Improving Asthma Care: A System Wide Approach

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Samantha Gunkelman, MD
Cooper White, MD
Conflict of Interests Disclosure

- Elizabeth A. Bryson, PPCNP-BC:
  - Gilead Pharmaceuticals
    - Transition Advisory Council
    - CF RISE educational program trainer & coach
  - Cystic Fibrosis Foundation
    - Partnership for Sustaining Daily Care Advisory Committee
    - Learning & Leadership Collaborative QI Coach
- Samantha Gunkelman, MD
  - Nothing to disclose
- Cooper White, MD
  - Nothing to disclose
Objectives

1) Describe the role of the EMR in asthma quality improvement.
2) Recognize the components of an asthma related primary care quality improvement project.
3) Utilize standardization as a method for improving hospital based asthma care.
4) Integrate multiple stakeholders in a healthcare system quality transformation priority
Timeline

- 2009: Ohio Chapter Quality Network Asthma Quality Improvement Project
- 2013: ACH Community Health Needs Assessment
- 2016: Board Quality Imperative
CQN

- Multilevel quality improvement project sponsored by the AAP
- Based on IHI Breakthrough Collaborative Model, the Model for Improvement, and the Chronic Disease Model.
- 4 Waves, 10 – 15 practices each. 4 states each wave
- Improvement in “Optimal care” demonstrated in each wave, typically from 30-50% to 80-90% of encounters.
CHNA-2013 to 2016

- Required exercise for all hospitals due to provisions in the Affordable Care Act.
- Asthma, Type 2 DM, Mental Health and Infant Mortality (Youngstown) identified as ACH Priorities.
CHNA 2013 to 2016
Global and Specific Aims

• In the next 3 years, we aim to substantially reduce the burden of asthma for our patients, their families, and our community.

• Between 1/1/14 and 1/1/17, we will reduce hospitalizations for asthma at Akron Children’s Hospital by 10% per year (30% total).

• Between 1/1/14 and 1/1/17 we will reduce ER visits for asthma at Akron Children’s Hospital by 5% per year (15% total)
Aims and Goals

Global Aim: In the next 3 years, we aim to substantially reduce the burden of asthma for our patients, their families, and our community.

Specific Aim: Between 1/1/14 and 1/1/17, we will reduce hospitalizations for asthma at Akron Children’s Hospital by 10% per year (30% total), and reduce ER visits for asthma by 5% per year (15% total) by implementing guideline based care in the primary care setting, hospital setting, and school setting.

### Measure | Goal
--- | ---
Rolling 12 mo Hospitalization Rate | 30% reduction
Rolling 12 mo ER visit rate | 15% reduction
Annual assessment of control | 90%
Asthma Action Plan | 90%
Flu vaccine | 90%
Optimal Care (All 3 of above) | 90%
School Absenteeism | 25% reduction
ER F/U within 2 weeks | 90%
Hospital F/U within 2 weeks | 90%
30 Day Readmission Rate | 50% reduction

Key Drivers

- Improve asthma identification and care in the primary care setting. EZB
- Improve information systems to allow for registry informed care. Asthma Registry
- Standardize care in hospital and ER settings
- Reduce exposure to acetaminophen (Emphasis to be informed by anticipated studies).
- Reduce Environmental Triggers
- Improve asthma care in the school setting
- Increase Patient and Family Empowerment

Interventions

- Launch EZB in all ACHP practices
- Enroll >90% of patients
- Guideline based severity and control assessment
- Guideline based therapy
- Regional EZB for non ACHP practices, especially hot spots
- EZB fully functional within EPIC
- All regional asthma patients identified.
- Asthma dashboard with transparency
- Registry to inform POC
- Asthma Pathway on floor and ER fully implemented
- Follow-up visits scheduled prior to discharge
- Guideline based therapy for persistent asthma
- Respiratory floor to enhance standardized care
- Asthma plan compliance
- Epic Preference list edits
- Health Care Provider education
- Public Health Campaign
- Mobilize social networking and technology
- Trigger identification (EZB)
- Home inspection for all with severe or high risk asthma
- Improve air quality in school
- Smoking cessation
- Asthma screening for unidentified asthma
-Medication available for all who need them in school
- Education for Educators
- Asthma education
- Improved use of communication technology
- Motivational Interviewing
- Leverage Payer Care Coordination and Navigators
- Asthma Hotline/Support Groups
CHNA Workgroups

- IT
- Inpatient
- Primary Care (Easy Breathing)
- School
Notewriter Template
Assessment Tools

© 2016 Epic Systems Corporation. Confidential
Asthma Treatment Plan

© 2016 Epic Systems Corporation. Confidential
Asthma Treatment Plan

Daily Treatment Plan:
- Take these controller medications every day:
  - FLOVENT® Inhaler (fluticasone propionate): 2 puffs, inhalation, 2 times daily
  - 15-20 mins before exercise or play take ALBUTEROL® Inhaler: 2 puffs, inhalation

Sick Treatment Plan:
- If symptoms don’t improve, use sick treatment plan.

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Other Tools

• Smart sets
• BPA’s: Flu Vaccine, Controller for Persistent Asthma, Problem List Reminder
• Order Sets
Asthma Registry

- Ages 2-18
- Asthma on the Problem List
- Seen by an ACH Provider within the last 2 years
- CF and Trach Dependence are excluded
Asthma Registry

- POC
- Outreach
- Quality measures at the system, practice and provider level
- Outcomes
Registry: POC

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Registry: Outreach

- Daily reports of patients discharged from the ER or hospital with follow-up scheduled.
- Flu vaccine
- MyChart
Registry: Quality

- Optimal Care
- EZB enrollment
Optimal Care

%Optimal Care

- ACHP - PERRY
- LOCUST PEDIATRICS
- ACHP - BOARDMAN
- STE PEDIATRICS CLINIC
- ACHP - ASHLAND PRACTICE
- ACHP - NORTH CANTON
- ACHP - ALLIANCE
- ACHP - FAIRLAWN
- ACHP - WADSWORTH
- ACHP - FAIRLAWN
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- ACHP - FAIRLAWN
- ACHP - FAIRLAWN
- ACHP - FAIRLAWN
- ACHP - WADSWORTH
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- ACHP - WADSWORTH
- ACHP - STREETSBORO
- ACHP - NEW PHILADELPHIA
- ACHP - AKRON EAST
Outcomes

Asthma Registry Hospitalization Rate

- Mean, 3.2%
- UCL, 5.0%
- LCL, 1.3%
- Goal, 2.0%

% Decrease from Peak (4.0 to 2.4) = 40%
Annual Hospitalizations, decrease from peak (1024 to 621) = 403
Outcomes

Asthma Registry ED Visit Rate

- UCL, 9.1%
- Mean, 6.8%
- Goal, 5.0%
- LCL, 4.5%

% Decrease from peak (7.9 to 5.6) = 29%
Annual ED visits decrease (2011 to 1501) = 510
Outcomes (8/16)

- 26888 patients in the registry
- 19970 with an ACHP PCP
- 6446 enrolled in EZB
- If in EZB, 73% with a current ATP, 61% with current ACT
- If not, 28% with ATP, 20% with ACT
Easy Breathing Program (EZB)- What is It?

- **Asthma Management Program**
  - developed in 1998 by Michelle Cloutier, MD, Connecticut Children’s
  - translates key elements of the National Asthma Education & Prevention Program guidelines for primary care providers.

- **Studied from 2002-2007 in 51 practices who enrolled 32,680 children (10,467 whom had asthma)**

- **Results demonstrated that children with moderate persistent asthma had:**
  - a decrease in hospital days by 31% & ED visits by 29%
  - adherence to the national asthma guidelines w/ 90% of children having a written ATP
  - 96% were prescribed a daily ICS

Easy Breathing Program- Goals

• Improve recognition of asthma & classification of asthma severity by clinicians
• Assist clinicians in developing a systematic approach to asthma management in their practice
• Improve the health of children with asthma
• Decrease the need for unnecessary medical services & reduce health care costs for children with asthma

Akron Children’s Hospital - Easy Breathing Results

Easy Breathing Surveys

10-2013 through 9-2016

72%

19%

4% 5%

New Diagnosis (N=1,550)
Previous Diagnosis (N=6,236)
No Asthma (N=22,919)
Unable to Determine (N=1180)

Total surveys (N=31,885)
Easy Breathing Program- Akron Children’s Hospital Results

• For patients enrolled in Easy Breathing, 73% have a current asthma treatment plan (ATP) and 61% have a current asthma control test (ACT)
• For patients not enrolled in Easy Breathing, only 28% have an ATP and 20% have an ACT
• The hospitalization rate for patients with a documented ACT and ATP, but who are not enrolled in Easy Breathing is 7.0%
• For Easy Breathing patients who have an ACT and ATP, the hospitalization rate is 3.9%
Easy Breathing Program – How Does It Work?

- Created an EZB team - physician champions, EZB coordinators, data specialist
- Identify provider champion and office champion at each practice
- Training to all staff - program elements
- Developed standardized workflow
- Routine follow-up
Easy Breathing Program- Key Elements

• Easy Breathing Survey completed by family

• Provider Assessment : asthma or no asthma:
  – If newly diagnosed asthma, determine severity
  – If previously diagnosed with asthma, assess asthma control using one of the following:
    • Asthma Control Test (ACT) for children 12 years & older
    • ACT for children 4-11 years of age
    • EZB series of questions for children 6 months - 3 yrs.

• Treatment Selection Guide (“Buffet”)
  – Medications based upon asthma severity

• Asthma Treatment Plan for ALL patients w/ asthma
  – Written plan for daily, sick & emergency
Easy Breathing Program - Provider Assessment

- **Provider reviews the survey**: 13 questions with the first 4 questions validated; (~97% Sensitivity, 60% Specificity)
- If all answers are “no,” most likely not asthma
- If any questions are answered “yes” asthma should be considered
  - **Newly Diagnosed Asthma**: Determine asthma severity, decide on treatment & provide education
  - No asthma
  - Unable to determine
- **If Asthma Previously Diagnosed**
  - Assess asthma control & determine if on appropriate medication

Cloutier, M. Easy Breathing Clinician Education Guide 1999
## Asthma Severity Classification

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<td>Interference with activity</td>
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As per the national asthma guidelines, level of severity is determined by reviewing these events, the frequency and intensity.

NHLBI Guidelines for Diagnosis & Management of Asthma (EPR-3); April 2012 update
Asthma Control Test

- For children ≥12 years
  - Five questions each with a numerical score. The scores are summed and adequacy of control is determined

- For children 4-11 years
  - Seven questions, four completed by the child and three by the parent. The scores are summed and adequacy of control is determined.

- Score:
  - >20 Asthma is under good control
  - 15-19 Asthma is marginally controlled
  - <15 Asthma is inadequately controlled

Asthma Control Test is a trademark of QualityMetric incorporated.
*The Childhood Asthma Control Test was developed by GSK*
Asthma Control Test™
For People with Asthma > 12 years of Age

Dr. Michelle Cloutier is a lung doctor and researcher at Connecticut Children’s Medical Center. She is working with your doctor to improve asthma care. She has requested a copy of this survey, the doctor’s assessment, and if needed, a copy of your asthma treatment plan. This authorization to disclose health information has no expiration date and once disclosed, may no longer be protected under the Federal Privacy Rule. You may refuse to complete the survey without penalty. You may revoke your permission to use this information by writing to your doctor.

**PLEASE SIGN HERE if you agree to the above:**
(Patient Signature)

This survey was designed to help you describe your asthma and how your asthma affects how you feel and what you are able to do. To complete it, please mark an \( \boxed{\text{x}} \) in the one box that best describes your answer.

1. **In the past 4 weeks, how much of the time did your asthma keep you from getting as much done at work, school or at home?**
   - All of the time
   - Most of the time
   - Some of the time
   - A little of the time
   - None of the time
   - \( \boxed{\text{x}} \)

2. **During the past 4 weeks, how often have you had shortness of breath?**
   - More than once a day
   - Once a day
   - 3 to 6 times a week
   - Once or twice a week
   - Not at all
   - \( \boxed{\text{x}} \)

3. **During the past 4 weeks, how often did your asthma symptoms (wheezing, coughing, shortness of breath, chest tightness or pain) wake you up at night or earlier than usual in the morning?**
   - 6 or more nights a week
   - 2 to 3 nights a week
   - Once a week
   - Once or Twice
   - Not at all
   - \( \boxed{\text{x}} \)

4. **During the past 4 weeks, how often have you used your rescue inhaler or nebulizer medication (such as Albuterol, Ventolin®, Proventil®, Maxair® or Primatene Mist®)?**
   - 3 or more times per day
   - 1 or 2 times per day
   - 1 or 2 times a week
   - Once a week or less
   - Not at all
   - \( \boxed{\text{x}} \)

5. **How would you rate your asthma control during the past 4 weeks?**
   - Not Controlled
   - Poorly Controlled
   - Somewhat Controlled
   - Well Controlled
   - Completely Controlled
   - \( \boxed{\text{x}} \)

**Doctor, how did this patient score?**
\[ Q_1 + Q_2 + Q_3 + Q_4 + Q_5 = ___ \]
\[ <15 \text{ (Inadequate Control)} \]
\[ 15-19 \text{ (Marginal Control)} \]
\[ >20 \text{ (Good Control)} \]

**Asthma Severity is:**
(Circle one)
- Intermittent
- Mild Persistent
- Moderate Persistent
- Severe Persistent

**Change in severity?**
- Yes
- No

If yes, please attach an Asthma Treatment Plan.

**Signature:**

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ACT is a trademark of QualityMetric incorporated. & was developed by GSK
Easy Breathing Program - The Treatment Buffet

• Laminated cards or “smart set” orders in EMR for each severity class of asthma - mild, moderate & severe (includes both medications at the low end of that severity class and the higher end)

• Medications within a bracket are equivalent (equal potency), i.e. fluticasone 44 mcg & beclomethasone 40 mcg.

• Also identifies alternative treatment that include addition of leukotrienes like montelukast sodium and LABA

Medications

In-Office Medications

Interruption Asthma

Mild Persistent Asthma Lower Dose ICS - Preferred Treatment

- beclomethasone (QVAR) 40 MCG/ACT inhaler
  Inhalation, Disp-1 Inhaler, Normal

- fluticasone (FLOVENT HFA) 44 MCG/ACT 44 mcg inhaler
  Inhalation, Disp-1 Inhaler, Normal

- budesonide (PULMICORT FLEXHALER) 90 MCG/ACT Flexhaler
  Inhalation, Disp-1 Inhaler, Normal

- budesonide (PULMICORT) 0.25 MG/2ML nebulizer suspension
  Nebulization, Disp-30 Ampule, R-12, Normal

Mild Persistent Asthma Higher Dose ICS

Mild Persistent Asthma - Alternative Treatment

Moderate Persistent Asthma - Medium Dose - ICS Alone - Preferred Treatment

- beclomethasone (QVAR) 80 MCG/ACT inhaler
  Inhalation, Disp-1 Inhaler, R-1, Normal

- fluticasone (FLOVENT HFA) 110 MCG/ACT 110 mcg inhaler
  Inhalation, Disp-1 Inhaler, R-1, Normal

- budesonide (PULMICORT FLEXHALER) 180 MCG/ACT Flexinhaler
  Inhalation, Disp-1 Inhaler, R-1, Normal

- mometasone (ASMANEX 60 METERED DOSES) 220 MCG/INH inhaler
  Inhalation, Disp-1 Inhaler, R-1, Normal

- Ciclesonide (ALVESCO) 160 MCG/ACT AERS
  Inhalation, Disp-1 Inhaler, R-1, Normal

- budesonide (PULMICORT) 0.5 MG/2ML nebulizer suspension
  Nebulization, Disp-100 Ampule, R-1, Normal

Asthma Treatment Plan

• Every child with asthma of ANY severity (including intermittent) should receive a written asthma treatment plan & understand what it means

• Complete asthma treatment
  – Daily Plan (green zone): Anti-inflammatory therapy with bronchodilator rescue
  – Sick Plan (yellow zone): Bronchodilator use and continued anti-inflammatory therapy; may include when to start steroids & when to seek further treatment
  – Emergency Plan (red zone): Symptoms of respiratory distress, & what to do

Cloutier, M. Easy Breathing Clinician Education Guide 1999
Asthma Type: mild persistent
Asthma Triggers: viral infection

Remember! Always use a spacer with your inhaler! Rinse mouth after use of inhalers! A flu shot is recommended, in the fall, for all children with asthma and their families.
Acetaminophen (Tylenol®) has been found to be potentially harmful for children with asthma. Ibuprofen (Motrin®, Advil®) is recommended if there is a need to treat fever or pain.

**DAILY TREATMENT PLAN**

Take These Controller Medications Everyday:
- FLOVENT 44 inhaler (fluticasone) - 2 puffs - Inhalation - 2 times daily
For coughing, wheezing, or exercise symptoms not due to illness take:
- ALBUTEROL Inhaler - 2 puffs
- Inhalation - Right away
If symptoms don't improve, use SICK TREATMENT PLAN

**SICK TREATMENT PLAN**

Symptoms (any of these):
1) Increased cough or wheeze. 2) Tight chest. 3) Short of breath. 4) First sign of a cold.
Continue to use daily medications and take your quick reliever:
- ALBUTEROL Inhaler - 2 puffs - Inhalation - Right away
If no improvement in 20 minutes, repeat quick relief medicine and continue every 4 hours as needed for 1-2 days. Call doctor if not getting better.

**EMERGENCY PLAN**

Symptoms (any of these):
1) Albuterol not helping or not lasting 4 hours. 2) Hard to walk or talk. 3) Nasal flaring
4) Ribs or neck muscles show when breathing in. 5) Lips or fingernails turn blue.
Get help from a doctor now! Continue to use daily medications and take:
- ALBUTEROL Inhaler - 2 puffs - Inhalation - Right away and repeat every 15mins for 2 more doses
Start oral steroids if not already taking

**MEDICAL ALERT!**

If still in Emergency zone after 15 minutes this could be a life-threatening emergency.
Take another dose of quick relief medicine AND Go to the Emergency Room or call 911
If breathing is getting better after taking quick relief medication:
1) Call provider right away for advice. 2) Return to Sick Treatment Plan

Easy Breathing – Follow Up Plan

- For those patients who are newly diagnosed with asthma or previously diagnosed, a follow up visit is crucial to:
  - assess asthma control & symptoms
  - assess adherence to ATP, environmental controls, avoidance of irritants
  - assess co-morbidities
  - step down therapy if well controlled
  - educate, educate & educate
  - provide annual influenza vaccine
  - referral to asthma specialist if not well controlled
Case Study: Thomas, 11 yr. old male

At a well child visit last year, Thomas’ mom answered the EZB survey:

1. Has your child had wheezing in the chest anytime in last 12 months? **YES**
2. Has your child awakened at night because of coughing in the last 12 months? **YES**
3. Has your child had coughing, wheezing or shortness of breath with activity & had to stop in the last 12 months? **YES**
4. When your child has a cold, does the coughing linger usually more than 10 days? **YES**

With this information, known FH of asthma in dad, further assessment of differential diagnosis & physical exam (mild wheezing), the PCP determined Thomas had asthma.
# Asthma Severity Classification

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*Thomas’ frequency of these events are listed in red: Moderate Persistent Asthma
NHLBI Guidelines for Diagnosis & Management of Asthma (EPR-#); April 2012 update
## Medications

### In-Office Medications

### Intermittent Asthma

- **Mild Persistent Asthma Lower Dose ICS - Preferred Treatment**
  - beclomethasone (QVAR) 40 MCG/ACT inhaler
    - Inhalation, Disp-1 Inhaler, Normal
  - fluticasone (FLOVENT HFA) 44 MCG/ACT 44 mcg inhaler
    - Inhalation, Disp-1 Inhaler, Normal
  - budesonide (PULMICORT FLEXHALER) 90 MCG/ACT Flexhaler
    - Inhalation, Disp-1 Inhaler, Normal
  - budesonide (PULMICORT) 0.25 MG/2ML nebulizer suspension
    - Nebulization, Disp-30 Ampule, R-12, Normal

- **Mild Persistent Asthma Higher Dose ICS**

- **Mild Persistent Asthma - Alternative Treatment**

- **Moderate Persistent Asthma - Medium Dose - ICS Alone - Preferred Treatment**
  - beclomethasone (QVAR) 80 MCG/ACT inhaler
    - Inhalation, Disp-1 Inhaler, R-1, Normal
  - fluticasone (FLOVENT HFA) 110 MCG/ACT 110 mcg inhaler
    - Inhalation, Disp-1 Inhaler, R-1, Normal
  - budesonide (PULMICORT FLEXHALER) 180 MCG/ACT Flexinhaler
    - Inhalation, Disp-1 Inhaler, R-1, Normal
  - mometasone (ASMANEX 60 METERED DOSES) 220 MCG/INH inhaler
    - Inhalation, Disp-1 Inhaler, R-1, Normal
  - Ciclesonide (ALVESCO) 160 MCG/ACT AES
    - Inhalation, Disp-1 Inhaler, R-1, Normal
  - budesonide (PULMICORT) 0.5 MG/2ML nebulizer suspension
    - Nebulization, Disp-100 Ampule, R-1, Normal

Asthma Treatment Plan for

Whom to call for questions about your Asthma: ACHP - ASHLAND (410-281-3077).

Asthma Triggers:
Remember! Always use a spacer with your inhaler! Rinse mouth after use of inhalers!
A flu shot is recommended, in the fall, for all children with asthma and their families.

DAILY TREATMENT PLAN

Take These Controller Medications Everyday:
QUAER 60 mcg 2 puffs, twice a day.
- 15-20 mins before exercise or play take ALBUTEROL inhaler - 2 puffs Inhalation.

For coughing, wheezing or exercise symptoms not due to illness take: - ALBUTEROL Inhaler, - 2 puffs, - Inhalation, - Right away.
If symptoms don’t improve, use SICK TREATMENT PLAN

SICK TREATMENT PLAN

Symptoms (any of these):
1) Increased cough or wheeze. 2) Tight chest. 3) Short of breath. 4) First sign of a cold.
Continue to use daily medications and take your quick reliever:
- ALBUTEROL Inhaler, - 2 puffs, - Inhalation, - Right away.
If no improvement in 20 minutes repeat quick relief medicine and continue every 4 hours as needed for 1-2 days.

Call your healthcare provider if not getting better.

EMERGENCY PLAN

Symptoms (any of these):
1) Quick reliever not helping or not lasting 4 hours. 2) Hard to walk or talk. 3) Nasal flaring
4) Ribs or neck muscles show when breathing in. 5) Lips or fingernails turn blue.
Get help from your healthcare provider now! Continue to use daily medications and take your quick reliever:
- ALBUTEROL Inhaler, - 2 puffs, - Inhalation, - Right away and repeat every 15 mins for 2 more doses,
MEDICAL ALERT!
If still in Emergency zone after 15 minutes this could be a life-threatening emergency.
Take another dose of quick relief medicine AND Go to the Emergency Room or call 911
If breathing is getting better after taking quick relief medication:
1) Call your healthcare provider right away for advice. 2) Return to Sick Treatment Plan
Case Study: Thomas’ F/U Visit

• Thomas returned for his f/u visit in 8 weeks and his symptoms resolved 2 weeks after starting his daily beclomethasone 80 mcg- 2 puffs BID so he stopped taking it.
• Still had problems with exercise (gym & soccer); forgot to take the albuterol MDI to school
• Waking up several times a week coughing
• On exam today he had mild wheezing and lots of allergy symptoms;
• PCP restarted same ICS 2 x a day, prescribed an antihistamine & to return in 4 months
Case Study: Thomas’s Exacerbation

• 1 month later, Thomas gets a URI
• Family follows ATP when he has distress and goes to the ED in the middle of the night due to needing frequent albuterol
• Has Pediatric Asthma Score (PAS) of 14, asthma pathway algorithm used, treated with duonebs x3 and systemic steroids, PAS now 10, given further albuterol, and admitted to acute care floor
ED Algorithm
Inpatient Asthma Pathway

• Separate algorithms for Acute Care, PICU, ED, and transport

• Use common language with PAS (Pediatric Asthma Score) to discuss severity throughout

• Acute Care and PICU algorithms have RRT/RN advancement without physician orders at each step based on pathway orders
Pathway Inclusion Criteria

If the patient meets the following criteria they should be considered for the asthma pathway.

- A diagnosis of status asthmaticus or asthma exacerbation as **admitting diagnosis**

- Age of ≥ 1 year

- A known diagnosis of asthma or prior wheezing

- The first time experiencing wheezing AND having one of the following:
  - Food allergy
  - Allergic rhinitis
  - Eczema
  - Parent with asthma
Exclusion Criteria

- Patients who should be excluded and NOT be on the asthma pathway include those with:
  - Active BPD (on chronic oxygen or diuretics)
  - *Bronchiolitis*
  - Chronic lung disease
  - Complex congenital heart disease
  - *Complicated pneumonia* (necrotic pneumonia, empyema, pleural effusion)
  - Cystic Fibrosis
  - Tracheostomy dependent
  - *Physician level decision*
Case Study: Thomas’s Hospital Stay

- Thomas is admitted, placed on the asthma pathway using the admission order set
- Residents/hospitalist assess his overall asthma symptoms and medication use using standardized asthma H&P template and review history and ATP in medical record
- Reinforce use of beclomethasone 80 mcg- 2 puffs BID and use of spacer (not doing consistently)
Case Study: Thomas’s Hospital Stay

• Advances along pathway by RRT based on PAS
• During his stay, he and his family get an updated ATP and asthma education in classroom and at bedside with teach-back of medication delivery
• He gets an influenza vaccine at discharge and is instructed to follow up with his PCP
What is the PAS?

The Pediatric Asthma Score (PAS) is......

• One of several standardized asthma scales which was developed by Kelly et al., (2000) and adapted for use to assess the pediatric patient.

• Assigned a numeric score between 5-15 based on RR, oxygen requirement, retractions, dyspnea, auscultation

• Improves communication by providing a common language to describe the severity of signs and symptoms, and provides overall score for the acute asthma exacerbation

• Does not assess underlying control of asthma at baseline
# Pediatric Asthma Score (PAS)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Respiratory Rate</strong></td>
<td>1-3 years</td>
<td>4-5 years</td>
<td>6-12 years</td>
</tr>
<tr>
<td>1-3 years</td>
<td>≤34</td>
<td>35-39</td>
<td>≥40</td>
</tr>
<tr>
<td>4-5 years</td>
<td>≤30</td>
<td>31-35</td>
<td>≥36</td>
</tr>
<tr>
<td>6-12 years</td>
<td>≤26</td>
<td>27-31</td>
<td>≥31</td>
</tr>
<tr>
<td>&gt;12 years</td>
<td>≤23</td>
<td>24-27</td>
<td>≥28</td>
</tr>
<tr>
<td><strong>Oxygen Requirement</strong></td>
<td>&gt;95% on room air</td>
<td>90-95% on room air</td>
<td>&lt;90% on room air or any amount of O2</td>
</tr>
<tr>
<td><strong>Retractions</strong></td>
<td>None or intercostal</td>
<td>Intercostal and substernal OR nasal flaring (infants)</td>
<td>Intercostal, substernal, and supraclavicular OR nasal flaring and head bobbing (infants)</td>
</tr>
<tr>
<td><strong>Dyspnea</strong></td>
<td>Normal feeding, vocalization, and play</td>
<td>Decreased appetite, coughing after play, hyperactivity</td>
<td>Stops eating or drinking, stops playing, OR drowsy and confused and/or grunting</td>
</tr>
<tr>
<td>1-4 years</td>
<td>Counts to ≥10 in one breath OR speaks in complete sentences</td>
<td>Counts to 4-6 in one breath OR speaks in partial sentences</td>
<td>Counts to ≤3 in one breath OR speaks in single words OR grunts</td>
</tr>
<tr>
<td>&gt; 5 years</td>
<td>Counts to ≥10 in one breath OR speaks in complete sentences</td>
<td>Counts to 4-6 in one breath OR speaks in partial sentences</td>
<td>Counts to ≤3 in one breath OR speaks in single words OR grunts</td>
</tr>
<tr>
<td><strong>Auscultation</strong></td>
<td>Normal breath sounds, end expiratory wheezes</td>
<td>Expiratory wheezing</td>
<td>Inspiratory and expiratory wheezing to diminished breath sounds</td>
</tr>
<tr>
<td><strong>Total PAS</strong></td>
<td>Mild 5-7</td>
<td>Moderate 8-11</td>
<td>Severe ≥12</td>
</tr>
</tbody>
</table>
Inpatient Asthma Pathway

**INITIAL FLOOR ASSESSMENT**

**PAS ≤ 11**
- **IF ALBUTEROL GIVEN < 2 HOURS AGO**
  - Go to LEVEL 2 assessment 2 hours after last treatment
- **IF ALBUTEROL GIVEN ≥ 2 HOURS AGO:**
  1. Albuterol MDI 6 puffs with VHC or nebulizer (0.5%) 5mg
  2. Reassess patient in 30 minutes
  3. If PAS ≤ 11, go to LEVEL 2 assessment (assess 2 hours after this treatment)
  4. If PAS ≥ 12, go to INTENSIFICATION

**LEVEL 2 ASSESSMENT**

**PAS ≤ 7**
- Go to LEVEL 3, assess in 1 hour

**PAS 7-11**
- **Go to LEVEL 3, assess in 1 hour**

**LEVEL 3 ASSESSMENT**

**PAS ≤ 7**
- Go to LEVEL 4, assess in 1 hour

**PAS 7-11**
- **Go to LEVEL 4, assess in 1 hour**

**LEVEL 4 ASSESSMENT**

**PAS ≤ 7**
- **Continue LEVEL 4 assessments until discharge**
  1. Albuterol MDI 2 puffs with VHC q6h or nebulizer 2.5mg q4 hours
  2. Reassess every 4 hours

**PAS 7-11**
- **Continue LEVEL 4 assessments until discharge**
  1. Albuterol MDI 2 puffs with VHC q4 hours or nebulizer (0.083%) 2.5 mg q4 hours
  2. Reassess every 4 hours

**PAS ≥ 12**
- **INTENSIFICATION THERAPY**
  1. Notify Doctor/APP of intensification
  2. Albuterol 0.083% 5 mg aerosol
  3. Terbutaline Aerosol 500 mcg aerosol
  4. Reassess every 30 minutes
  5. If PAS ≤ 11, go to LEVEL 2 assessment or
  6. If PAS ≥ 12, repeat INTENSIFICATION and notify Doctor/APP

*After 3 intensifications in a row, if PAS remains ≥ 12, transfer to PICU for continued aerosols

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**IMPORTANT**
- A Doctor/APP can order an intensification treatment based on clinical judgment regardless of PAS

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**IMPORTANT**
- A Doctor/APP can order an intensification treatment based on clinical judgment regardless of PAS
Standardized Care

The pediatric asthma score (PAS) and asthma pathway standardize and improve patient care by:

– Incorporating national guidelines, best practices, and evidence based research to guide practice decisions according to patient’s response to treatment
– Increasing consistency in care (reducing unnecessary variation)
– Implementing a series of timed assessments using a standardized pediatric asthma score (PAS)
– Implementing treatments and individualizing care based on the patient’s response
Standard Care for Everyone

- Albuterol and systemic steroids
- Education (class/videos AND bedside)
- Asthma treatment plans for all
- School ATP as applicable
- Influenza vaccines (seasonally)
- Controller medications as applicable
- Specialist referrals as applicable
- Home care referrals as applicable
Asthma Education

- Bedside education throughout stay with RRT/RN teaching roles of medication and delivery devices with teach back (focus of QI initiative to improve)
- At Akron campus, class by certified asthma educators available daily M-F, individual sessions available at Mahoning Valley campus, videos available at other times
  - Asthma Basics: What Families Need to Know
  - Asthma: Allergies
  - Asthma: Medications and Treatment Plan
  - Asthma: How to Use an MDI with a Spacer
  - Asthma: How to Use an MDI with Spacer and Mask
  - Asthma: How to Use a Nebulizer
- Kids Breath Free booklets
ATP QI work

- Focus of provider QI work as had been Joint Commission requirement through 2015
- Revised form, education, chart audits, feedback and Best Practice Advisory have resulted in 93% of patients leaving hospital with ATP since October 2015
Influenza Vaccine QI work

- Hospitalist fellow and resident led education campaign for 2015-16 season improved rate to 60% from 30% in 2014-15 season with education and Best Practice Advisory
Home Health Referrals

• Asthma home health nurse visits are covered with most insurance plans and Akron Children’s Home Care Group has standard format for completing visits and getting feedback to ordering provider

• 35 referrals made since October 2015 from PCPs, pulmonary, and inpatient

• Expanding to ED
All Resources Available on Our Intranet

Asthma Pathway

We are committed to using pathways to provide the highest quality, multidisciplinary care for our patients. Below are pathways and related documents for asthma.

- PAS Score Tool
- Asthma Pathway Guidelines
- Inpatient Asthma Pathway Algorithm
- Inpatient Asthma Pathway Algorithm - Black and White Version
- RRT and RN Inpatient Asthma Pathway Standard Work Instructions
- RRT and RN Advancing the Patient in Epic Standard Work Instructions
- Asthma Pathway Communication Tool
- Doctor/App Inpatient Asthma Pathway Standard Work Instructions
- Printing the Inpatient Asthma Treatment Plan
- Transport Pathway
- ED Asthma Algorithm
- PICU Asthma Algorithm
- PICU Asthma Algorithm - Black and White Version

Asthma Frequently Asked Questions - August 2014

References:
1. Effect of a clinical pathway on the hospitalization rates of children with asthma: a prospective study
2. Effect of an integrated care pathway on acute asthma/wheeze in children attending hospital: cluster randomized trial
3. Impact of a pediatric asthma clinical pathway on hospital cost and length of stay
4. Improved outcomes for hospitalized asthmatic children using a clinical pathway
Case Study: Thomas’ Post Hospital F/U Visit

- Thomas returns to PCP four weeks after his hospitalization for a post hospital visit:
  - ACT score is 15. marginally controlled asthma as he is having nighttime symptoms, and unable to play soccer without coming out of practice almost daily
  - Mom reports he is taking the beclomethasone 80 mcg-2 puffs in the AM as she is home, but not sure about PM dose since she works nights
  - Thomas has the albuterol for sports but no spacer & only using one puff right before soccer practice
**Case Study: Thomas’ Post Hospital F/U visit**

- **Assess adherence with his medications & potential barriers to care** “What gets in the way?”
  - Complexity of the treatment regimen
  - Lack of a perceived benefit
  - Competing social and work demands
  - Stigma/embarrassment
  - Financial barriers/Access
  - Forgetting
  - Side effects
  - Daily habits/routines (vacation, summer, extracurricular activities)

- **Offer some individualized solutions to these barriers**
Case Study: Thomas’ Post Hospital F/U visit

• Along with assessing adherence & potential barriers to care, it is always important at EVERY visit to re-educate about asthma

• Provide education/review on:
  – What is asthma
  – Each medication & the actions (i.e. albuterol 20 mins before exercise)
  – Spacer technique with demonstration
  – Asthma treatment plan: daily, sick and emergency plan
  – Provide written ATP, follow-up appt & who to call if concerns/questions
Care Coordination

- Patient identification and risk stratification
- Medication management
- Education- Asthma Hotline
- Managed care
- Follow-up
- School
- Liaison with providers
- Discharge planning
- Home Health
Home Health

- Nursing or CHW
- Environmental assessment
- Trigger reduction
- Education
- Medications: availability and usage
- Liaison
School Health

- Case identification
- Asthma Treatment Plan management
- Asthma medication administration
- Stock Albuterol
- Medication technique assessment
- Communication with providers
SCHD

- Housing inspection and remediation
- Air Quality
- Smoking Cessation
2016

• CHNA Renewal
• CQCTSC (Clinical Quality and Care Transformation Steering Committee) priority
• Marked increase in home health referrals
• School health to adopt Easy Breathing for schools
• Hot-spotting
• NIH Grant application: Asthma Care Implementation Programs (Disparities)
• First 2 members of the Care Coordination team identified
Organizational Structure

Asthma Organizational Structure

- CQCTSC
  - M. Bird

- CHNA
  - B. Williams

- Steering Committee
  - C. White

- Team Leads Committee
  - C. White

- Stakeholders Group
  - C. White

Work Groups

- Primary Care
  - D. Karas

- Hospital-Based
  - S. Gunkelman

- Pulmonary
  - B. Boyson

- School Health
  - M. Wilmoth

- Home Care
  - T. Gearhart

- ED / Urgent Care
  - L. Pollauf

- PICU
  - M. Forbes

- Allergy
  - R. Kamani

Integration Teams

- Community Outreach
  - D. Skoda

- Pharmacy
  - C. Karish + C. Roose

- Managed Care
  - K. Richter

- Parents & Families
  - J. Doyle + B. Tenda

- IT Subcommittee
  - C. White + S. Evans
# System Level KDD

**2015 – 2017 Asthma Key Driver Diagram (KDD) – System Level**

- **Project Name:** Clinical Transformation Priority: Asthma
- **Physician Co-Champions:** Dr. P. Cooper White and Dr. David Chand

**Date:** 03/28/2016

## SMART AIM

- **Reduce Hospitalization rate from 2.75% to < 2% (approx. 25% reduction), and ED visit rate from 5.84% to < 5% (approx. 14% reduction), by December 31, 2017.**
- **Reduce by Dec 2015, 52-month rolling average.**

**Secondary Measures:**

- Increase % of Practices achieving 20% of Optimal Care (HCT 5.1% by 12/24/17 & Flu Vaccine by 06/20/17) from < 10% to 80%.
- Increase eligible CareSource members’ use of asthma controller medication, closing the gap between our 2015 performance (21%) and the national NCQA 90% line (42.8%), by 20%, by 12/31/2016 [HECS, HEDIS Proxy measure, TBD]

## GLOBAL AIM

- In the next 3 years, we aim to substantially reduce the burden of asthma for our patients, their families, and our community.

## KEY DRIVERS

**What (big picture) needs to be done to accomplish the Aim?**

- Asthma Care Coordination
- Guideline-Based Care (Standardization)
- Identification of Asthma Patients (Risk Stratification)
- Medication Management & Compliance
- Patient & Family Engagement
- Technology
- Education (Consistent across Continuum)
- Informatics (Metrics, Asthma Registry)
- Community Engagement
- Access to Care at Appropriate Levels

## INTERVENTIONS

**How (specific) we accomplish the Drivers**

- Eg. Multidisciplinary team, Office/Staff Engagement; E2B, routine SW assessments for all high-risk patients
- Evidence-Based, Asthma Pathway, Asthma Treatment Plan, Asthma Control Test, E2B, Flu Vaccine, Use of Spirometry
- E2B, Registry, School, Home Care, High Risk, Co-Morbidity
- Ordering, Billing, Usage; Increase correct/decrease incorrect medications, Medication demonstration devices for practices
- Evaluate Home Environment, School Health, 24/7 Hot Lines; use of Spirometry; Literacy; Behavioral Health issues
- Epic, MyChart, Reminder, Tele-Health, Smartphones/Apps, e.g. pulmonary effort, Interactive Patient TV, Social Media
- Standardized curriculum for IP & OP; mechanism to monitor, home env’t, School Health, trigger avoidance
- BPAs, Documentation, define/identify/pareto High Risk patients, Registry, Analytics
- Resources, Technology, PT & Family Engagement, Hot-Lines, Support Groups, Phone
- Population Health, ACT Now, ED, Pulmonary, IP, Alternatives, Missed appointments

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**Akron Children’s Hospital**
High Risk Asthma

- Ever Intubated
- ICU admission in the past 2 years
- 2 admissions in the past year
- 3 ER visits in the past year

- Focus of work in Pulmonary, Allergy and Immunology, and Care Coordination
High Risk Asthma

- N=137 (0.5% of all registry patients)
- 159 Admissions (25% of all admissions)
- 289 additional ED visits (19% of all ED visits)
- 71 ACHP, 66 Non-ACHP

From July registry report, all patients with at least 2 admissions or 3 ED visits in the last year.
Summary

• Quality Improvement is not easy
• Quality Improvement is a team endeavor
• Data is critical to success
• Build on the success of others