

AUGUST 17, 2018

**Children's Hospital
Colorado
Nicholas E. Davies
Award of Excellence
Presentation**



Nationally Ranked

As one of the Best Children's Hospital
by the *U.S. News and World Report* for
more than 20 years.



Children's Hospital Colorado
Here, it's different.™



*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

479

Licensed beds

173,085

Emergency and urgent care visits

15,330

Inpatient admissions

6,821

Employees

19,362

Total surgeries

2,170

Medical staff

97,418

Days of patient care

259

Residents and fellows

574,929

Outpatient visits

2,502

Volunteers

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
- ★ 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.





You Work For Me

AUGUST 17, 2018

De-implementing Unnecessary Testing and Treatment in Bronchiolitis

Amy Tyler, MD, MSCS

Leigh Anne Bakel, MD, MSc



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

PEDIATRICS
OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

**Clinical Practice Guideline: The Diagnosis, Management, and Prevention of
Bronchiolitis**

Shawn L. Ralston, Allan S. Lieberthal, H. Cody Meissner, Brian K. Alverson, Jill E. Baley, Anne M. Gadomski, David W. Johnson, Michael J. Light, Nizar F. Maraqa, Eneida A. Mendonca, Kieran J. Phelan, Joseph J. Zorc, Danette Stanko-Lopp, Mark A. Brown, Ian Nathanson, Elizabeth Rosenblum, Stephen Sayles III and Sinsi Hernandez-Cancio

Pediatrics; originally published online October 27, 2014;
DOI: 10.1542/peds.2014-2742



Table 2. American Academy of Pediatrics Guidance for Diagnosis and Management of Bronchiolitis.²

Intervention	Recommendation	Comment
Diagnostic Test		
Chest radiography	Not recommended for routine use	Poor correlation with severity of disease or risk of progression; studies show increase in inappropriate use of antimicrobial therapy owing to similar radiographic appearance of atelectasis and infiltrate
Testing for viral cause	Not recommended for routine use	May influence isolation of symptomatic patients, but infection-control procedures are similar for most respiratory viruses
Treatment		
Bronchodilator therapy	Not recommended	Randomized trials have not shown a consistent beneficial effect on disease resolution, need for hospitalization, or length of stay
Epinephrine	Not recommended	Large, multicenter, randomized trials have not shown improvement in outcome among outpatients with bronchiolitis or hospitalized children
Glucocorticoid therapy	Not recommended	Large, multicenter, randomized trials provide clear evidence of lack of benefit
Nebulized hypertonic saline	May be considered	Nebulized 3% saline may improve symptoms of mild-to-moderate bronchiolitis if length of stay is >3 days (most hospitalizations are <72 hr)
Supplemental oxygen	Routine use not recommended if oxyhemoglobin saturation is >90% in the absence of acidosis	Transient episodes of hypoxemia are not associated with complications; such episodes occur commonly in healthy children
Pulse oximetry	Not recommended for patients who do not require supplemental oxygen or if oxygen saturation is >90%	Oxygen saturation is a poor predictor of respiratory distress; routine use correlates with prolonged stays in the emergency department and hospital
Chest physiotherapy	Not recommended	Deep suctioning is associated with a prolonged hospital stay; removal of obstructive secretions by suctioning the nasopharynx may provide temporary relief
Antimicrobial therapy	Not recommended for routine use	Risk of serious bacterial infection is low; routine screening is not warranted, especially among infants 30 to 90 days of age
Nutrition and hydration	Hospitalization for observation of hydration and nutritional status may be needed for infants with respiratory distress	Intravenous or nasogastric hydration may be used

² Adapted from the clinical practice guidelines for the diagnosis and management of bronchiolitis in children 1 through 23 months of age.³

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".

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.

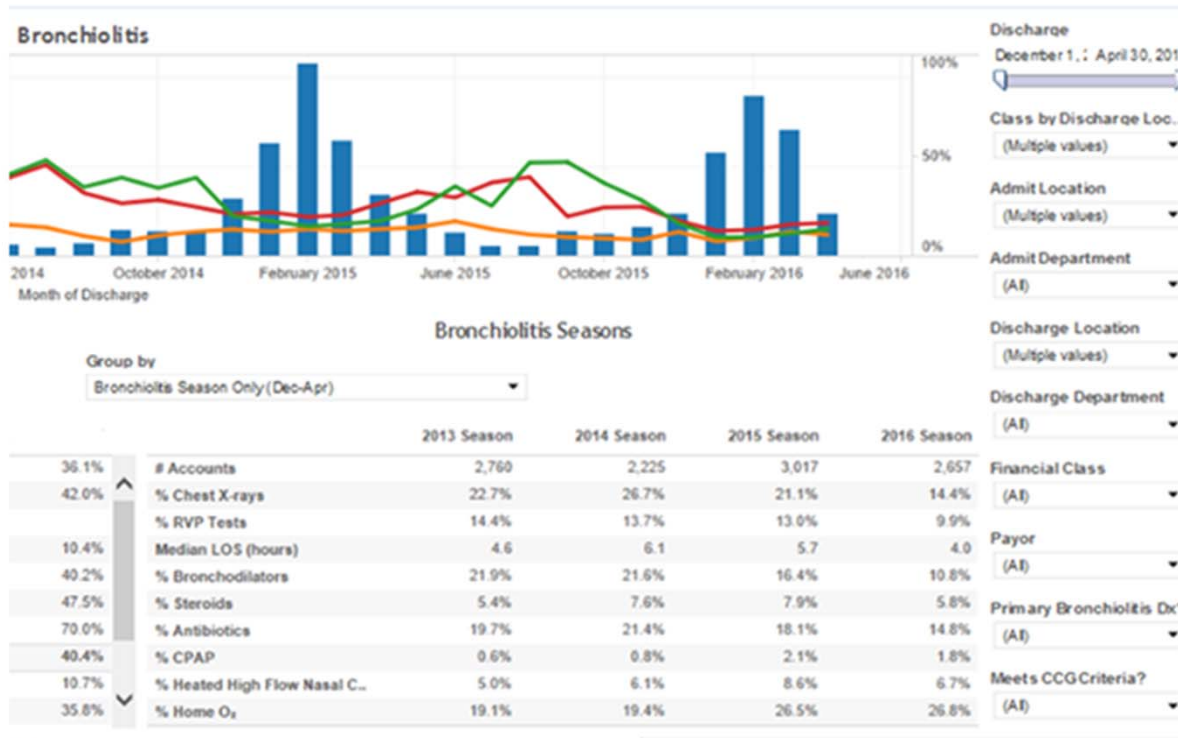
When Guideline "Implementation" Requires "De-implementation"

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Clinical Practice Guideline: The Diagnosis, Management, and Prevention of
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Define the Local Problem



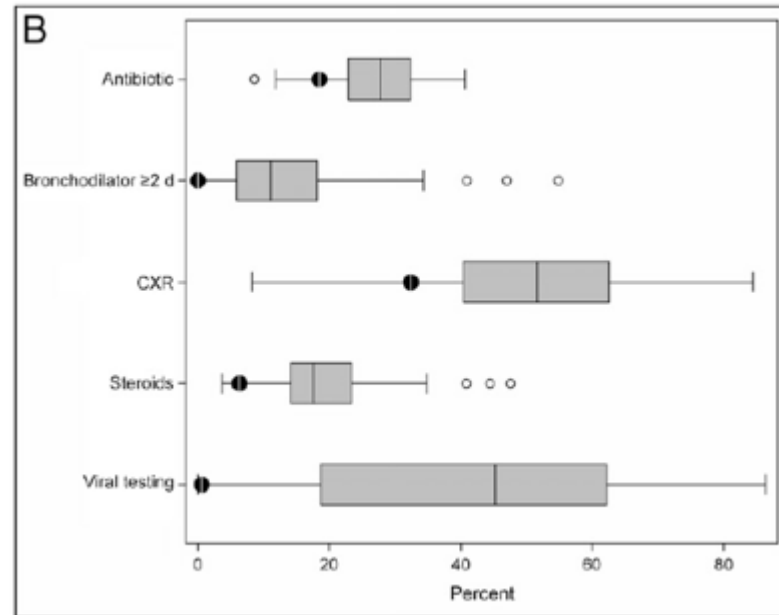
Dashboard

Define the Local Problem

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How do we Compare?



Define the Local Problem

	Benchmarks** (Parikh et al. <i>Pediatrics</i> , 2014)	Median Hospital rates of utilization** (Parikh et al. <i>Pediatrics</i> , 2014)	CHCO Inpatients (<i>bronchiolitis season only</i> Dec 2014 – April 2015)
Bronchodilator	19%*	74%*	33%*
Steroid	6%	18%	15%
Antibiotic	19%	37%	29%
Viral Testing	0.6%	45%	30%
CXR	32%	53%	34%

* ≥ 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

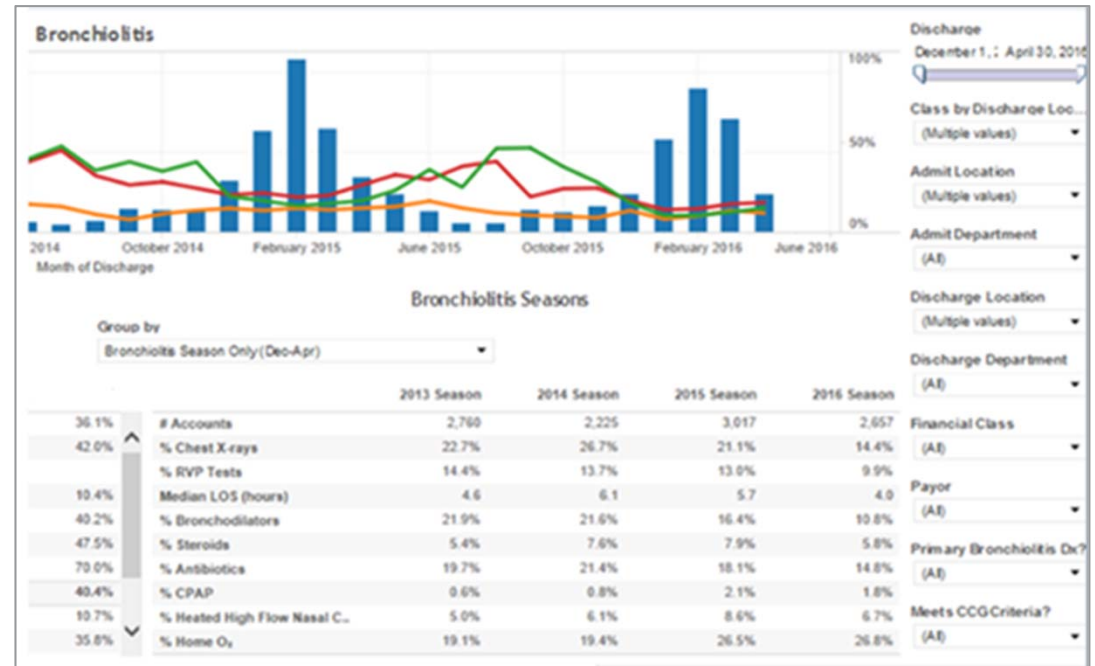
- We care for over 3000 patients with bronchiolitis annually.
 - 700 -900 admissions
- Median length of stay 60 hours

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

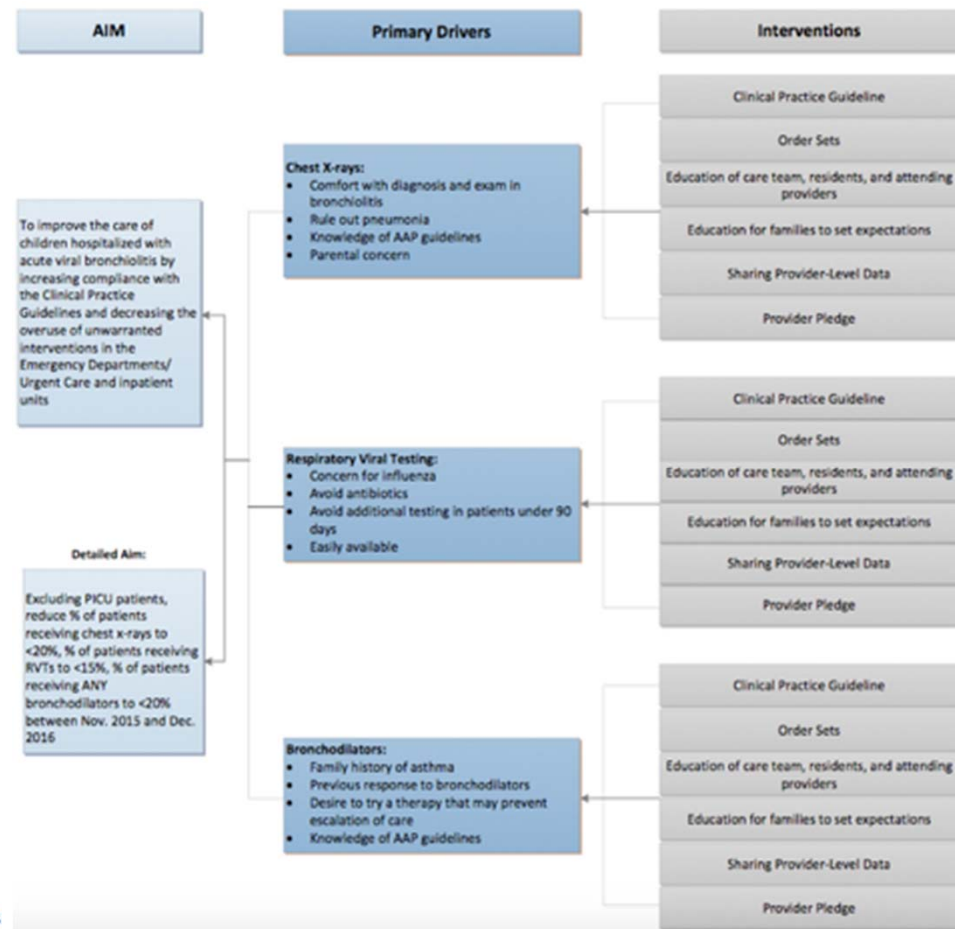


Who needs to do what differently?

What drives the behavior? (Barriers and Enablers)

What interventions will overcome barriers or enhance enablers?

Key Driver Diagram



Smart Aim

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

	Baseline	Goal
Chest radiograph	39%	≤20%
Viral Testing	32%	≤15%
Bronchodilators	34%	≤20%

- 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

1

2

3

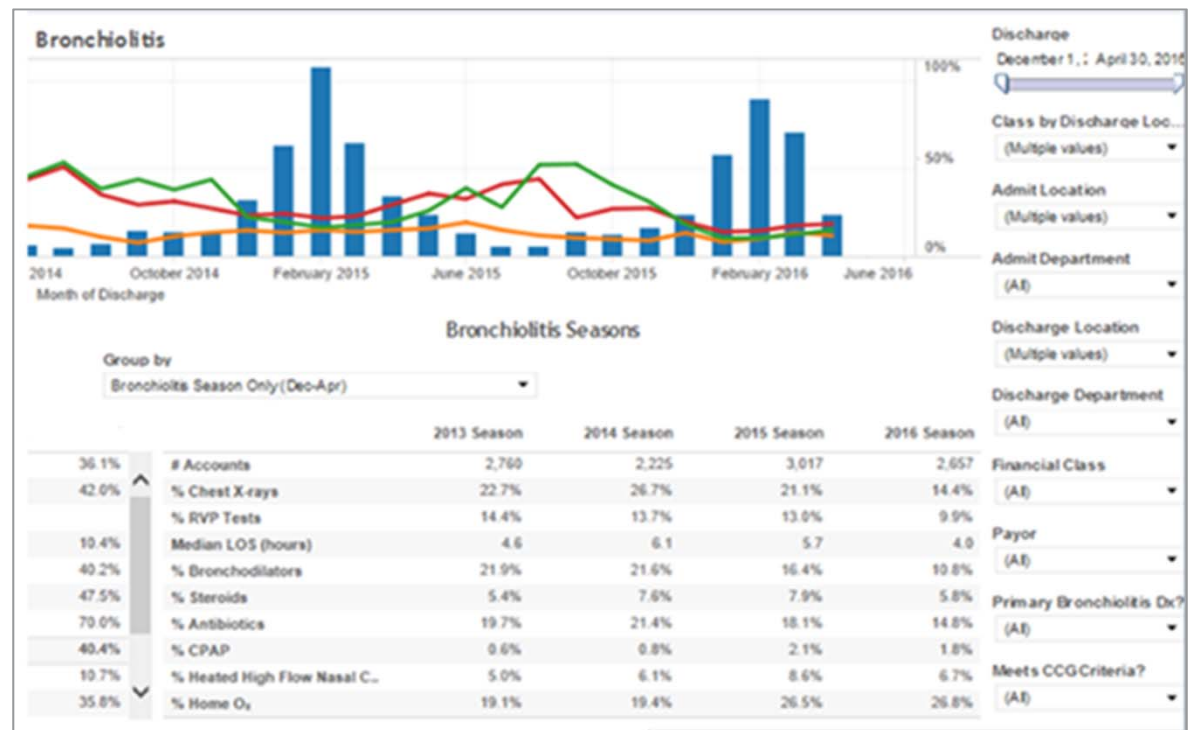
4

5

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?

1

Balancing Measures

Delayed diagnoses?

Habit?
(Type I vs Type II thinking)

2

Provider Pledge

EHR Implementation

3

EHR order sets

Clinical Pathway linked to EHR

Is it all about resources?

4

Treatment Cascade

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

5

Education

Patient video

Explore patient preferences for less is more conversations

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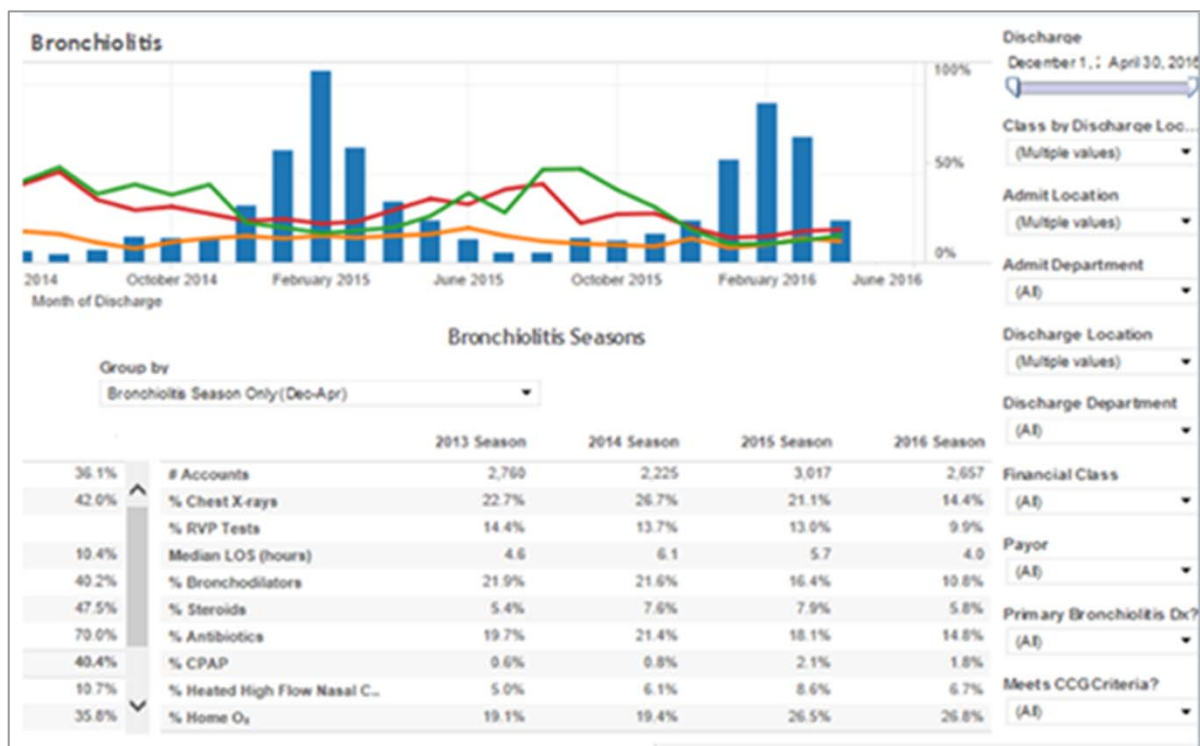
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Dashboard

Real-time EHR
Balancing measures



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Provider Pledge

Antimicrobial
stewardship literature

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

REST is Best

Reduce unnecessary interventions
Educate team about AAP guidelines
and families on expectations for care
Supportive Care
Time = Improvement; have patience!

*The Provider Pledge to Reduce Unnecessary Interventions
in the Care of Children and Infants with Bronchiolitis*

CALL TO ACTION
The American Academy of Pediatrics published updated Clinical Practice Guidelines for Bronchiolitis in 2014 that recommend against the routine use of bronchodilators, chest x-rays, and viral testing for patients with uncomplicated bronchiolitis.

Join the Bronchiolitis Improvement Team to spread awareness of the Guideline's recommendations and partner with our team members to practice resource stewardship.

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

The pledge can also be signed electronically at: <https://www.surveymonkey.com/r/YCSCC5>

Date	Signature, Title	Print Name, Title



Meeker D, Knight TK, Friedberg MW, et al. Nudging guideline-concordant antibiotic prescribing: a randomized clinical trial. *JAMA internal medicine*. 2014;174(3):425-431.

Provider Pledge

“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.”



Meeker D, Knight TK, Friedberg MW, et al. Nudging guideline-concordant antibiotic prescribing: a randomized clinical trial. *JAMA internal medicine*. 2014;174(3):425-431.

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."



O'Hara K, Tanverdi M, Bakel LA, Gambino J, Reich J, Tyler A, Scudamore DD. "I Pledge Allegiance to What?" Exploring Provider Perspectives around a Pledge to Improve Resource Stewardship. Poster accepted at Pediatric Academic Societies Meeting. Toronto, Ontario; May 2018.

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Order sets

Don't make it easy to do the wrong thing.....



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Order Sets

▼ Bronchiolitis Admission Orders

Admission Collapse

▼ Admission

Please remember that **bronchodilators, chest x-rays, and Respiratory Viral Panels (RVPs)** are **NOT** indicated in the **routine** care of children diagnosed with acute viral bronchiolitis. Children with unexpected worsening of disease, age <12 weeks, a history of prematurity, underlying cardiopulmonary disease, or immunodeficiency should alert reconsideration of typical bronchiolitis assessment and management.

Please refer to the following clinical care guidelines for additional information:

- Bronchiolitis Clinical Care Guideline

Order for Inpatient
Service: Medical-General (NOC Only)
P Attending: ADAMS, TIMOTHY W.
Order for: Inpatient

Patient Care Orders Collapse

▼ General

Vital Signs
P Q4H First occurrence Today at 2000 Until Specified, Vital Signs = Temp, Pulse, Resp Rate, Blood Pressure To specify frequencies for individual parameters, complete the questions.

Activity: AGE SPECIFIC-AS TOLERATED
Activity: AGE SPECIFIC-AS TOLERATED

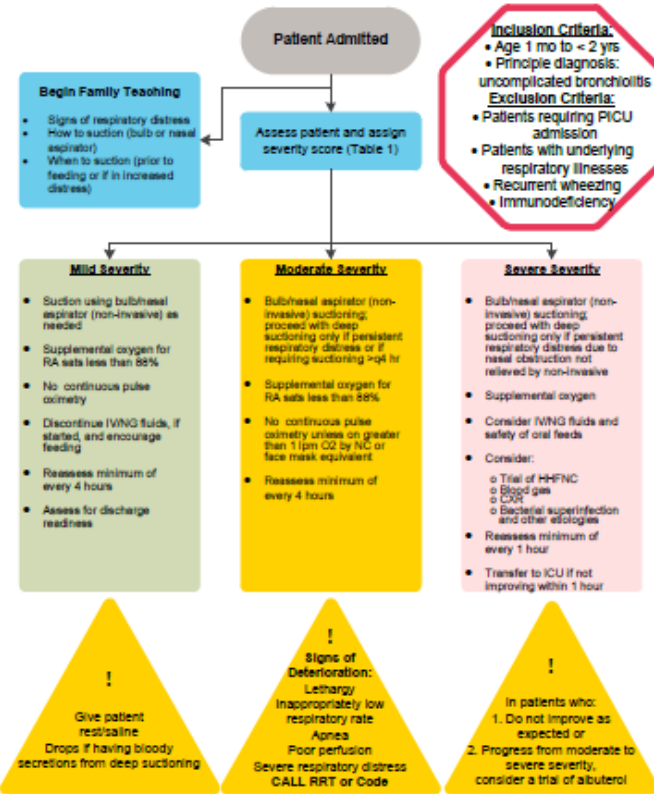
Call House Officer
Notify house officer if temperature greater than ***, heart rate greater than ***, respiratory rate greater than ***, Bronchiolitis Severity Classification worsens.

Pathway

CLINICAL PATHWAY



ALGORITHM: Inpatient Bronchiolitis Management



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

1. If bronchiolitis symptoms are MILD, wean oxygen flow in increments of 0.125 to 0.5 Lpm. Assess for titration of oxygen at least every 4 hours.
2. If bronchiolitis symptoms are MODERATE or SEVERE, increase oxygen incrementally. Consider continuous pulse oximetry if oxygen flow is greater than 1 Lpm for infants 3 to 6 months of age or greater than 2 Lpm for children greater than 6 months of age. In consultation with medical staff.



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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...”



Which patients are

low risk?

Which patients
need tests
treatments?

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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 mucous. 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 mucous 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 most mucous. 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 them hydrated while they recover. Using albuterol 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)**



Children's Hospital Colorado
Here, it's different.™

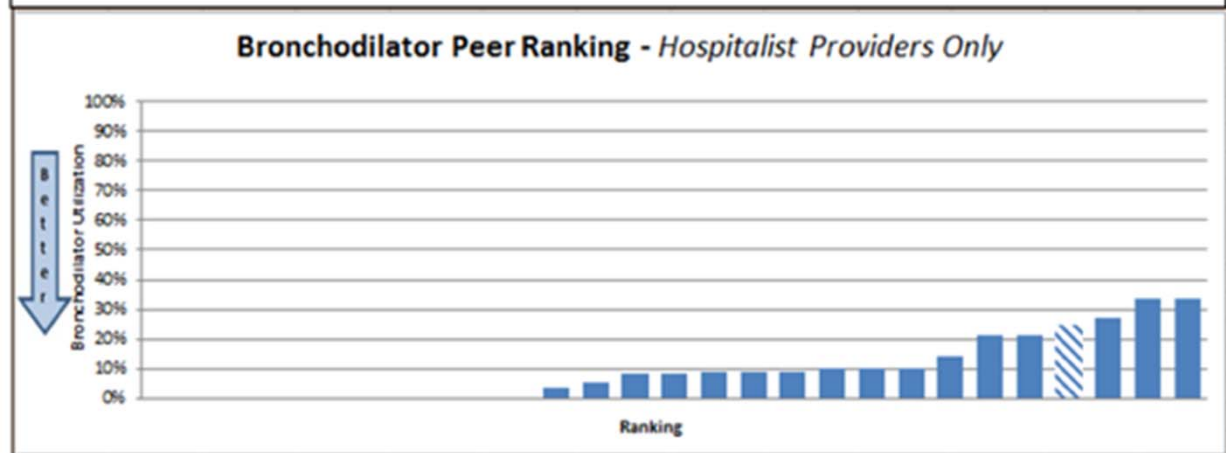


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Audit and Feedback

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

During the current bronchiolitis season (December through February), you have cared for a total of 20 patients with bronchiolitis. You ordered bronchodilators for 25% of these patient visits. The graphs below indicate how these percentages rank among your peers.



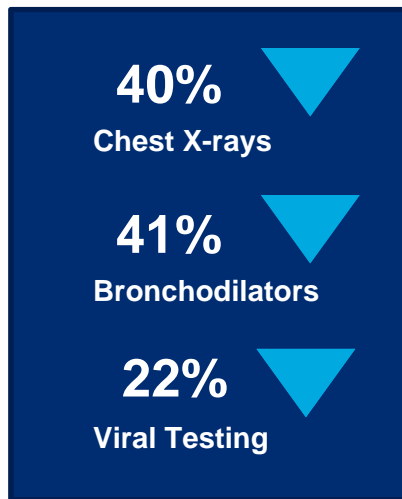
Qualitative Study Audit and Feedback

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



Hospital-Wide Quality-Improvement Project to Reduce Unnecessary Use in Bronchiolitis

Amy Tyler, MD, MSc,^{a,b} Paige Krack, MBA, MS,^a Leigh Anne Bakel, MD, MSc,^{a,b} Kimberly O'Hara, MD,^{a,b} Douglas Scudamore, MD,^{a,b} Irina Topoz, MD,^{a,b} Julia Freeman, MD,^{a,b} Angela Moss, MS,^c Renee Allen,^a Angela Swanson, MS,^a Lalit Bajaj, MD, MPH^{a,b}

PEDIATRICS Volume 141, number 6, June 2018:e20170485

QUALITY REPORT

Slide 50

Unknown User12 Amy - they asked for a summary slide including baseline, targets and ultimate results. (I would note the updated bronchodilator target of $\leq 25\%$) in this slide

Unknown User1, 8/22/2018

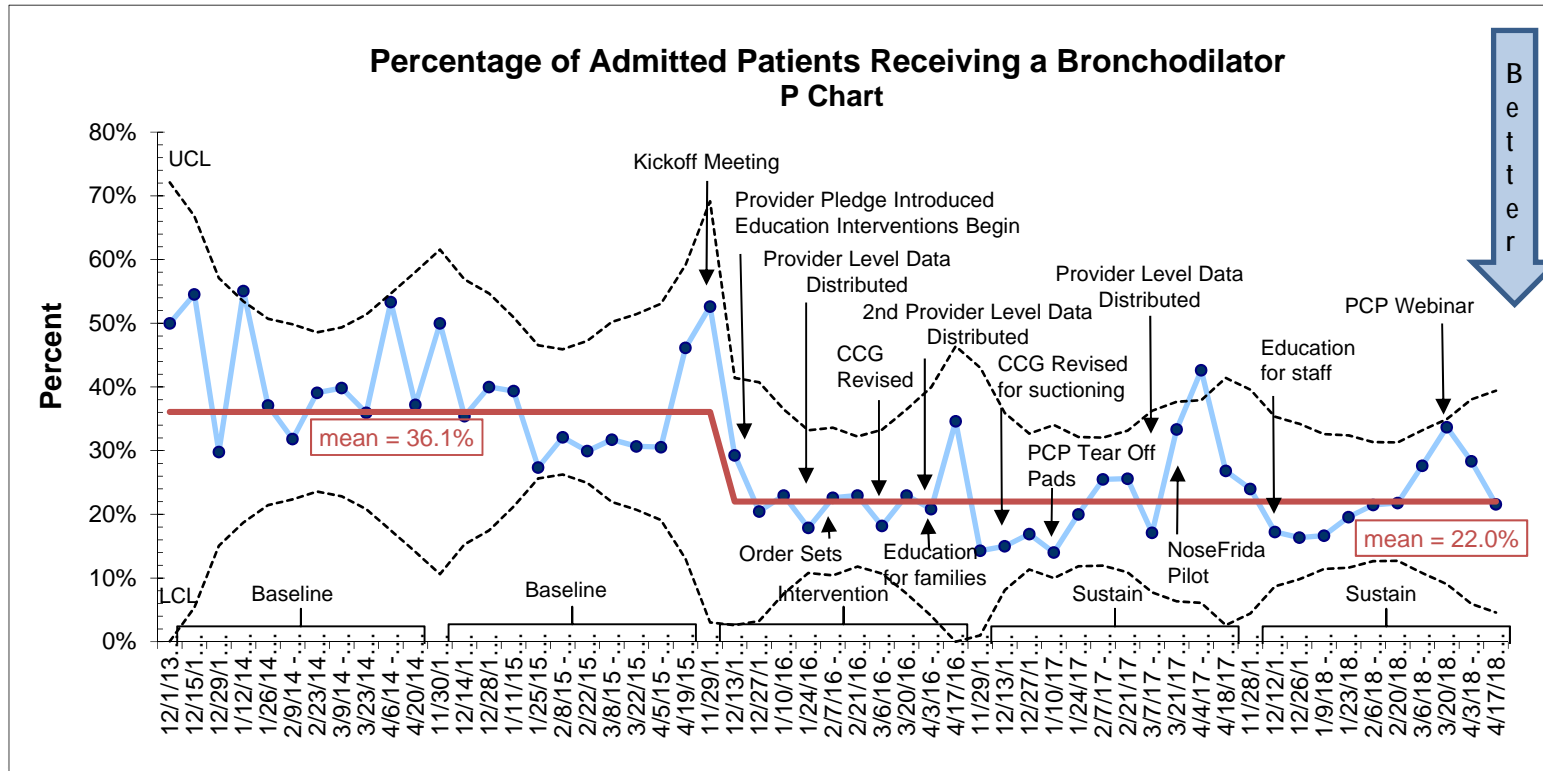
Significant Reduction in Utilization

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

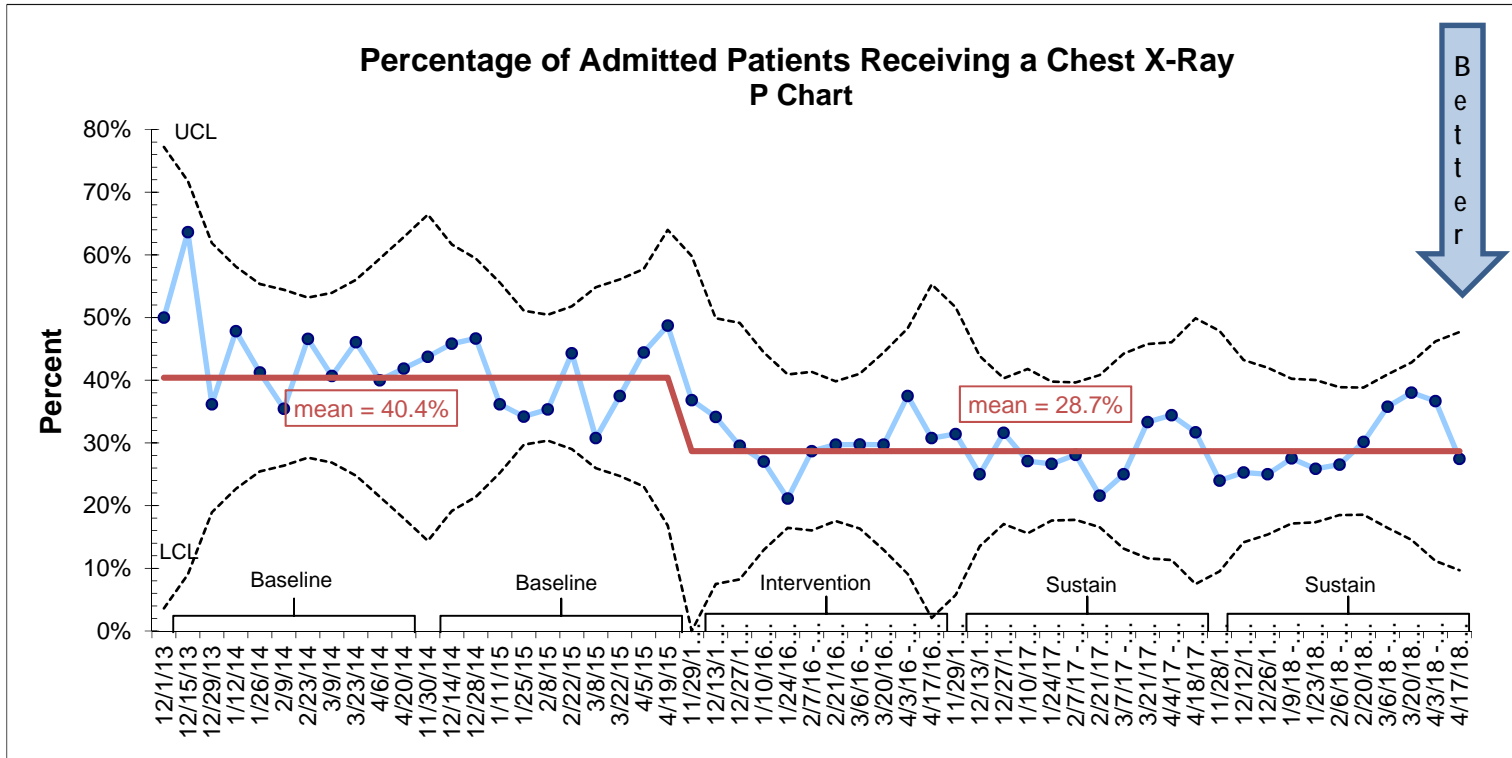
	All Visits and/or Admissions (n = 6659)			ED and UC Visits (n = 4448)			Admissions (n = 2211)		
	Baseline (n = 4411)	Postintervention (n = 2248)	P	Baseline (n = 2892)	Postintervention (n = 1556)	P	Baseline (n = 1519)	Postintervention (n = 692)	P
CXR, n (%)	1001 (22.7)	305 (13.6)	<.001	404 (14.0)	117 (7.5)	<.001	597 (39.3)	188 (27.2)	<.001
RVT, n (%)	553 (12.5)	221 (9.8)	.001	69 (2.4)	39 (2.5)	.80	484 (31.9)	182 (26.3)	.008
Bronchodilators, n (%)	770 (17.5)	232 (10.3)	<.001	251 (8.7)	83 (5.3)	<.001	519 (34.2)	149 (21.5)	<.001

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.

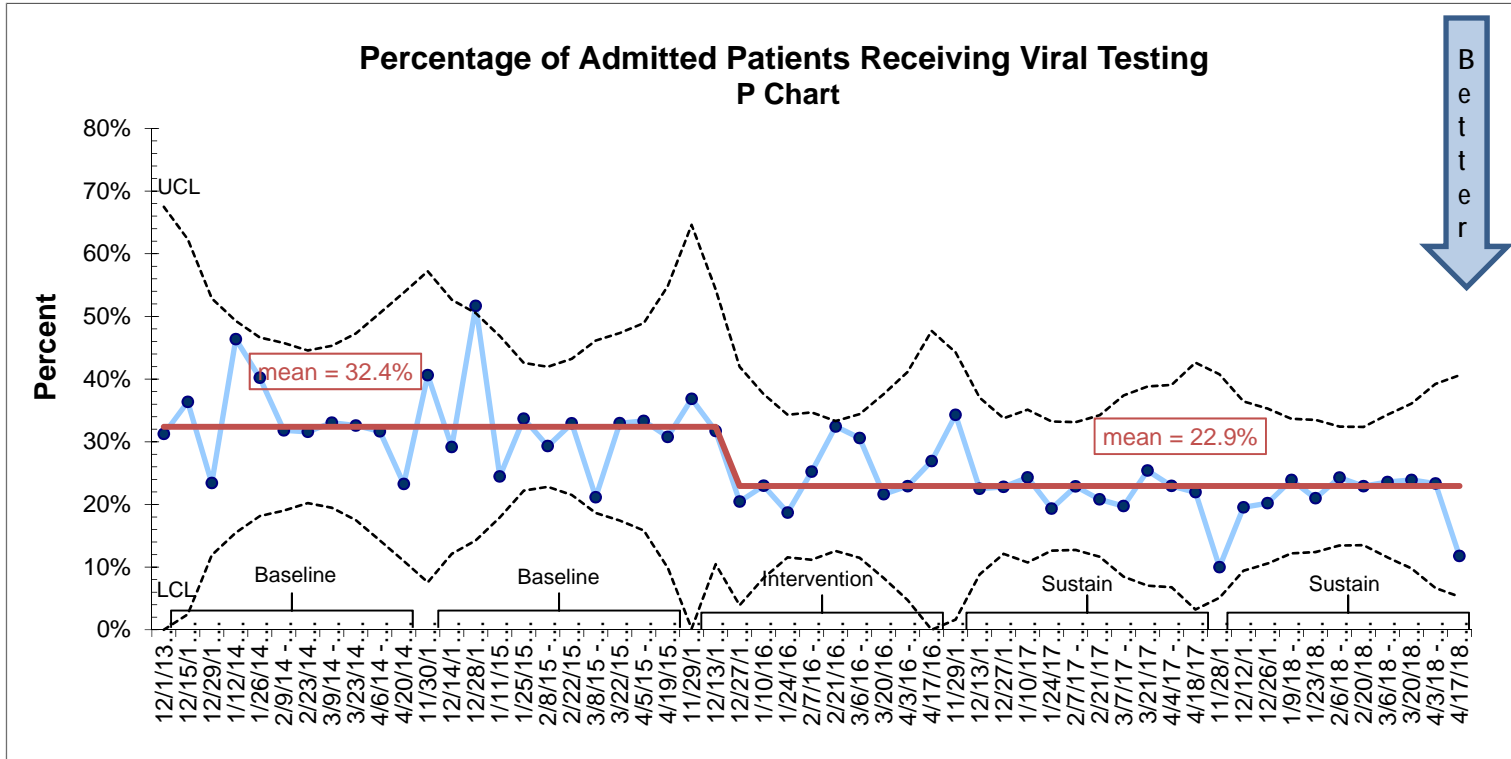
Bronchodilators



Chest X-rays



Viral Testing



Our Results

	Baseline	Goal	Results
Chest radiographs	39%	$\leq 20\%$	27%
Viral Testing	32%	$\leq 15\%$	26%
Bronchodilators	34%	$\leq 20\%$	22%

Significant reduction in proportion of patients receiving antibiotics

Balancing & Outcome Measures

1

Re-visits

2

Patients
requiring
ICU-level
care

3

Length of
stay

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



Children's Hospital Colorado
Here, it's different.™

8/17/18

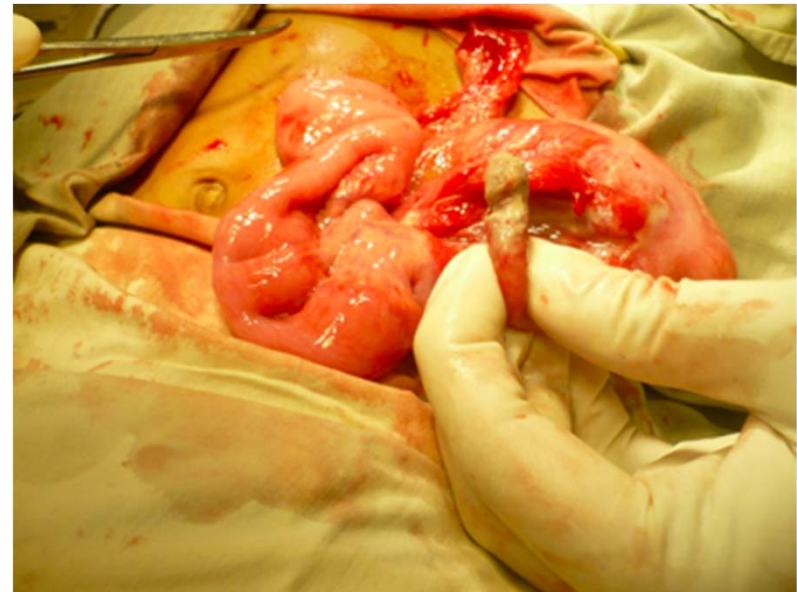
Improving the Care of Patients with Suspected Appendicitis

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

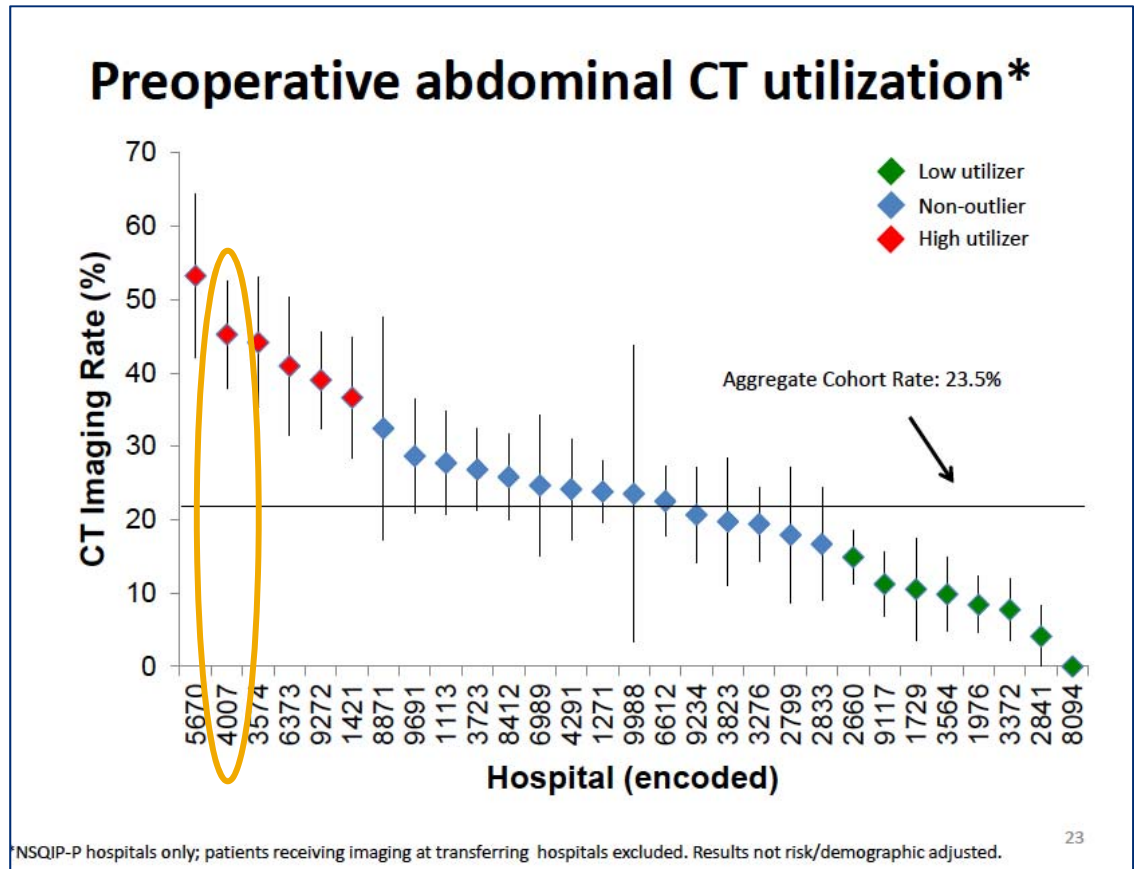


Abdominal pain

- 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

	Outlier Status	Quartile	Measure (+/- 95% CI or IQR)	Peer Median
Preoperative Diagnostic Evaluation (All Patients)				
Advanced Diagnostic Imaging Rate (US or CT)*		4	100.0% (78.5 - 100.0)	90.6%
CT Scanning Rate*	L	4	41.1% (28.5 - 53.7)	16.2%
US Rate*	N/A	2	72.5% (52.0 - 93.0)	94.7%
Compliance with American College of Radiology Imaging Guidelines	L	3	31.7% (17.5 - 46.0)	75.0%
Ultrasound Diagnostic Success Rate		3	72.9% (60.3 - 85.5)	79.8%



Baseline CT Utilization Rates

Patient Location	2013-2014 In-House
Anschutz Campus	25%
Network of Care	66%
System-wide	35%

Project Aim

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

	Baseline (2013- 2014)	Target
CT utilization in patients undergoing appendectomy surgery	35%	$\leq 20\%$

“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



