<tbody>
<tr>
<td>15,330</td>
<td>6,821</td>
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<table>
<thead>
<tr>
<th>Total surgeries</th>
<th>Medical staff</th>
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<tbody>
<tr>
<td>19,362</td>
<td>2,170</td>
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<table>
<thead>
<tr>
<th>Days of patient care</th>
<th>Residents and fellows</th>
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</thead>
<tbody>
<tr>
<td>97,418</td>
<td>259</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Outpatient visits</th>
<th>Volunteers</th>
</tr>
</thead>
<tbody>
<tr>
<td>574,929</td>
<td>2,502</td>
</tr>
</tbody>
</table>
Our families complete our care team

We include patients and their families in every care decision — and we do our best to make sure they don’t have to worry about anything else while they’re here. We know kids need to play, learn and connect, even when they’re sick, and we offer dozens of amenities to help them do just that.

For kids:
- Child Life specialists help children to cope and feel comfortable in the hospital.
- Philips Ambient Experience MRI puts kids in a jungle or deep sea adventure to make testing less stressful.
- Creative Arts therapists promote physical and emotional health through yoga, art, dance and music.
- Seacrest Studios connects kids in the hospital with an in-house radio and TV broadcast studio.
- Playrooms on every floor offer antsy kids an outlet, wherever they are.
- Teen Zone offers adolescents a 3,000 square-foot hangout with tons of amenities.

For families:
- Private rooms with full-size pullout beds and ample storage
- A Family Resource Center, where parents can recharge while kids are in the hospital
- A chapel and Spiritual Care for people of any faith
- Daycare for siblings at our Creative Play Center
- Outside areas and gardens where families can relax and get some fresh air
- Flat-screen TVs, internet access and on-demand video in every room
Top-Ranked Specialties for More Than 20 Years

Our commitment to healing kids has gone a long way toward placing us among the nation’s top hospitals since U.S. News & World Report began ranking them — but it isn’t possible without dedicated expertise.

We rank among the best in ten specialties:
- Cancer: #8
- Cardiology and Heart Surgery: #18
- Diabetes and Endocrinology: #7
- Gastroenterology and GI Surgery: #7
- Neonatology: #4
- Nephrology: #26
- Neurology & Neurosurgery: #13
- Orthopedics: #27
- Pulmonology: #7
- Urology: #21
Bringing care closer to home

We work closely with community providers to coordinate each patient’s care. And because we serve a big region, it’s imperative to get it right: a family going home to Montana, say, can’t easily come back. That’s why we’ve formed Care Alliances with providers all over the region.

We’ve also worked with providers around the region to expand the reach of our telehealth programs. Using specialized equipment, our specialists can conference with patients with complex needs, monitor their condition and order tests from hundreds of miles away — saving parents the trip.

We see more, treat more, and heal more kids than any other hospital in our seven-state region

- We are Colorado’s only licensed specialty hospital exclusively for children.
- We care for patients from all 50 states and at least 35 countries.
- We are the only Level I Pediatric Trauma Center in our region.
- Our Level IV Neonatal Intensive Care Unit offers the smallest patients the highest level of acute care.

Regional Outreach
- 1,284 clinics
- 14 specialties
- 23 cities
- 3 states

Telehealth
- 2,209 encounters
- 36 specialties
- 36 cities
- 9 states
Children’s Hospital Colorado Locations

1. Anschutz Medical Campus, Aurora
2. North Campus, Broomfield
3. Therapy Care, Broomfield
4. Urgent and Outpatient Specialty Care, Wheat Ridge
5. Urgent, Emergency and Outpatient Specialty Care, Uptown Denver
6. KidStreet
7. South Campus, Highlands Ranch
8. Therapy Care, Highlands Ranch
9. Orthopedic Care, Centennial
10. Parker Adventist Hospital Emergency Care, Parker
11. Outpatient Specialty Care, Parker
12. Therapy Care, Parker
13. Memorial Hospital, pediatric expertise provided by Children’s Colorado
14. Urgent and Outpatient Specialty Care at Briargate, Colorado Springs
15. Therapy Care at Printers Park, Colorado Springs
16. Therapy Care, Pueblo
17. Colorado Springs, new hospital coming soon
Mission
As a private, non-profit pediatric hospital, our mission is to improve the health of children through the provision of high-quality, coordinated programs of patient care, research, education and advocacy.

Patient Care
We keep our patients and their families at the center of everything we do, especially when it comes to experience, quality and safety. Equipped with the most advanced technology, our experts deliver some of the best outcomes in the country.

Research
We offer our patients the most innovative treatments today. Collaborating with our colleagues from the University of Colorado on the Anschutz Medical Campus ensures that our discoveries rapidly lead to new medicines, devices and treatment practices.

Education
Lifelong learning advances our mission. Through academic and community partnerships, we shape the future of pediatric health by training tomorrow’s health care professionals.

Advocacy
Our influence extends beyond our health system. We bring health programs to the community and advocate in the state and national legislatures.

Vision
Child health. Reimagined. Realized

Values
For a child’s sake...
We are a caring community called to honor the sacred trust of our patients, families and each other through humble expertise, generous service and boundless creativity.

...This is the moment.
What is De-implementation?
Failure to Translate Evidence into Practice

- 30-40% of patients do not get treatments of proven effectiveness.
- 20-25% of patients get care that is not needed or potentially harmful.
Background

• Bronchiolitis is a viral infection that cause lower airway swelling and mucus plugging resulting in various degrees of respiratory distress.
• It is the most common reason for hospitalization of infants.
  • >100,000 admissions annually in the U.S.
  • Estimated cost of $1.73 billion
American Academy of Pediatrics
Bronchiolitis Clinical Practice Guideline

National, evidenced-based guidelines

Recommend discontinuing unnecessary tests and outdated treatments
Chest X-rays

Studies show increase in inappropriate use of antibiotic therapy owing to similar appearance of atelectasis and infiltrate

Bronchodilators

Randomized trials have not shown a consistent beneficial effect on disease resolution, need for hospitalization or length of stay
Implications

Unnecessary diagnostic testing and treatment has consequences for patients.

• Increased length of stay
• Increased healthcare costs

The majority of admitted bronchiolitis patients continue to receive tests and treatments.

• These tests and treatments don’t have replacements.
• Providers and parents are left with nothing but “supportive care”.

Children’s Hospital Colorado
Affiliated with University of Colorado Anschutz Medical Campus
Project Aim

Increase compliance with the American Academy of Pediatrics Clinical Practice Guideline by decreasing overuse of unwarranted interventions for patients with acute viral bronchiolitis in the emergency department, urgent care, and inpatient units at our free-standing children’s hospital and affiliated satellite locations.
When Guideline "Implementation" Requires "De-implementation"
Define the Local Problem
Define the Local Problem

How do we Compare?
Define the Local Problem

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bronchodilator</td>
<td>19%*</td>
<td>74%*</td>
<td>33%*</td>
</tr>
<tr>
<td>Steroid</td>
<td>6%</td>
<td>18%</td>
<td>15%</td>
</tr>
<tr>
<td>Antibiotic</td>
<td>19%</td>
<td>37%</td>
<td>29%</td>
</tr>
<tr>
<td>Viral Testing</td>
<td>0.6%</td>
<td>45%</td>
<td>30%</td>
</tr>
<tr>
<td>CXR</td>
<td>32%</td>
<td>53%</td>
<td>34%</td>
</tr>
</tbody>
</table>

* > 0 days, Of note: Benchmark for >1 day is 0% (our data any use)

** From PHIS, 42 tertiary care children's hospitals. Average performance of the top hospitals comprising 10% of admitted patient population.
Population

• We care for over 3000 patients with bronchiolitis annually.
  • 700 - 900 admissions
• Median length of stay 60 hours
Improvement Team

- 40-person
- Multidisciplinary
- Hospitalists, ED/UC providers, bedside nurses, respiratory therapists, information technology specialists, pharmacists and process improvement specialists
Kickoff Meeting

- Define the problem
- What drives utilization
- Identify barriers and facilitators to de-implementation
- Choose interventions to overcome barriers or enhance enablers
- Form working-groups to develop and implement each of the interventions
Who needs to do what differently?

What drives the behavior? (Barriers and Enablers)

What interventions will overcome barriers or enhance enablers?
Smart Aim

- Specifically, to reduce the percent of admitted patients receiving:

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest radiograph</td>
<td>39%</td>
<td>&lt;20%</td>
</tr>
<tr>
<td>Viral Testing</td>
<td>32%</td>
<td>&lt;15%</td>
</tr>
<tr>
<td>Bronchodilators</td>
<td>34%</td>
<td>&lt;20%</td>
</tr>
</tbody>
</table>

- Between December 1, 2015 and April 30, 2016 and sustain the improvement for subsequent bronchiolitis seasons.
Multi-site QI Initiative to De-implement Unnecessary Testing and Treatment in Bronchiolitis

1. Respiratory Viral Testing
2. Bronchodilators
3. Chest X-rays
Key Issues We Considered

De-implementation Strategies
Dashboard Key to Improvement

- Real-time data
- Data refreshed daily
- Data accessible to members of the project team
- Filters allowed individual team members to stratify the data by:
  - Clinical unit
  - Date range
  - Payer
  - Provider
  - Other important criteria
Which patients are low risk?
Which patients need tests treatments?

Habit?
(Type I vs Type II thinking)

Is it all about resources?

Lack skills to talk to patients about low value test/treatments?

Balancing Measures

Provider Pledge

EHR order sets

Treatment Cascade

Education

Delayed diagnoses?

EHR Implementation

Clinical Pathway linked to EHR

Patient video

Explore patient preferences for less is more conversations
Which patients are low risk? Which patients need tests/treatments?

Habit? (Type I vs Type II thinking)

Is it all about resources?

Lack skills to talk to patients about low value test/treatments?

1. Balancing Measures
2. Provider Pledge
3. EHR Implementation
4. Treatment Cascade
5. Education

Delayed diagnoses

Clinical Pathway linked to EHR

EHR order sets

Patient video

Explore patient preferences for less is more conversations
Dashboard
Real-time EHR
Balancing measures
Which patients are low risk?
Which patients need tests treatments?

Habit? (Type I vs Type II thinking)

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1. Balancing Measures
2. Provider Pledge
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5. Education

Delayed diagnoses?

EHR order sets
Clinical Pathway linked to EHR

Explore patient preferences for less is more conversations
Which patients are low risk? Which patients need tests treatments?

1. Balancing Measures

2. Habit? (Type I vs Type II thinking)

3. EHR Implementation

4. Is it all about resources?

5. Lack skills to talk to patients about low value test/treatments?

- Provider Pledge
- EHR order sets
- Clinical Pathway linked to EHR
- Treatment Cascade
- Education
- Patient video
- Explore patient preferences for less is more conversations

Children's Hospital Colorado
Affiliated with University of Colorado Anschutz Medical Campus
Provider Pledge

Antimicrobial stewardship literature

Type 1 (automatic) vs Type 2 (conscious) thinking

“I pledge to utilize only the necessary interventions in the care of patients presenting with history and physical exam findings consistent with anything less than severe acute bronchiolitis.

If a patient needs a diagnostic test or intervention, I will have a collaborative discussion with team members, patients and families and practice shared decision making.”
Qualitative Study

Pledge

Interviewed 15 hospitalists and 15 EM physicians

Mean years in practice since residency = 9 (S.D. 6.1)

"I definitely talk about [the pledge and guidelines] more, to the teams, to the nurses… I feel like [the pledge] helps me actually talk to families, to spread the word."

Which patients are low risk?
Which patients need tests treatments?

Habit?
(Type I vs Type II thinking)

EHR Implementation

Is it all about resources?

Lack skills to talk to patients about low value test/treatments?

1. Balancing Measures

2. Provider Pledge

3. EHR order sets

4. Treatment Cascade

5. Education

Patient video

Explore patient preferences for less is more conversations
Which patients are low risk?
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Habit? (Type I vs Type II thinking)
EHR Implementation
Is it all about resources?
Lack skills to talk to patients about low value test/treatments?

1. Balancing Measures
2. Provider Pledge
3. EHR order sets Clinical pathway linked to EHR
4. Treatment Cascade
5. Education
   Patient video
   Explore patient preferences for less is more conversations
Order sets
Don't make it easy to do the wrong thing........
CLINICAL PATHWAY

ALGORITHM: Inpatient Bronchiolitis Management

Patient Admitted

Assess patient and assign severity score (Table 1)

Pathway

Clinical Titrations of Oxygen for Stable Infants over 3 Months of Age

1. If bronchiolitis symptoms are MILD, maintain oxygen flow in increments of 1 L/min. Assess for titration of oxygen at least every 1 hour.

2. If bronchiolitis symptoms are MODERATE or SEVERE, increase oxygen incrementally. Consider continuous pulse oximetry if oxygen flow is greater than 1 L/min for infants, 3 to 6 months of age, or greater than 2 L/min for children greater than 6 months of age. Consultation with medical staff.
Qualitative Study
Pathways

Interviewed 15 hospitalists and 15 EM physicians

Mean years in practice since residency = 9 (S.D. 6.1)

“If it’s not at your fingertips, if it’s not prompting you to look at the clinical pathway I think a lot of providers don’t have the practical time to, between patients, look it up, print it out, reference it...”

Tanverdi M, O’Hara K, Tyler A, Gambino J, Reich J, Bakel LA, Scudamore, DD. Understanding Pediatric Hospitalist and Pediatric Emergency Medicine Physicians’ Barriers to Clinical Practice Guideline. Poster accepted at: Pediatric Academic Societies (PAS) Annual meeting; 2018 May 5-8; Toronto, Canada
Which patients are low risk? Which patients need tests treatments?

Habit? (Type I vs Type II thinking)

EHR Implementation

Is it all about resources?

Lack skills to talk to patients about low value test/treatments?

Balancing Measures

Provider Pledge

EHR order sets

Treatment Cascade

Education

Patient video

Explore patient preferences for less is more conversations
<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>Which patients are low risk?</td>
<td>Habit? (Type I vs Type II thinking)</td>
<td>EHR Implementation</td>
<td>Is it all about resources?</td>
<td>Lack skills to talk to patients about low value test/treatments?</td>
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<tr>
<td>Which patients need tests treatments?</td>
<td>Balancing Measures</td>
<td>Provider Pledge</td>
<td>EHR order sets</td>
<td>Treatment Cascade</td>
</tr>
<tr>
<td></td>
<td>Delayed diagnoses?</td>
<td></td>
<td></td>
<td>Education</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Patient video</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Explore patient preferences for less is more conversations</td>
</tr>
</tbody>
</table>
Which patients are low risk?
Which patients need tests treatments?
Habit? (Type I vs Type II thinking)
Is it all about resources?
Lack skills to talk to patients about low value test/treatments?

1
Balancing Measures

2
Provider Pledge

3
EHR Implementation

4
Treatment Cascade

5
Education

Patient video

Explore patient preferences for less is more conversations
Patient Education

• Handouts
• Videos
• Primary Care

Tear off handouts

In Care of Kids

Bronchiolitis: Care in the Hospital

What is Bronchiolitis?
Bronchiolitis is a common lung infection that babies and children younger than 2 years old get. It is often caused by the respiratory syncytial virus (RSV), but can also be caused by other viruses.

What are the symptoms of Bronchiolitis?
Bronchiolitis usually starts as a cold, with a fever, runny nose, cough, and poor appetite or trouble feeding in babies. The virus makes the smallest airways in the lungs (bronchioles) get smaller and get blocked by mucus. This often causes a baby or young child to breathe more quickly and wheeze (whistling sound when breathing). These symptoms can last between 2 and 4 weeks. Bronchiolitis usually happens in the winter and early spring.

How is Bronchiolitis treated in the hospital?
Some children need more help with breathing and hydration than can be done at home.
• Suctioning out the excess mucus is one of the most important ways to keep your child breathing comfortably. Respiratory therapists (RTs) and nurses can suction deep into the airway to get out the mucus. As your child gets better, staff will switch to using the same bulb suction tool that can be used at home.
• Extra oxygen is used to keep your child’s blood oxygen in the normal range and to keep his or her breathing at a comfortable rate.
• Most children can eat and drink as usual. Some children may need IV fluids if they are having trouble feeding or are really dehydrated.

Is there a medicine that can be given to treat Bronchiolitis?
Because Bronchiolitis is caused by a virus, antibiotics don’t work. Unless your child has the flu (influenza virus), there are no medicines to treat viruses. Treatment for Bronchiolitis is to watch your child’s breathing and keep him hydrated while they recover. Using abdominal breathing treatments doesn’t help kids get better from Bronchiolitis any faster, and can have side effects. Doing tests to know which virus your child has won’t help us treat the illness. Chest X-rays aren’t usually helpful or needed.
"I don't have any bad habits. They might be bad habits for other people, but they're all right for me."

- Eubie Blake
American Composer (1883-1983)
Audit and Feedback

- EHR data
- Early
- Frequent
- Individual
- Clear comparators
- Visual display & summary message
- Address credibility (FAQ's)

Qualitative Study
Audit and Feedback

Interviewed 15 hospitalists and 15 EM physicians

Mean years in practice since residency = 9 (S.D. 6.1)

"I think seeing your own practice put back in front of yourself with data, benchmarked to peers, is one of the most powerful ways to show people how they’re actually practicing, not just what they think in their head."

Our Results

40% Chest X-rays
41% Bronchodilators
22% Viral Testing

Hospital-Wide Quality-Improvement Project to Reduce Unnecessary Use in Bronchiolitis
Unknown User12 Amy - they asked for a summary slide including baseline, targets and ultimate results. (I would note the updated bronchodilator target of <=25%) in this slide

Unknown User1, 8/22/2018
## Significant Reduction in Utilization

### TABLE 2 Baseline to Postintervention Comparison of Resource Use for Admitted Patients and Patients Discharged From the ED or UC

<table>
<thead>
<tr>
<th></th>
<th>All Visits and/or Admissions (n = 6659)</th>
<th>ED and UC Visits (n = 4448)</th>
<th>Admissions (n = 2211)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Baseline (n = 4411)</td>
<td>Postintervention (n = 2248)</td>
<td>P</td>
</tr>
<tr>
<td>CXR, n (%)</td>
<td>1001 (22.7)</td>
<td>305 (13.6)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>RVT, n (%)</td>
<td>553 (12.5)</td>
<td>221 (9.8)</td>
<td>.001</td>
</tr>
<tr>
<td>Bronchodilators, n (%)</td>
<td>770 (17.5)</td>
<td>232 (10.3)</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Data include all patients with a primary or secondary diagnosis of bronchiolitis not requiring ICU services. Baseline includes patients seen during bronchiolitis season, December 2013 to April 2015. Postintervention includes all patients seen during bronchiolitis season, December 2015 to April 2016.
Bronchodilators

Percentage of Admitted Patients Receiving a Bronchodilator
P Chart

- Mean = 36.1%
- Mean = 22.0%

Actions:
- Kickoff Meeting
- Provider Pledge Introduced
- Education Interventions Begin
- Provider Level Data Distributed
- CCG Revised
- Education for families
- PCP Tear Off Pads
- NoseFrida Pilot
- Education for staff
- Order Sets
- Education for providers
- Sustain
- PCP Webinar

Baseline Intervention
Percentage of Admitted Patients Receiving a Chest X-Ray

P Chart

Baseline Baseline Intervention Sustain Sustain

mean = 40.4%

mean = 28.7%
Viral Testing

Percentage of Admitted Patients Receiving Viral Testing
P Chart

Baseline  Baseline  Intervention  Sustain  Sustain

Mean = 40.4%
Mean = 28.7%

0%  10%  20%  30%  40%  50%  60%  70%  80%

## Our Results

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Goal</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest radiographs</td>
<td>39%</td>
<td>&lt;20%</td>
<td>27%</td>
</tr>
<tr>
<td>Viral Testing</td>
<td>32%</td>
<td>&lt;15%</td>
<td>26%</td>
</tr>
<tr>
<td>Bronchodilators</td>
<td>34%</td>
<td>&lt;20%</td>
<td>22%</td>
</tr>
</tbody>
</table>
Balancing & Outcome Measures

1. Re-visits
2. Patients requiring ICU-level care
3. Length of stay

Significant reduction in proportion of patients receiving antibiotics
Value

40%  
Chest X-rays
Charges: 351k to 180k/year
~400 fewer x-rays/year

22%  
Respiratory tests
Charges: 320k to 191k/year
~160 fewer/year
Lesson Learned

• Real-time data from the EHR displayed in a meaningful and actionable way is instrumental to success.
• Providers are willing to change their practice.
• Appropriate EHR interventions such as a care pathway are crucial to guiding providers away from costly and ineffective interventions.
• Multidisciplinary improvement/governance team helped spread the project throughout the institution.
• You must involve key stakeholders, including community providers, early on in the process.
• Clearly defined population of focus is important.
Conclusions

- We achieved large decreases in the use of tests/treatments known to be ineffective in the care of bronchiolitis.
- These improvements were sustained over multiple seasons.
- We used proven QI methods and EHR based solutions to achieve our goals.
- Our project lead to culture change at the institution.
Next Steps

• Reconvene team in October to begin planning for next season to sustain and continue improvement

• Continued review of data on a monthly basis to ensure sustainability
  • Clinical Effectiveness team monitors results and reports to the Quality, Safety, and Experience Committee of the Board monthly.

• Learn from the data to improve care by adding to the evidence base and refining care guidelines
Thank You
Improving the Care of Patients with Suspected Appendicitis

Lalit Bajaj MD, MPH
Medical Director, Clinical Effectiveness
Professor of Pediatrics and Emergency Medicine
Abdominal pain

- Appendicitis is most common surgical condition in children.
- Nearly 2000 patients present to our ED/UC every year with abdominal pain and suspicion for appendicitis.
- 1/3 of patients will present with perforation
  - Higher in children with Medicaid
In 2013, the National Surgery Quality Improvement Program – Pediatric (NSQIP-P) presented data on the comparative use of CT amongst like Children’s Hospitals.
## Children’s Hospital Association Pediatric Health Information System data - 2013

<table>
<thead>
<tr>
<th>Preoperative Diagnostic Evaluation (All Patients)</th>
<th>Outlier Status</th>
<th>Quartile</th>
<th>Measure (+/- 95% CI or IQR)</th>
<th>Peer Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Diagnostic Imaging Rate (US or CT)*</td>
<td>L</td>
<td>4</td>
<td>100.0% (78.5 - 100.0)</td>
<td>90.6%</td>
</tr>
<tr>
<td>CT Scanning Rate*</td>
<td>L</td>
<td>4</td>
<td>41.1% (28.5 - 53.7)</td>
<td>16.2%</td>
</tr>
<tr>
<td>US Rate*</td>
<td>N/A</td>
<td>2</td>
<td>72.5% (52.0 - 93.0)</td>
<td>94.7%</td>
</tr>
<tr>
<td>Compliance with American College of Radiology Imaging Guidelines</td>
<td>L</td>
<td>3</td>
<td>31.1% (17.5 - 46.0)</td>
<td>75.0%</td>
</tr>
<tr>
<td>Ultrasound Diagnostic Success Rate</td>
<td></td>
<td>3</td>
<td>72.9% (60.3 - 85.5)</td>
<td>79.8%</td>
</tr>
</tbody>
</table>
### Baseline CT Utilization Rates

<table>
<thead>
<tr>
<th>Patient Location</th>
<th>2013-2014 In-House</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anschutz Campus</td>
<td>25%</td>
</tr>
<tr>
<td>Network of Care</td>
<td>66%</td>
</tr>
<tr>
<td>System-wide</td>
<td>35%</td>
</tr>
</tbody>
</table>
Project Aim

Reduce unnecessary imaging in patients undergoing appendectomy surgery and achieve a system-wide CT use ≤20%, (with no change in negative and missed appendicitis rates)

<table>
<thead>
<tr>
<th>CT utilization in patients undergoing appendectomy surgery</th>
<th>Baseline (2013-2014)</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>35%</td>
<td>≤ 20%</td>
</tr>
</tbody>
</table>
“Imaging Gently” Improvement Project

Multidisciplinary team/Governance:
• Surgery (Jen Bruny MD)
• Radiology (John Strain MD)
• ED/UC (Lalit Bajaj MD, Kevin Carney MD)
• Process Improvement (Jesse Herrgott, RN)
• Data (Matthew Kopetsky/Brad Ewald)

Activities
• Internal collection of data from Epic/Clarity
• Creation of real time data dashboard
• Extensive Process Mapping
• Time series studies
• Assessment and revision of Clinical Care Pathway
High Level Process

Diagnose

Treat

Recover

Pt arrives to ED/UC

Check-in

roomed

Order CBC, US, UA, NPO, Morphine.

RN to send labs and call radiology

Take pt to radiology for US

CBC resulted

US exam complete and pt back in room

Exam read and resulted by radiologist. Provider read result.

Pt re-examined.

PD challenge

D/C home