**VIP Pathways for Improving Pediatric Asthma Care (PIPA): Clinical Pathway for Pediatric Asthma in the Emergency Department Setting**

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- Julie P. Katkin, MD: Texas Children’s Hospital
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- Shawn Ralston, MD, MS: Dartmouth Hitchcock Medical Center
- Christopher J. Russo, MD: Central Lynchburg General Hospital
- Stephen J. Teach, MD: Children’s National Medical Center
- Joseph J Zorc, MD, MSCE: Children’s Hospital of Philadelphia

**Overview**
The Pathways for Improving Pediatric Asthma Care (PIPA) Clinical Pathway is designed as an easy-to-follow tool to help clinicians care for children with asthma in the emergency department setting. This pathway incorporates national guideline recommendations for asthma with the goals of providing appropriate, timely care and limiting unnecessary testing.

**Inclusion Criteria**
- Children 2-17 years of age, presenting with an asthma exacerbation

**Exclusion Criteria**
- Children with co-morbid conditions predisposing to severe or recurrent respiratory illness such as chronic lung disease (e.g. cystic fibrosis, restrictive lung disease, bronchopulmonary dysplasia), congenital or acquired heart disease, airway issues (e.g. vocal cord paralysis, tracheomalacia, tracheostomy dependent), immune disorders, sickle cell anemia, or neuromuscular disorders

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**Overview**

**Begin**

**Triage:**
Assess and document severity of asthma exacerbation

**Within 60 Minutes**

**Mild/ESI 4-5**
- Initiate administration of bronchodilators
- Consider administration of oral steroids

**Moderate/ESI 3 or Severe/ESI 1-2**
- Initiate administration of bronchodilators
- Initiate administration of oral steroids

**After 1 hour: Reassess**

**Mild**
- Teaching, Discharge home

**Moderate or Severe**
- Continue administration of bronchodilators
- Consider administration of Mg Sulfate
- Admit to hospital

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*Chest x-rays are not recommended* for routine assessment of acute asthma exacerbations. Bacterial super-infection is rare, and apparent infiltrates are often atelectasis. Appropriate indications for chest x-rays may include fever and prolonged illness course, focal exam, concern for foreign body, significant hypoxemia, or failure to improve with typical treatments.

**Disclaimer:** This algorithm was developed through the efforts of the American Academy of Pediatrics Value in Inpatient Pediatric Network in the interest of advancing pediatric healthcare. It does not represent AAP policy nor is it a professional care standard governing providers’ obligation to patients. Ultimately, the patient’s health care providers must determine the most appropriate care.
Inclusion Criteria
- 1-18 y.o with asthma exacerbation admitted to general medicine service

Exclusion Criteria
- Acute Illnesses
  - Patients with pneumonia, bronchiolitis, or croup as their primary diagnosis
- Chronic Conditions:
  - Chronic lung disease: (e.g. cystic fibrosis, restrictive lung disease, bronchopulmonary dysplasia)
  - Congenital and acquired heart disease:
  - Airway Issues: (e.g. vocal cord paralysis, tracheomalacia, tracheostomy dependent)
  - Medically complex children
  - Immune disorders
  - Sickle cell anemia

**RESPIRATORY SCORE (RS)**

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Signs of clinical deterioration by ALS nebulized albuterol in second hour

- Albuterol MDI 8 puffs
- Dexamethasone 0.6 mg/kg x 1 (16 mg max)

**Supplemental O2** should be administered to keep O2 saturation > 90%

- Albuterol continuous neb 20 mg x 1 hr
- Ipratropium neb 1.5 mg (0.75 mg for <2 yo)
- Dexamethasone 0.6 mg/kg x 1 (16 mg max)

**Assess and Score at end of 1st hour**

RS 1-5

- Albuterol MDI 8 puffs

RS 6-12

- Albuterol continuous neb 20 mg/hr
- Ipratropium neb 1.5 mg (0.75 mg for <2 yo) if not given
- Magnesium Sulfate IV 50 mg/kg x 1 (max 2 grams) for age ≥ 2 y.o.
- Place bed request

**Assess and Score at end of 2nd hour**

RS 1-4

- If first hour RS 1-5, discharge

RS 9-12

- ICU Consult for RS 10-12
- Magnesium Sulfate IV 50 mg/kg x 1 (max 2 grams) for age ≥ 2 y.o. if not given
- Admit to Inpatient / ICU
- If undecided on Inpatient or ICU, move on to 4th hour

**Assess and Score at end of 3rd hour**

RS 1-4

- Discharge

RS 5-8

- Albuterol MDI 8 puffs
- Give Ipratropium neb 1.5 mg (0.75 mg for <2 yo) if not given
- Admit to Phase III

RS 9-12

- ICU Consult for RS 10-12
- Albuterol continuous neb 20 mg/hr
- Magnesium Sulfate IV 50 mg/kg x 1 (max 2 grams) for age ≥ 2 y.o. if not given
- Admit to Inpatient / ICU
- If undecided on Inpatient or ICU, move on to 4th hour

**Assess and Score at end of 4th hour**

RS 1-8

- Admit to Inpatient

RS 9-10

- Albuterol continuous neb 20 mg/hr x 1 hr

RS 11-12

- Admit to ICU

**Urgent Care Transfer Criteria**
- Score >8 following first hour of nebulized albuterol- send by ALS
- Score 5-8 following 8 puffs of albuterol in second hour- send by ALS
- Signs of clinical deterioration or poor clinical response to therapy

**ED Discharge Criteria**
- RS 1-4 for minimum of 1 hour (Patients with an initial RS of 10-12 should be observed for 2 hours prior to discharge)
- Tolerating oral intake
- Adequate family teaching
- Follow-up established

**Discharge Instructions**
- Continue to use albuterol MDI every 4 hours until seen by provider
- Follow up with provider within 24-48 hours (when possible)
PCH Emergency Department Acute Asthma Standing Order Pilot

**Step 1: IDENTIFY**

- **Triage RN**
  - **Does this child have difficulty breathing?**
  - **Is this child 12 months or older?**
  - **Does this child have a history of either 1) asthma or 2) wheezing needing albuterol**

**ASSIGN TRIAGE ACUTY**

- **YES to ALL three questions**
- **5**
- **4**
- **3**
- **2**
- **1**

**Place this form on chart and notify PATIENT CARE NURSE**

**Step 2: PROVIDE STEROID**

- **ED RN**
  - **Continue based on Clinical Asthma Score (CAS) obtained 15 minutes after finishing initial treatment**
  - **CAS:**
  - **time:**
  - **initi**
  - **or RT**

**TREAT**

- **5**
- **4**
- **3**
- **2**
- **1**

**Initiate treatment by Triage Acuity - Notify RT to assess ASAP for yellow, orange, and red acuity**

**Regarding oxygen therapy**

- **Administer oxygen to maintain SpO₂ of 88% or higher**
- **When starting oxygen after albuterol treatment, check room air saturation in 30 minutes (see reverse)**
- **Persistent hypoxia (more than 30 minutes) is an indication for admission AT ANY POINT using disposition criteria**

**Step 3: TREAT**

- **5**
- **4**
- **3**
- **2**
- **1**

**Discus**

- **Discuss treatment with LIP**

**Have**

- **Give dexamethasone by mouth**

**Record**

- **Patient weight**
- **Goal within 20-30 minutes of arrival**

**Step 4: REASSESS**

- **ED RN**
- **RT**

**Step 5: REFRACTORY TREATMENT OR OBSERVATION**

- **ED RN**
- **RT**

**Step 6: REASSESS**

- **ED RN**
- **RT**

**DISPOSITION CRITERIA**

**HOME**

- **CAS 0-3**
- **SpO₂ >88% on room air**

**RTU**

- **CAS 4-6**
- **FiO₂ < 3L**

**Floor**

- **CAS 4-6**
- **FiO₂ < 0.6 on continuous albuterol**

**ICU**

- **CAS 9-10**
- **FiO₂ > 0.6 on continuous albuterol**

**Admit Team to consult in ED for CAS 7-8**

**DOCUMENTATION**

- **Drug allergies:**
- **Patient weight:**
- **SpO₂:**
- **FiO₂:**
- **Room air saturation:**
- **PCH Emergency Department Acute Asthma Standing Order Pilot**

**Form PCHMR124, revision 05/2015**

**Order SQ251**
**PCH ED Acute Asthma Process Guidelines**

**CLINICAL ASTHMA SCORE**

<table>
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<th></th>
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<th>2</th>
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<tbody>
<tr>
<td>RR (age 1-5)</td>
<td>&lt;40</td>
<td>40-60</td>
<td>&gt;60</td>
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<tr>
<td>RR (age &gt;5)</td>
<td>&lt;25</td>
<td>25-35</td>
<td>&gt;35</td>
</tr>
<tr>
<td>WHEEZING</td>
<td>None</td>
<td>Expiratory</td>
<td>I+E</td>
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<tr>
<td>INDRAWING</td>
<td>None</td>
<td>Subcostal only</td>
<td>Subcostal and intercostal</td>
</tr>
<tr>
<td>OBSERVED DYSPNEA</td>
<td>None</td>
<td>Mild</td>
<td>Marked</td>
</tr>
<tr>
<td>I:E RATIO</td>
<td>I&gt;E</td>
<td>I=E</td>
<td>I&lt;E</td>
</tr>
</tbody>
</table>

**Danger Zone Vital Signs:** Consider up triage to ESI 2 if **any** vital sign criterion is exceeded.

**Pediatric Fever Considerations**

- 1-28 days of age: assign at least ESI 2 if temp >38.0 C (100.4F)
- 1-3 months of age: consider assigning ESI 2 if temp >38.0 C (100.4F)
- 3 months to 3 yrs of age: consider assigning ESI 3 if: temp>39.0 C (102.2 F), or incomplete immunizations, or no obvious source of fever

**Room air saturation recommendations**

1. Place on pulse oximetry
2. Turn off oxygen flow meter
3. Remain in room for 2 minutes
4. If stable wave form and SpO₂<88%, resume oxygen
5. If SpO₂ consistently ≥ 88%, keep on pulse oximetry for 10 minutes to ensure normal oxygenation

**IV magnesium recommendations**

- **Dose:** Magnesium sulfate 50 mg/kg, IV (max. 2 grams)
- **Route:** Check order to place IV
- **Infusion:** Over 20 minutes via pump
  - Patient on cardiac monitor
  - BP 10 minutes after beginning infusion
- **Contraindications:** renal failure, hypotension, pregnancy

**Notes:**
Immediate life-saving intervention required: airway, medications, or other hemodynamic interventions; or any of the following clinical conditions: intubated, apneic, pulseless, severe respiratory distress, SpO₂<80, acute mental status changes, or unresponsive.

**Resources:** Count the number of different types of resources, not the individual tests or x-rays (examples: CBC, electrolytes and coags equals one resource; CBC plus chest x-ray equals two resources).

<table>
<thead>
<tr>
<th>Resources</th>
<th>Not Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labs (blood, urine)</td>
<td>History &amp; physical (including pelvic)</td>
</tr>
<tr>
<td>ECG, X-rays</td>
<td>Point-of-care testing</td>
</tr>
<tr>
<td>CT-MRI-ultrasound-angiography</td>
<td>Saline or heplock</td>
</tr>
<tr>
<td>IV fluids (hydration)</td>
<td>PO medications</td>
</tr>
<tr>
<td>IV or IM or nebulized medications</td>
<td>Tetanus immunization</td>
</tr>
<tr>
<td></td>
<td>Prescription refills</td>
</tr>
<tr>
<td>Specialty consultation</td>
<td>Phone call to PCP</td>
</tr>
<tr>
<td>Simple procedure =1 (lac repair, foley cath)</td>
<td>Simple wound care (dressings, recheck)</td>
</tr>
<tr>
<td>Complex procedure =2 (conscious sedation)</td>
<td>Crutches, splints, slings</td>
</tr>
</tbody>
</table>

**Danger Zone Vital Signs**

- If YES, consider
### PR PED PCH Asthma Phase 1 ESI 1-3 (Initiated Pending)

**Admit/Transfer/Discharge/Status**
- For triage acuity (ESI) of 1 or 2 (red/orange), please request orders for IV placement and IV Magnesium from provider immediately.
- Indicators: Consider all patients 12 months or older who describe their main problem as difficulty breathing, cough or asthma. Criteria: 1. History of diagnosed asthma or prior episodes of wheezing needing albuterol AND 2. On exam there is difficulty breathing (retractions, grunting, nasal flaring, breathing interfering with speaking)
- Contraindications: Patients in impending respiratory failure, age < 12 months, concern for airway, foreign body or pneumonia, no prior history of wheezing.

**Patient Care**

**Physiological Monitoring**
- Cardiac Monitoring* As clinically indicated
- Oximetry - Continuous* (Pulse Oximetry Continuous*) As clinically indicated

**Medications**

**Acute Treatment Medications**
- Contraindications for Steroid (Dexamethasone) Administration: Any oral or IV steroid medicine in last 12 hours, Active varicella or herpes infection, history of varicella exposure in last 3 weeks.
- Dexamethasone 0.6 mg/kg/dose, Oral, Tab, Once, First Dose Priority; NOW Max dose 16...
- Albuterol 10 mg, Nebulized Inhalation, Soln-Inhalation, Once, First Dose Priority...
- Ipratropium (Ipratropium 0.02% solution for nebulization) 1 mg, Nebulized Inhalation, Soln-Inhalation, Once, First Dose Priority;

**Respiratory**
- Room Air saturation recommendations: 1. Place on pulse oximeter 2. Turn off oxygen flow meter 3. Remain in room for 2 minutes 4. If stable wave form and SpO2 < 88%, resume oxygen 5. If SpO2 consistently, 88%, keep on pulse oximeter 10 minutes to ensure normal oxygenation.
- Oxygenation Goal* SpO2 goal Other (please specify), keep > 88%
- Oxygen Therapy* Nasal Cannula, As needed Initiate supp...
- Pediatric Clinical Asthma Score - RT As Directed

**Non Categorized**
- Click on reference link to submit PowerPlan feedback
- Approved on 9/2017 by Drs. Douglas Nelson and David Sandweiss

### PR PED Asthma Phase 2 CAS 4 10 (Initiated Pending)

**Patient Care**
- If clinical asthma score of 4 or more (after the initial treatment in Phase 1), if IV Magnesium not already given, please request orders for IV placement and IV Magnesium from provider immediately.
- This PR to be used on patients with Clinical Asthma Scores of 4-10 who have received treatment with PR PED PCH Asthma Phase 1 ESI 1-3 powerplan and or PR PED Asthma Phase 1 ESI 1-3

**Medications**

**Acute Treatment Medications**
- Albuterol 10 mg, Nebulized Inhalation, Soln-Inhalation, Once, First Dose Priority; NOW Over 1 hour

**Respiratory**
- Pediatric Clinical Asthma Score - RT As Directed

**Non Categorized**
- Click on reference link to submit PowerPlan feedback
- Approved on 11/2017 by Drs. Douglas Nelson and David Sandweiss
Severity of Asthma Exacerbation (circle one):

Mild = CAS 1 – 3 OR ESI 4-5  Moderate = CAS 4 – 6 OR ESI 3  Severe = CAS 7 – 10 OR ESI 1-2

ALL patients:
✓ Allergies: __________________________
✓ Temperature, heart rate, respiratory rate and pulse oximetry
✓ Initial Clinical Asthma Score (CAS) and CAS after each treatment
✓ NC oxygen to achieve SaO2 > 90%
✓ Document CAS after each treatment

HOUR 1 INITIAL THERAPY:
☐ Dexamethasone 0.6 mg/kg = ________ (max 16 mg) (circle) PO  IM  IV
☐ Albuterol (0.083%) 7.5 mg/9ml nebulized OR Albuterol MDI 8 puffs (90 mcg/puff)
☐ Albuterol (0.083%) nebulized over 1 hour
   o ≤ 20 kg – 10 mg/12ml
   o ≥ 20 kg – 20 mg/24mL
☐ All weights: Ipratropium (Atrovent) 1 mg = 5mL

Consider giving Magnesium with initial therapy for Severe (CAS 7 – 10)
☐ Magnesium sulfate 50 mg/kg, IV = ______________(max. 2 grams)  Infuse over 20 minutes via pump; patient on cardiac monitor

HOUR 2 REFRACTORY THERAPY (CAS 4-10 after 1 hour)
✓ NPO, Place IV
✓ IV Fluids __________________________________
☐ Magnesium sulfate 50 mg/kg, IV = ______________(max. 2 grams) if not already given, Infuse over 20 minutes via pump; patient on cardiac monitor
☐ Albuterol nebulized over 1 hour – continuous
   o ≤ 20 kg – 10 mg (20 mL 0.5% albuterol in 250ml 0.9% NaCl)
   o ≥ 20 kg – 20 mg (40 mL 0.5% albuterol in 250ml 0.9% NaCl)

SOME patients:
☐ Asthma education (when anticipating discharge)
☐ Admit/Transfer
   o Consider transfer or ICU admission if CAS ≥ 7 after first hour of therapy

ED PEDIATRIC ASTHMA ORDER  LIP Sign:  Date/Time:

RN Sign:  Date/Time  RT Sign:  Date/Time:
Emergency Department Pathway: Children’s Hospital of Philadelphia

http://www.chop.edu/clinical-pathway/asthma-emergent-care-clinical-pathway
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*Respiratory Score (RS)*

For questions concerning this pathway, contact: Asthma@seattlechildrens.org
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Last Updated: December 2015
Next Expected Revision: July 2020
Inpatient Steroid Treatment
- Transition to prednisone or prednisolone (2 mg/kg/day) for a total course of 5-10 days depending on severity of exacerbation

Discharge Criteria
- In Phase V with RS 1-4
- Observe for minimum of 2 hours after initial treatment in Phase V
- Tolerating oral intake
- No supplemental oxygen
- Completion of asthma education and asthma management plan
- Follow-up established

Supplemental O2 should be administered to keep O2 saturation > 90%

PHASE II: INPATIENT
- Albuterol: continuous neb 20 mg/hr (maximum on floors)
- Assessment q 1 hour
- Advance after 1 hr of treatment for score 1-8

PHASE III: INPATIENT
- Albuterol: MDI 8 puffs q 2 hours
- Assessment q 2 hours
- Begin discharge teaching and planning

PHASE IV: INPATIENT
- Albuterol: MDI 8 puffs q 4 hours
- Assessment q 4 hours

PHASE V: INPATIENT
- Albuterol: MDI 4 puffs q 4 hours
- Assessment q 4 hours

Call RRT for:
- Signs of clinical deterioration
- RS 9-10 on Continuous albuterol for 12 hours in phase II
- RS 11-12

RISK Watch on Inpatient
- Dashboard until RS <9

ICU Transfer
- RS 11-12 with 3 hours continuous
- Signs of clinical deterioration

Phase Change by Respiratory Score is the standard of care for patients on the asthma pathway
- Scoring is performed by RN & RT

Patients with unique clinical conditions that complicate their asthma treatment: Phase Change by Physician Assessment & Order Only
- Scoring by RN, RT & MD
- Provider to assess pt every 2-3 hrs

Conditions in which this is appropriate:
- Patient transferred from ICU
- Complex asthma history (e.g. hx intubation for asthma)
- Medical comorbidity (e.g. morbid obesity)

If Physician Assessment needed for phase changes, go to Inpt Asthma phase to discontinue “Phase Change by Respiratory Score” subplan and order “Phase Change by Physician Assessment & Order Only” subplan. If appropriate, “Phase Change by Respiratory Score” may also be re-ordered as patient improves.
This guideline is designed to direct the general care of most pediatric asthma patients, but may need to be adapted to meet the special needs of a specific patient as determined by the MD/LIP.

- **Weight** kg  
- **Allergies** ☐ No Known Allergies  ☐ Other

**Diagnosis**  
☐ Asthma  
☐ Acute Exacerbation Severity  ☐ Mild  ☐ Moderate  ☐ Severe

**Degree of Chronic Asthma Control**  
☐ Well controlled  ☐ Not well controlled  ☐ Very poorly controlled

Use checkboxes in table below. To adjust preventative medications, reference Asthma Stepwise Formulary for Daily Control Medication.

<table>
<thead>
<tr>
<th>Chronic Asthma Control</th>
<th>WELL Controlled</th>
<th>NOT WELL Controlled</th>
<th>Very POORLY Controlled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daytime Symptom Frequency</td>
<td>☐ Twice a week or less</td>
<td>☐ More than twice a week</td>
<td>☐ Throughout the day</td>
</tr>
<tr>
<td>Night/Sleep Symptom Frequency</td>
<td>☐ 1 per month</td>
<td>☐ &gt; 1 per month</td>
<td>☐ &gt; 1 per week</td>
</tr>
<tr>
<td>PEF (5 years and older)</td>
<td>☐ &gt; 80%</td>
<td>☐ 60-80%</td>
<td>☐ 60-80%</td>
</tr>
<tr>
<td>FEV1 / FVC Ratio</td>
<td>☐ &gt; 80%</td>
<td>☐ 75-80%</td>
<td>☐ &lt; 75%</td>
</tr>
<tr>
<td># of Exacerbations in Past 12 Months</td>
<td>☐ 0-1</td>
<td>☐ 2-3</td>
<td>☐ &gt; 3</td>
</tr>
<tr>
<td>Limitation of Daily Activities (work, school, exercise)</td>
<td>☐ Never</td>
<td>☐ Some limitation</td>
<td>☐ Severe and frequent limitation</td>
</tr>
<tr>
<td>Frequency of Albuterol Use</td>
<td>☐ Twice a week or less</td>
<td>☐ More than twice a week</td>
<td>☐ Several times per day</td>
</tr>
</tbody>
</table>

**Other Diagnoses**  
☐.............  ☐.............  ☐.............

**Nursing**  
☒ Provide patient/parent with asthma teaching packet  ☒ Complete asthma questionnaire with patient/parent

**Vital Signs**  
Heart rate, respiratory rate, and temperature ☐ Routine (q 4 hr)  ☐ Other (q____hr)

Blood pressure ☐ Routine (q 12 hr)  ☐ Other (q____hr)

**Monitoring**  
☒ Cardiorespiratory Monitor  ☒ Pulse Oximetry: ☐ Continuous  ☐ Other

**Activity**  
☐ Ad lib  ☐ Isolation  ☐ Other

**Call MD/LIP for**  
RR greater than_______or less than_______; HR greater than or less than_____; Temp greater than_____;BP systolic greater than or less than_____; Urine output less than_______ml/kg/hr; O₂ requirement greater than_______L/min; Requiring Albuterol q 1 hour x3 and/or clinical worsening of respiratory status

**Diet**  
☐ Regular diet for age  ☐ NPO  ☐ I&O  ☐ Other

**IV Fluids**  
☐ Peripheral IV  ☐ Peripheral IV with saline lock and normal saline flushes PRN to maintain line

☐ IV Fluid___________@___________ml/hr  ☐ IV + PO minimum @___________ml/hr

**Oxygen**  
☐ Supplemental O₂ to keep SpO₂ greater than ☐ 88%  ☐ Other___________% and wean or escalate per protocol

**Consult**  
☐ Pulmonology (MD/LIP to call)  ☐ Allergy (MD/LIP to call)  ☐ Social Work (RN to call)  ☐ Other

**Education**  
☒ Asthma education per Pediatric Asthma Teaching Outline  ☒ Asthma action plan completed prior to discharge  ☒ Peak flow education if 5 years or older.

---

**ASTHMA ADMISSION ORDERS, PAGE 1 OF 2**

*50261*  
Order50261  

---

* IHCMD333 Print on Demand 03/2013 ©IHC Health Services, Inc. (2011)
### Medication Orders

**Albuterol by Nebulizer** (use for age under 3 years or dose frequency < 2 hours)
- ☒ Albuterol neg
- ☒ 2.5 mg
- ☒ 5 mg
- ☒ Other mg q hours AND q 1 hour PRN respiratory distress (usual dose = 0.15-0.3 mg/kg; max dose = 10mg)
- ☒ Wean or escalate Albuterol frequency per protocol. (Clinical impression overrides clinical asthma score. Protocol cannot be used in children ≤ 12 months)
- ☒ Pharmacy to provide spacer.
- ☒ Pharmacy will enter on MAR only q 1 hr PRN. “Frequency and number of puffs determined by albuterol protocol.”

**Albuterol HFA by MDI and Spacer with / without mask**
- ☒ Albuterol HFA 4-8 puffs / treatment q hours (frequency every 1 to 2 hours; max dose 8 puffs) AND q 1 hour PRN respiratory distress
- ☒ Wean or escalate Albuterol frequency per protocol. (Clinical impression overrides clinical asthma score. Protocol cannot be used in children ≤ 12 months)
- ☒ Pharmacy will enter on MAR as 2-8 puffs.
- ☒ Spacer with appropriate mask for size. General guide is small for 0-2 years, Medium for >2-5 years, and Mouthpiece for > 5 years.
- ☒ Albuterol HFA 2-4 puffs / treatment q hours (frequency ≥ 3 hours; max dose 4 puffs) AND q 1 hour PRN respiratory distress
- ☒ Wean or escalate Albuterol frequency per protocol. (Clinical impression overrides clinical asthma score. Protocol cannot be used in children ≤ 12 months)
- ☒ Pharmacy will enter on MAR as 2-8 puffs.
- ☒ Spacer with appropriate mask for size. General guide is small for 0-2 years, Medium for >2-5 years, and Mouthpiece for > 5 years.

**Corticosteroids**
- ☒ Prednisone tablets mg PO q 12 hr
- ☒ Prednisone liquid mg PO q 12 hr
- ☒ Other

**Influenza Vaccine** (recommended for all children 6 months and older)
- ☒ 0.5 mL IM (patient older than 3 years)
- ☒ 0.25 mL IM (patient between 6 months and 3 years)

**Inhaled Corticosteroids (ICS) – Use Spacer**
- ☒ Fluticasone (Flovent® HFA) 44 mcg
- ☒ Fluticasone (Flovent® HFA) 110 mcg
- ☒ Fluticasone (Flovent® HFA) 220 mcg
- ☒ Other

**Controller Medications**
MD/LIP to assess chronic asthma score and current preventive therapy, then use Asthma Stepwise Formulary for Daily Control Medication to determine medication need.

**Other Medications**

<table>
<thead>
<tr>
<th>Name</th>
<th>Dosage</th>
<th>Route</th>
<th>Frequency</th>
<th>Delivery Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MD/LIP Signature** ____________________________ Date ___________ Time ___________
**RN Signature** ____________________________ Date ___________ Time ___________
**HUC Signature** ____________________________ Date ___________ Time ___________
# Severity Assessment of an Acute Asthma Exacerbation

<table>
<thead>
<tr>
<th></th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Imminent Respiratory Arrest</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Symptoms</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breathlessness</td>
<td>•While walking</td>
<td>•While talking</td>
<td>•At rest</td>
<td></td>
</tr>
<tr>
<td></td>
<td>•Can lie down</td>
<td>•Infants: shorter, softer</td>
<td>•Infants: stops feeding</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>cry, difficulty feeding</td>
<td>•Sits upright</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>•Prefers sitting</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Signs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Talks In</td>
<td>•Sentences</td>
<td>•Phrases</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Respiratory Rate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accessory Muscles, Nasal Flaring, Retractions</td>
<td>None or nasal flaring only</td>
<td>Usually 1-2 sites of accessory muscle use</td>
<td>May exhibit paradoxical thoracoabdominal movement</td>
<td></td>
</tr>
<tr>
<td>Welding</td>
<td>Moderate, often only expiratory</td>
<td>Loud, throughout exhalation</td>
<td>Usually loud, often during inhalation and exhalation</td>
<td>Absence of wheeze</td>
</tr>
<tr>
<td>Heart Rate</td>
<td>•Increased up to 10% from upper limit of normal</td>
<td>•Increased up to 20% from upper limit of normal</td>
<td>•Increased more than 20% from upper level of normal</td>
<td>•Increased or paradoxically bradyardic.</td>
</tr>
</tbody>
</table>

## Functional Assessment

<table>
<thead>
<tr>
<th></th>
<th><strong>Peak Flow for Children</strong> &gt; 5 years, % of Predicted or % of Personal Best</th>
<th><strong>Heart Rate</strong></th>
<th><strong>Respiratory Rate</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt; 80%</td>
<td>&gt; 80%</td>
<td>25-40</td>
</tr>
<tr>
<td></td>
<td>50-80%</td>
<td>&lt; 50%</td>
<td>50</td>
</tr>
<tr>
<td>p O₂ on Room Air</td>
<td>&lt; 60 mm Hg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>p CO₂</td>
<td>&gt; 42 mm Hg; indicates possible respiratory failure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sat O₂ on Room Air at 5000 ft Elevation</td>
<td>&gt; 88%</td>
<td>&gt; 88%</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt; 88%</td>
<td>20</td>
</tr>
</tbody>
</table>

## Reference Values for Respiratory Rate and Heart Rate in Children

<table>
<thead>
<tr>
<th>Heart Rate</th>
<th>Respiratory Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td><strong>Heart Rate</strong></td>
</tr>
<tr>
<td></td>
<td>Beats / Minute</td>
</tr>
<tr>
<td>Newborn</td>
<td>110-150</td>
</tr>
<tr>
<td>2 yr</td>
<td>85-125</td>
</tr>
<tr>
<td>4 yr</td>
<td>75-115</td>
</tr>
<tr>
<td>Over 6 yr</td>
<td>60-100</td>
</tr>
</tbody>
</table>

---

3. Based on IMCI (Integrated Management of Childhood Illness) – WHO publication
Primary Children’s Asthma Care Process Model

Intermountain
Primary Children’s Hospital
Asthma Chronic Control

How often do you have one of the following problems: cough, wheezing, feeling short of breath, chest tightness?

- Don’t know
- Twice a week or less
- More than twice a week
- Throughout the day

How often do you wake up from sleep with breathing difficulties or cough?

- Don’t know
- Less than or equal to once a month
- More than once a month
- More than once a week

Asthma Action Plan

Green Zone
You have ALL of these:
- Breathing is good
- No cough or wheeze
- Can work or exercise easily
- Sleeping all night

Peak Flow (optional): 0 to 80-100% of personal best

Go! Take these CONTROL (PREVENTION) Medicines EVERY Day
Are medications required for this zone? 
- Yes
- No

Yellow Zone
You have ANY of these:
- First sign of a cold
- Coughing or mild wheeze
- Tight chest
- Problems sleeping, working, or playing

Peak Flow (optional): 0 to 50-79% of personal best

Got Doing Well. Maintain Therapy. Take Quick-Relief medication (listed in Yellow Zone) before exercise or exposure to a trigger

Caution! Continue CONTROL Medicines and ADD Quick-Relief Medicines
Are medications required for this zone? 
- Yes
- No

Red Zone
You have ANY of these:
- Breathing is hard and fast
- Medicine is not helping

Emergency! Continue CONTROL AND Quick-Relief Medicines and GET HELP!
Are medications required for this zone? 
- Yes
- No

Asthma Control Test (ACT) Score: --
Asthma Admission: --
Asthma Discharge: --
Asthma Patient/Parent Questionnaire: --
Documentation: --
Asthma Control Degree: Not well controlled
Allergies: No Known Medication Allergies
WE WOULD LIKE TO LEARN MORE ABOUT YOUR ASTHMA AND HOW IT AFFECTS YOUR LIFE.

Please take a moment to answer the following questions, circling the correct answers where appropriate. For parents of young children, please answer the questions on behalf of your child. If you would like assistance, please ask your nurse or respiratory therapist.

<table>
<thead>
<tr>
<th>What Medication(s) do you take for your asthma?</th>
<th>How many TIMES PER DAY do you take this medication?</th>
<th>How many puff/spray do you take per treatment?</th>
<th>On average, how many times per week do you take this medication?</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEDICATION NAME</td>
<td>DOSE</td>
<td>Number of sprays</td>
<td>Question mark</td>
</tr>
<tr>
<td>0 1 2 3 4 5 Other</td>
<td>1 2 3 4 5 Other</td>
<td>1 2 3 4 5 6 7 As Needed Other</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 5 Other</td>
<td>1 2 3 4 5 Other</td>
<td>1 2 3 4 5 6 7 As Needed Other</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 5 Other</td>
<td>1 2 3 4 5 Other</td>
<td>1 2 3 4 5 6 7 As Needed Other</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 5 Other</td>
<td>1 2 3 4 5 Other</td>
<td>1 2 3 4 5 6 7 As Needed Other</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 5 Other</td>
<td>1 2 3 4 5 Other</td>
<td>1 2 3 4 5 6 7 As Needed Other</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 5 Other</td>
<td>1 2 3 4 5 Other</td>
<td>1 2 3 4 5 6 7 As Needed Other</td>
<td></td>
</tr>
</tbody>
</table>

Do you use a spacer with your inhaler? Yes  No  If so, what color spacer do you use?

How does asthma influence your life?

1. How often do you have one of the following problems: cough, wheezing, feeling short of breath, chest tightness
   - Don't Know
   - Twice a week or less
   - More than twice a week
   - Throughout the day

2. How often do you wake from sleep with breathing difficulties or cough?
   - Don't Know
   - Less than or equal to once a month
   - More than once a month
   - More than once a week

3. What is your peak flow level usually? (If your doctor has asked you to monitor it)
   - Don't Know
   - 60% - 100% personal best (green)
   - 50% - 60% personal best (yellow)
   - Less than 50% of personal best (red)

4. How often does asthma limit your daily activities: playing, running, exercising, or missing school / work?
   - Don't Know
   - Never
   - Some limitation
   - Frequent limitation

5. How often do you use a quick relief (rescue) medication (for example, albuterol)?
   - Don't Know
   - Twice a week or less
   - More than twice a week
   - Several times a day

6. In the last year, how often did your asthma get worse and require oral steroids, a clinic visit, or an emergency or hospital visit?
   - Don't Know
   - 0 – 1 time
   - 2 – 3 times
   - More than 3 times

---

**PEDIATRIC ASThma QUESTIONNAIRE**

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Asthma Stepwise Formulary FOR DAILY CONTROL MEDICATION

**Step 1**
- **NO DAILY CONTROL MEDICATION**
  - SABA, as needed in all steps, all ages.

**Step 2**
- **0-4 YRS**
  - LOW-DOSE ICS (mark choice)
    - Fluticasone (Flovent) MDI: 44 mcg: 2 puffs twice daily
  - Budesonide (Pulmicort) respules: 0.25 mg: 1 respule twice daily

**Step 3**
- **0-4 YRS**
  - MEDIUM-DOSE ICS (mark choice)
    - Fluticasone (Flovent) MDI: 110 mcg: 1 puff twice daily
    - Budesonide (Pulmicort) respules: 0.5 mg: 1 respule twice daily

**Step 4**
- **0-4 YRS**
  - LITRA (per step 4)
  - HIGH-DOSE ICS (mark choice)
    - Fluticasone (Flovent) MDI: 110 mcg: 2 puffs twice daily
    - Budesonide (Pulmicort) respules: 1.0 mg: 1 respule twice daily

**Step 5**
- **0-4 YRS**
  - LITRA (per step 4)
  - HIGH-DOSE ICS (mark choice)
    - Fluticasone (Flovent) MDI: 110 mcg: 2 puffs twice daily
    - Budesonide (Pulmicort) respules: 1.0 mg: 1 respule twice daily

**Step 6**
- **HIGH-DOSE ICS**
  - LITRA (per step 4)
  - Oral systemic steroids (lowest dose for the shortest duration: 5-10 mg considered low-dose)

**Abbreviations**
- ICS: Inhaled corticosteroid
- LABA: Long-acting beta-agonist
- LITRA: Leukotriene receptor antagonist
- SABA: Short-acting beta-agonist

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To determine whether Albuterol should be given earlier than scheduled evaluate the patient for:
- Clinical impression
- Clinical Asthma Score

**ADMINISTER ALBUTEROL**
Shorten Albuterol administration interval to next higher frequency

**YES**

"Patient is not doing well" AND/OR combined Clinical Asthma Score is > 4?

**NO**

"Patient is doing well" AND/OR combined Clinical Asthma Score is ≤ 4

**YES**

DO NOT ADMINISTER Albuterol

Go to Asthma Albuterol Weaning for Pediatrics

**NO**

Patient is receiving Albuterol every 4 hours

Escalate Albuterol to every 3 hours

Patient is receiving Albuterol every 3 hours

Escalate Albuterol to every 2 hours. Notify MD/LIP, RT

Patient is receiving Albuterol every 2 hours/or Q2 for max of 6 hours

**Clinical Asthma Score**

<table>
<thead>
<tr>
<th>Score</th>
<th>RR (age 1-5)</th>
<th>RR (age &gt; 5)</th>
<th>Wheezing</th>
<th>Retractions</th>
<th>Observed Dyspnea</th>
<th>I:E Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>&lt; 40</td>
<td>&lt; 25</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>I &gt; E</td>
</tr>
<tr>
<td>1</td>
<td>40 - 60</td>
<td>25 - 35</td>
<td>Expiratory only</td>
<td>1 location</td>
<td>Mild</td>
<td>I = E</td>
</tr>
<tr>
<td>2</td>
<td>&gt; 60</td>
<td>&gt; 35</td>
<td>Inspiratory and Expiratory or markedly decreased / tight</td>
<td>2 locations</td>
<td>Marked</td>
<td>I &lt; E</td>
</tr>
</tbody>
</table>

**GENERAL GUIDELINES**

1. Notify the MD/LIP and RT if:
   a. Albuterol is needed earlier than scheduled or escalated to Q2
   b. Clinical impression that patient is critically ill or deteriorating, or is not improving as expected while receiving Albuterol

2. Within initial 24 hours of exacerbation, patient may benefit from the addition of Ipratropium Bromide.

3. PICU transfer indications include:
   a. Requirements of supplemental oxygen >10 LPM by non-rebreather face mask
   b. Patients presenting with apneic episodes.
   c. CBG with a pCO2>42 mm Hg or trending towards hypercapnia in serially obtained blood gases.
   d. Any change in mental status.

4. This algorithm was designed to help facilitate the Albuterol escalation process, but it may not apply to all patients with asthma.

5. If the clinical impression does not support the decision recommended by this algorithm notify the MD or RRT. In general the clinical impression overrules the escalation protocol.

- Notify LIP/place
- Mg Sulfate
- Place on Continuous Albuterol (see protocol)
### Asthma Albuterol Weaning for Pediatrics

**Scheduled Albuterol is due to be given.**
Evaluate the patient for:
- Clinical impression
- Clinical Asthma Score

- **YES**
  - "Patient is doing well" AND Clinical Asthma Score is ≤ 4
  - **YES**
  - **YES**
  - **YES**

- **NO**
  - "Patient is not doing well" AND/OR combined Clinical Asthma Score is > 4
  - **YES**
  - **YES**

---

**GENERAL GUIDELINES**

1. Initial frequency and dosage of Albuterol administration to be written in the admission orders. (Albuterol 0.3mg/kg; max dose = 10 mg) or MDI 8 puffs with spacer
2. Clinical impression = patient looks good or looks bad.
3. This algorithm was designed to help facilitate the Albuterol weaning process, but it may not apply to all patients with asthma.
4. After each wean give at least one treatment at new time interval before weaning again.
5. If the clinical impression does not support the decision recommended by this algorithm notify the MD or RRT. In general the clinical impression overrules the weaning protocol.
6. If the weaning algorithm is not followed please document on the documentation form.

---

**Clinical Asthma Score**

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>RR (age 1-5)</td>
<td>&lt; 40</td>
<td>40 - 60</td>
<td>&gt; 60</td>
</tr>
<tr>
<td>RR (age &gt; 5)</td>
<td>&lt; 25</td>
<td>25 - 35</td>
<td>&gt; 35</td>
</tr>
<tr>
<td>Wheezing</td>
<td>None</td>
<td>Expiratory only</td>
<td>Inspiratory and Expiratory or markedly decreased / tight</td>
</tr>
<tr>
<td>Retractions</td>
<td>None</td>
<td>1 location</td>
<td>2 locations</td>
</tr>
<tr>
<td>Observed Dyspnea</td>
<td>None</td>
<td>Mild</td>
<td>Marked</td>
</tr>
<tr>
<td>I:E Ratio</td>
<td>I &gt; E</td>
<td>I = E</td>
<td>I &lt; E</td>
</tr>
</tbody>
</table>

---

Caution: If patient on ≥ 1L O2 notify provider for weaning orders
Floors:
Q2 hour TX not effective, CAS greater than 4 and/or clinically ill appearing

ED:
TX not effective, CAS greater than 4 and stable appearing

Initiation Guidelines:
- RN to notify RT/LIP that patient meets criteria for continuous albuterol
- RN/RT/LIP to review initiation criteria and decide jointly on plan of care
- Protocol can’t be used on children less than 2 years
- Clinical impression overrules weaning protocol
- LIP evaluation every 4 hours with written documentation at least every 8 hours
- Exclusion criteria: acutely unstable with CAS>7, FiO2 of 1.0 and unable to wean, co-morbid disease and/or very poorly controlled asthma, significant escalation in resources required in response to deterioration

Yes

Initiate continuous Albuterol and Magnesium sulfate per protocol. If patient received Magnesium previously: Minimum interval between doses = 3 hours. Notify MD/LIP, RT, Charge RN

Continue Continuous Albuterol with Clinical Asthma Score (CAS) every hour

Yes

CAS less than or equal to 4 for 4 hours AND stable appearing

Yes

Stop continuous and assess Q1 x 2 hours. Pt able to tolerate 2 hrs off continuous?

No

Place patient back on continuous albuterol

FiO2 greater than .6 call MD/LIP to assess patient/need for further interventions – MD/LIP responds within 30 minutes

Revert back to Asthma Admission Orders and use Asthma Albuterol Weaning/ Escalation Algorithms

Escalation Guidelines Once On Continuous Albuterol:

Call MD/LIP & RRT or Consider Transfer
- CAS 7-8
- Increasing respiratory distress (increased RR, severe retractions, dyspnea, decreased aeration)

Call PICU and Arrange for Immediate Transfer:
- CAS 9-10
- FiO2 1.0
- Patient requires higher dose of albuterol than initial weight-based dose
- Patient requires Positive Pressure Ventilation.
- PCO2 > 45
- Altered mental status

Clinical Asthma Score

<table>
<thead>
<tr>
<th>Score</th>
<th>RR (age 1-5)</th>
<th>RR (age &gt; 5)</th>
<th>Wheezing</th>
<th>Retractions</th>
<th>Observed Dyspnea</th>
<th>I:E Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>&lt;40</td>
<td>&lt;25</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>I &gt; E</td>
</tr>
<tr>
<td>1</td>
<td>40 - 60</td>
<td>25 - 35</td>
<td>Expiratory only</td>
<td>1 location</td>
<td>Mild</td>
<td>I = E</td>
</tr>
<tr>
<td>2</td>
<td>&gt;60</td>
<td>&gt;35</td>
<td>Inspiratory and Expiratory or markedly decreased / tight</td>
<td>2 locations</td>
<td>Marked</td>
<td>I &lt; E</td>
</tr>
</tbody>
</table>

December 2016

Intermountain Healthcare
Continuous Albuterol Orders With Magnesium
To be initiated if Q2 albuterol treatments are not sufficient x 3 for a max of 6 hours (per algorithm)

Attending: ___________________________ Weight: ___________________________ Diagnosis: Status Asthmaticus
Team: ___________________________ Allergies: ___________________________ Condition: Guarded
Nursing Assessment: ☑ Patient pulmonary assessment and CAS score every 30 minutes x2 then q 1 hour
RT Assessment: ☑ Patient pulmonary assessment and CAS score every 30 minutes x2 then q 1-2 hours

Vital signs:
☒ Heart rate, RR, Neuro checks q 1 hour
☒ Blood pressure and Temperature Q4 hours

Monitoring:
☒ Cardiorespiratory monitor
☒ Pulse oximetry: continuous

Activity:
☒ Bed rest with bathroom privileges with assistance as needed

Call MD: RR greater than _____ or less than _____ ; HR greater than _____ or less than _____;
Temp greater than _____; Systolic BP greater than _____ or less than _____;
UOP less than 1 mL/kg/hr; Any changes in neuro exam
☒ Call MD to assess patient Q4 hours while on continuous albuterol

Oxygen: Initiate oxygen at FiO2 0.6, wean to maintain Sats greater than 91%; ☑ Call MD if FiO2 is greater
than 0.6 on the blender

Diet:
☒ NPO for 6 hours, then advance diet as tolerated for CAS less than 6.

IV Fluids:
☒ Peripheral IV
☒ IV fluids ________________________ @ ______ mL/hr

Labs: ☑ CBG ☐ other: ________________________
☐ Serum electrolytes if on continuous albuterol greater than 24 hours

Imaging: ☑ Chest x-ray ☐ 2 views ☑ portable Indication: ________________________

Medications:
☒ CONTINUOUS ALBUTEROL VIA NEBULIZER (30 ML/HR)

--- Less than 20 kg: 10 mg/hour. Pharmacy to pour entire 20 mL bottle of 0.5% albuterol into entire 250 mL size. 0.9% sodium chloride bottle (including overfill) and place patient label over bottle’s label. May give 2.5 mg every 15 minutes until continuous available from pharmacy.

--- Greater than or equal to 20 kg: 20 mg/hour. Pharmacy to pour TWO entire bottles (about 40 mLs) of 0.5% albuterol into entire 250 ML size 0.9% sodium chloride bottle and place patient label over bottle’s label. May give 5 mg every 15 minutes until continuous available from pharmacy.

☒ Nebulized Medication by nebulizer at 11 LPM= 30 mL/hr

☒ Methylprednisolone 0.5 mg/Kg= _____mg (max 15 mg) IV every 6 hours

☒ DC methylprednisolone and transition patient to prednisolone 1mg/Kg q 12 hours _____mg (less than 12 years or max 60 mg/day; greater than or equal to 12 years-max 80 mg/day) when continuous albuterol is discontinued.

☒ Magnesium Sulfate (in children greater than 2 years) 50 mg/kg x one= _____mg IV over 20 minutes (max dose of 2 grams) when continuous albuterol is started. Subsequent doses of magnesium per Continuous Albuterol and Magnesium Protocol. Maximum number of doses = 3. Minimum time between doses is 3 hours.

OTHER MEDICATIONS OR ORDERS:
☐ ___________________________ ☐ ___________________________
☐ ___________________________ ☐ ___________________________

Signature_________________________________________ MD Date:__________ Time:___________
Signature_________________________________________ RN Date:__________ Time:___________
Signature_________________________________________ RT Date:__________ Time:___________
Signature_________________________________________ HUC Date:__________ Time:___________

December 2016
### Asthma intervention and scoring flow sheet

<table>
<thead>
<tr>
<th>Time</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Person charting:</td>
<td></td>
</tr>
<tr>
<td>Initials/ title</td>
<td></td>
</tr>
<tr>
<td>Pulse Oximetry (Sat O2)</td>
<td></td>
</tr>
<tr>
<td>Current Oxygen flow rate (lpm)</td>
<td></td>
</tr>
<tr>
<td>Is the child appearing clinically well?</td>
<td>Y/N</td>
</tr>
</tbody>
</table>

#### Clinical Asthma Score

<table>
<thead>
<tr>
<th>Pre</th>
<th>Post</th>
<th>Pre</th>
<th>Post</th>
<th>Pre</th>
<th>Post</th>
<th>Pre</th>
<th>Post</th>
<th>Pre</th>
<th>Post</th>
<th>Pre</th>
<th>Post</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
</table>

#### Respiratory Rate

**Age 1-5:**
- 0 = < 40
- 1 = 40-60
- 2 = >60

**Age > 5:**
- 0 = < 25
- 1 = 25-35
- 2 = > 35

#### Wheezing

- 0 = None
- 1 = expiratory
- 2 = inspiratory and expiratory

#### Indrawing

- 0 None
- 1 subcostal only
- 2 subcostal and intercostal

#### Observed Dyspnea

- 0 None
- 1 mild
- 2 marked

#### I:E ratio

- 0 = I > E
- 1 = I = E
- 2 = I < E

#### Total score

<table>
<thead>
<tr>
<th>Action taken:</th>
<th>Y/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albuterol given</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Action taken:</th>
<th>Y/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen weaned</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Signature/Title</th>
<th>Shift</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ALBUTEROL ADMINISTRATION AND WEANING PROTOCOL

Initial Albuterol order per admission sheet
Document CAS score before and after every treatment

Initiate weaning protocol after 6 hours

Evaluate patient at the time the treatment is due:
   1) If patient is clinically well AND
   2) Clinical asthma score (total score) is 1 or less

If both are present wean to next lower treatment interval and evaluate again:
Treatment intervals: q1 → q2 → q3 → q4 → q6

TREATMENT ESCALATION PROTOCOL

To activate treatment escalation protocol

1) Patient is clinically worse before scheduled treatment AND
2) Combined CAS score is 3 or above or “2” in any field

If treatment escalation criteria are met:
   a. Give tx early
   b. Use this interval as new scheduled treatment interval
   c. Inform MD via textpage:
      i. MD to evaluate patient within 2 hours
   d. Consider RT consult
**General**

- **Therapies Eval and Treat**
  - RT eval and treat

**Studies**

- **Lab - Blood gas**
  - Lab Blood Gas (POC)

- **Lab - Culture, Respiratory, Virus**
  - Culture, Respiratory, Virus

- **Imaging**
  - XR Chest PA and Lateral
  - XR Chest AP Portable

**Medications**

- **albuterol instruction**

  Albuterol MDIs have been shown to be as effective as nebulizers for the treatment of Asthma Exacerbation when used at appropriate doses of 4-8 puffs per treatment, and when used with a valved holding chamber. Mask should be used for children age ≤ 4 years old.

- **albuterol inhaler**
  - albuterol (VENTOLIN HFA) 90 mcg/puff inhaler
    - 4 puff, Inhalation, RT Q2O MIN. for 3 doses
  - albuterol (VENTOLIN HFA) 90 mcg/puff inhaler
    - 4 puff, Inhalation, RT Q4H
  - albuterol (VENTOLIN HFA) 90 mcg/puff inhaler
    - 4 puff, Inhalation, RT EVERY 2 HOURS PRN, Wheezing, Shortness of Breath

- **albuterol nebulizer**
  - albuterol 2.5 mg/3 mL nebulizer solution
    - 2.5 mg, Nebulization, RT Q2O MIN, for 3 doses, wean per RT protocol
  - albuterol 2.5 mg/3 mL nebulizer solution
    - 2.5 mg, Nebulization, RT Q4H
  - albuterol 2.5 mg/3 mL nebulizer solution
    - 2.5 mg, Nebulization, RT EVERY 2 HOURS PRN, Wheezing, Shortness of Breath
  - albuterol 5 mg/mL concentrated nebulizer solution
    - 0.5 mg/kg/hr, Nebulization, RT CONTINUOUS, Wean per RT protocol

- **ipratropium instruction**

  The Expert Panel concludes that ipratropium bromide, administered in multiple doses along with SABA in moderate or severe asthma exacerbations in the ED, provides additive benefit (Evidence B).
**i**pratropium inhaler
- **i**pratropium (ATROVENT HFA) 17 mcg/puff inhaler
  - 4 puff, Inhalation, RT Q20 MIN, for 3 doses
- i**pratropium (ATROVENT HFA) 17 mcg/puff inhaler
  - 2 puff, Inhalation, RT Q6H
- i**pratropium (ATROVENT HFA) 17 mcg/puff inhaler
  - 2 puff, Inhalation, RT EVERY 4 HOURS PRN, Wheezing, Shortness of Breath

**i**pratropium nebulizer
- i**pratropium (ATROVENT) 500 mcg/2.5 mL nebulizer solution
  - 250 mcg, Nebulization, RT Q20 MIN, for 3 doses
- i**pratropium (ATROVENT) 500 mcg/2.5 mL nebulizer solution
  - 250 mcg, RT Q6H
- i**pratropium (ATROVENT) 500 mcg/2.5 mL nebulizer solution
  - 250 mcg, RT EVERY 4 HOURS PRN, Wheezing, Shortness of Breath

**Systemic Corticosteroids - Age < 12 Years**
- Oral steroids have been shown to be as effective as IV steroids in treatment of Asthma Exacerbation.
  - prednisolone (PRELONE) 15 MG/5ML syrup
    - 1 mg/kg, Oral, 2 TIMES DAILY, Maximum 60 mg/day
  - prednisone (DELTASONE) tablet
    - 1 mg/kg, Oral, 2 TIMES DAILY, Maximum 60 mg/day
  - methylprednisolone sodium succinate injection
    - 2 mg/kg, ONCCE
  - methylprednisolone sodium succinate injection

**Inhaled Corticosteroids**
- mometasone (ASMANEX) 110 mcg/puff inhaler
  - 1 puff, Inhalation, RT QHS
- mometasone (ASMANEX) 220 mcg/puff inhaler
  - 1 puff, Inhalation, RT QHS
- budesonide (PULMICORT) 0.25 mg/2 mL nebulizer solution
- budesonide (PULMICORT) 0.5 mg/2 mL nebulizer solution
- budesonide (PULMICORT) nebulizer solution

**Leukotriene Receptor Antagonist**
- montelukast (SINGULAIR) chewable tablet

**Magnesium Sulfate**
- Consider for severe exacerbations
  - magnesium sulfate IV ONCE

**Subcutaneous Bronchodilators**
- Consider on presentation if air movement is very poor or patient is unable to cooperate with nebulizer
  - epinephrine 1 mg/mL injection
    - Subcutaneous
  - terbutaline (BRETHINE) injection

**Asthma Meds PICU Admission**
- Consider for PICU admission only
  - terbutaline (BRETHINE) bolus
    - 2 mcg/kg, Intravenous, ONCE, Loading dose
  - terbutaline (BRETHINE) 1mg/mL infusion
    - 0.1 mcg/kg/min, Intravenous, CONTINUOUS
OBJECTIVE: The objective was to determine the effect of an electronic asthma-specific inpatient history and physical (H&P) template on documented history and improvements in care plans.

METHODS: This was a before-after comparison of history and care plan documentation following implementation of a new H&P template. The template was implemented in May 2011. A retrospective review of the electronic health record was completed for 304 consecutive patients (2–16 years of age) admitted for asthma June to September 2010 and 242 admitted June to September 2011. Elements reviewed included asthma severity classification, utilization history (previous oral steroids, emergency visits, hospitalizations, intensive care admissions, and intubations), and environmental history (exposure to cockroaches, rodents, and mold). Assessed changes in care plans included social work or asthma-related subspecialty consult and change in controller medications. Patients from 2011 were compared with those from 2010 by using t test and \( \chi^2 \) statistics with adjustment for confounders by use of logistic regression. Interrupted time-series analyses assessed variability in documentation over time.

RESULTS: In 2011, the new H&P template was used in 74% of encounters. Compared with patients seen preimplementation, documentation in those seen after implementation was more likely to include severity classification (71% vs 44%; \( P < .0001 \)), complete utilization history (73% vs 12%; \( P < .0001 \)), and environmental history (66% vs 2%; \( P < .0001 \)). Documentation became more consistent over time. Changes in care planning were also more common after implementation (63% vs 49%; \( P = .0006 \)).

CONCLUSIONS: A structured H&P template for asthma led to more complete and less variable documentation of important history and likely led to enhancements in care plans.

Appropriate and evidence-based care plans rely on clinicians’ ability to identify and document accurate and relevant information. Templates, structured encounter forms, and decision support have led to improved documentation and reduced variability in both paper and electronic charting.1–9 The “meaningful use” of electronic health records (EHRs) aims to use electronic infrastructure to improve the safety, quality, and efficiency of care.10 Computerized documentation support guided by practice guidelines increases physician compliance with care standards.11

(Continued on last page)
Asthma is one of the most common chronic diseases of childhood. Clinical guidelines play a particularly important role for children hospitalized for asthma. Recently updated evidence-based guidelines for children admitted with an asthma exacerbation highlight the importance of addressing chronic as well as acute management.

Our institution recently accelerated the development and expansion of services to improve outcomes for children admitted for asthma. For patients to be connected with appropriate interventions to address chronic asthma management, reliable and accurate screening has become even more crucial. This article focuses on efforts to standardize and improve asthma-related documentation in a newly implemented EHR to efficiently connect patients to our institution’s portfolio of interventions. The specific objective was to determine the effect of an electronic asthma-specific inpatient history and physical (H&P) template, hypothesizing that the template would improve documented history, decrease documentation variability, and lead to appropriate changes in care plans.

METHODS

Study Design

This was a before-after comparison of history and care plan documentation following implementation of a new H&P template. We reviewed EHR documentation on 304 consecutive patients (2–16 years of age) admitted for asthma from June to September 2010 and 242 consecutive patients from June to September 2011. Subjects were identified based on admission diagnosis (International Classification of Diseases, 9th Revision, Clinical Modification 493.XX) and use of the evidence-based pathway for acute asthma care by the admitting physician. Quality assurance data show that this pathway is used for >98% of children admitted for asthma exacerbation to our institution. We excluded patients who were removed from the pathway after initial diagnostic consideration by the inpatient attending physician. Other exclusion criteria included cystic fibrosis and congenital heart defects. This study was approved by the Cincinnati Children’s Hospital Medical Center (CCHMC) Institutional Review Board.

Setting

CCHMC is a 425-bed, urban, pediatric academic hospital that trains ~150 pediatric residents each year. Approximately 1500 patients are hospitalized at CCHMC for an asthma exacerbation annually with most seen initially by pediatric residents who staff patients with attending physicians, >80% of whom are pediatric hospitalists.

In 2008, CCHMC began a long-term project to improve outcomes for patients with asthma cared for in our system. Before implementation of an EHR, a paper asthma-specific H&P template was piloted (August 2009 to January 2010), significantly increasing rates of pertinent documentation. In January 2010, the institution transitioned to an EHR. After the transition, several different asthma-related H&P templates, variable in use, quality, and asthma specificity, were available. None prompted specific interventions directed at chronic disease management.

In September 2010, an updated CCHMC Evidence-Based Care Guideline for Management of an Acute Asthma Exacerbation was published. Publication coincided with ongoing institutional efforts to improve outcomes that focused on the initiation or modification of chronic care management plans during hospitalization. Highlights of these efforts included targeted social work referrals, asthma-related subspecialty (allergy and pulmonology) consultations, and provision of severity-appropriate controller medications for home use before discharge. A home health pathway was also developed at this time that involved nurse home visits focusing on adherence and self-management. An additional home-based intervention involving referrals to the local health department for housing code enforcement for patients exposed to cockroaches, rodents, or mold was also being piloted during the summer of 2011. A structured asthma-specific H&P template based on the revised guideline and the paper-based pilot work was designed to reliably identify risks and make appropriate referrals to these existing and evolving resources.

Planning and Executing the Intervention

In January 2011, a multidisciplinary team of physicians, nurses, respiratory therapists, asthma care coordinators, and community partners at the Cincinnati Health Department assembled to identify key items to include in the new H&P template. Information technology specialists then created an electronic version.

During May 2011, pediatric residents from 2 of the 5 general pediatric inpatient teams used and critiqued the H&P template. Changes were made based on feedback, and a final version was available by the end of May (Fig 1). On June 1, previous templates, inconsistently used for asthma admissions, were removed from the
EHR. Meetings with each of the general pediatric inpatient resident teams took place to describe the H&P template and its foundation in both the revised guideline and local improvement efforts. Further initiatives aimed at uptake were pursued during the summer of 2011 with non-ICU teams and included educational outreach and data sharing.

Outcome Measures and Methods of Evaluation

Documentation of asthma severity classification, chosen for its relevance in the tailoring of chronic asthma medication regimens, was identified as present or absent. Utilization history was defined as presence or absence of a documented history of need for oral steroids, asthma-related emergency department visitation, hospitalization, ICU admission, and intubation. Documented presence of all 5 was also assessed. Each item was thought to be relevant to inpatient care and discharge planning, including referrals to subspecialists and the home health pathway. Documentation of exposure to cockroaches, rodents, and mold was assessed. At the time of H&P template development, social work referral was the primary intervention used when risks were identified, but the aforementioned partnership with the local health department for code enforcement was being actively developed.

Change in initial care planning was assessed through review of the plan from the resident H&P and documentation by the attending physician who staffed the admission. We did not review beyond these notes (eg, notes on subsequent days or the discharge summary) to take a conservative approach in assessing the H&P template’s impact on care plans. We identified 3 items specific to CCHMC improvement efforts. Specifically, we assessed documented intent to obtain a social work referral, request an allergy or pulmonology consult, or initiate or change asthma controller medications (defined as inhaled corticosteroids, montelukast sodium, or combination corticosteroid/long-acting β-agonist).

A summary variable was created to assess whether a plan for any one or more of the 3 changes was documented.

Demographic variables collected included age, gender, race, and insurance. Interval of albuterol at the time of admission was collected as a proxy for exacerbation severity, comparing those requiring albuterol at or more frequently than every hour with those requiring albuterol at or less frequently than every 90 minutes. At our institution, the severity of exacerbation, and initial interval of albuterol, is determined by symptoms, physical examination, pulse oximetry, and peak flow (if performed). Those in severe exacerbation are provided with continuous albuterol treatment. Those in moderate exacerbation are provided with hourly albuterol treatments; those in mild exacerbation are provided with albuterol at or less frequently than every 90 minutes.13,14 In addition, use of an asthma controller medication at admission was recorded along with asthma-related hospitalizations in the previous 12 months. Charts were reviewed by 3 trained research personnel by use of a standardized data collection tool.

Statistical Analysis

Before and after implementation sample characteristics were compared by
using *t* tests for continuous variables and $\chi^2$ statistics for categorical variables. All patients from the 2010 study period were compared with all those from the 2011 study period. This analysis was pursued to limit confounding by indication, considering that clinicians might have chosen to use or not use the H&P template based on clinical and/or social characteristics of a child’s initial presentation.\textsuperscript{15} Bivariate analyses were conducted by using $\chi^2$ statistics. Logistic regression was used to adjust for age, gender, insurance, interval of albuterol at admission, and previous hospitalization. A number needed to change (NNC) was calculated from the inverse of the absolute difference in documented change in care plans between those enrolled before and after H&P template implementation. NNC was conceptualized as the number of H&Ps that needed to be completed for 1 child to have an initial care plan change. Similar subanalyses were completed comparing only those receiving the H&P template in June to September 2011 with all patients from the June to September 2010 cohort.

To best depict and understand variability and trends over time, processes were tracked with annotated run charts, a visual depiction of our interrupted time-series analyses. Run charts can be used to differentiate common-cause and special-cause variation. Common-cause variation is the typical variation that occurs within a stable process. Special-cause variation results from specific changes in process.\textsuperscript{16} There are well-defined quantitative rules to determine special cause on run charts. One key rule is when there are 8 consecutive points above or below the previously established median.\textsuperscript{16} We were interested in identifying if special-cause variation and/or a reduction in common-cause variation could be attributed to implementation of the H&P template.

**RESULTS**

The 304 patients enrolled in 2010 were no different than the 242 enrolled in 2011 with regard to gender, race, or severity at admission (Table 1). Patients admitted in 2011 were slightly younger (6.6 vs 6.8 years; $P = .02$), more likely to be publically insured (80% vs 71%; $P = .02$), and more likely to have a previous hospitalization (42% vs 32%; $P = .01$). A total of 74% of patients in 2011 were admitted by using the H&P template. Uptake in template use was rapid with stabilization around a median of 87% occurring 2 weeks after implementation (Fig 2).

**Epidemiological Outcomes**

Table 2 compares all patients sampled in 2011 with all sampled in 2010. Documentation of severity classification (71% vs 44%; $P < .0001$), a complete utilization history (73% vs 12%; $P < .0001$), and a complete environmental history (66% vs 2%; $P < .0001$) were all significantly higher in 2011. Adjustment for age, gender, insurance, presenting severity, and previous hospitalization did not change effect estimates.

Similar trends were noted when children admitted in 2011 and 2010 were

| TABLE 1 Sample Characteristics for All Patients Sampled June to September 2011 and All Patients Sampled June to September 2010 |
|--------------------------------------------------|--------------------------------------------------|----------|
| **2011 (n = 242)** | **2010 (n = 304)** | **P** |
| Age, y, mean | 6.6 | 6.8 | .02 |
| Male, % | 67 | 60 | .1 |
| Black, % | 62 | 59 | .5 |
| Medicaid, % | 80 | 71 | .02 |
| Admission severity (albuterol $\leq q1h$), % | 67 | 59 | .06 |
| Previous hospitalization, % | 42 | 32 | .01 |

*p* *t* test for continuous, $\chi^2$ test for categorical variables.

**FIGURE 2** Annotated run chart of implementation of the asthma-specific history and physical.
compared with respect to changes in care plans (Table 3). Children in 2011 were significantly more likely to receive a social work referral, subspecialty consultation, or change in medication regimen in comparison with children in 2010 (63% vs 49%; \( P = .0006 \)). Adjustment for potential confounders did not change effect estimates. Although the NNCs for social work referral and medication change were >10, the NNC for any change was 7.1, suggesting that 7 children would have needed to be admitted in 2011 for 1 child to benefit from an initial care plan change. A subsequent analysis compared just those receiving the H&P template in 2011 (\( n = 178 \)) with all sampled in 2010. In 2011, those receiving the H&P template were no different than those not receiving the template in terms of gender, insurance, and age; however, they were more likely to be black (69% vs 44%, \( P = .002 \)), less likely to require albuterol every hour or more (63% vs 78%, \( P = .04 \)), and more likely to have been previously hospitalized (47% vs 30%, \( P = .02 \)). The majority (64%) of those not receiving the H&P template in 2011 were initially admitted to the ICU where its use was not being actively encouraged. Compared with all children sampled in 2010, those receiving the H&P template in 2011 were more likely to have a documented severity classification (84% vs 44%; \( P < .0001 \)), a complete utilization history (94% vs 12%; \( P < .0001 \)), and a complete environmental history (87% vs 2%; \( P < .0001 \)) (Table 4). Any change in care plan was significantly more likely to occur among those receiving the H&P template in 2011 (67% vs 49%; \( P < .0001 \)). The NNCs for all changes in care plans were ≤10. Adjustment for potential confounders had no impact on the size of effect. Those not receiving the H&P template in 2011 (\( n = 74 \)) showed no differences in documented history or changes in care plans compared with those sampled in 2010.

### Variability and Trends Over Time

Figure 3 illustrates the increased rate of documentation of key historical items over time. The median documentation rate for severity classification increased from 50% to 73%, previous steroid use from 36% to 80%, and cockroach exposure from 9% to 67%. In each case, special-cause criteria were met within the first few weeks of the 2011 study period. In addition, the run charts depict decreasing variability over time. Points become more tightly clustered around the median line the longer the H&P template was available and consistently used.

### DISCUSSION

Implementation of a standardized and structured asthma-specific inpatient H&P template was associated with a 60% increase in documented asthma severity classification, a sixfold increase in documentation of asthma-related utilization history, a 29-fold increase in documentation of environmental history, and a 30% increase in the documentation of initial change in care plans. Moreover, implementation of the H&P template reduced the variability with which certain items were documented, providing additional evidence that implementation of standardized tools improves process reliability.
Previous work has suggested that templates and structured encounter forms improve documentation, yet findings have been largely focused in the primary care setting. Davis et al. showed improvements in documented severity classification from 24% to 44% before and after implementation of an electronic outpatient asthma template in a family medicine practice. In our inpatient pediatric population, we too saw significant increases in severity classification. We believe the increase from 44% to 71% was driven almost entirely by the H&P template, because previous work in our institution that contributed to severity classification was well-established and stable by 2010.

Health outcomes are driven by appropriate and relevant care plans. Bell et al. demonstrated a 6% increase in prescriptions for asthma controller medications within pediatric primary care sites randomly selected to receive EHR-embedded decision support. We, too, saw changes in care planning, including a change in controller regimens after implementation of the H&P template. This is a powerful finding given that our study took place on the inpatient unit, among children who are potentially at very high risk. Although our data cannot assess whether the H&P template led directly to improvements in health outcomes, we do expect that it increased the likelihood of the right care plan being provided to the right patient.

The H&P template included potentially sensitive social and environmental questions but was designed with both evidence and interventions in mind. Previous work has highlighted the reluctance to ask certain questions, especially when there is no perceived fix. Thus, the sensitive questions were included only if potential interventions existed or if answers might impact clinical decision-making (eg, to help interpret a patient’s lack of adherence to previous medication prescriptions). Qualitatively, we found that having tangible interventions eased barriers to buy-in from both clinicians and families, especially when social and environmental history questions were involved.

Determining how an EHR fits into an academic environment has been a challenge, but we believe templates can be both clinical and educational resources, especially in the management of acute manifestations of chronic disease. Our asthma-specific H&P template was created to efficiently and reliably guide discussions surrounding a child’s acute and chronic care. In addition to highlighting evidence-based guidelines for management of an acute asthma exacerbation, the plan section highlighted interventions that might prevent readmissions. We expect that embedded prompts used on 1 patient may guide evidence-based practice on subsequent patients.

Evidence-based practice requires reliable systems that put evidence in the hands of the clinician. To realize improvement in performance reliability, we sought feedback from front-line clinicians before and after implementation. We also emphasized educational outreach to explain the H&P template’s rationale; we shared data and eliminated alternative templates. Implementation strategies were designed to maximize key stakeholder buy-in and allow for H&P template utilization to occur within preexisting clinician work flows. Such efforts led to reduced variability in history taking and further standardized inpatient asthma care. Standardization has been shown to improve patient outcomes, and reductions in unwarranted variation can increase adherence to evidence-based practice.

### Limitations

This study was not without limitation. First, a secular trend, or ongoing improvement efforts, may have altered results at baseline between 2010 and 2011. Still, those not receiving the H&P template in 2011 showed no differences in assessed outcomes compared with those from 2010. In addition, when just those receiving the H&P template

---

#### TABLE 4 Change in History and Care Plan Documentation Rates Before and After Implementation of an Asthma-Specific History and Physical Comparing Just Those Receiving the New Asthma-Specific History and Physical June to September 2011 With All Those Admitted June to September 2010

<table>
<thead>
<tr>
<th>Variable</th>
<th>2011 (n = 178), %</th>
<th>2010 (n = 304), %</th>
<th>RR (95% CI)</th>
<th>NNC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severity classification</td>
<td>84</td>
<td>44</td>
<td>1.9 (1.7–2.2)</td>
<td></td>
</tr>
<tr>
<td>Complete utilization history</td>
<td>94</td>
<td>12</td>
<td>8.0 (5.9–10.9)</td>
<td></td>
</tr>
<tr>
<td>Complete home environmental history</td>
<td>87</td>
<td>2</td>
<td>376 (18.0–78.3)</td>
<td></td>
</tr>
<tr>
<td>Care plans</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social work referral</td>
<td>25</td>
<td>11</td>
<td>2.3 (1.5–3.6)</td>
<td>7.1</td>
</tr>
<tr>
<td>Subspecialty consult</td>
<td>38</td>
<td>28</td>
<td>1.3 (1.0–1.7)</td>
<td>10.0</td>
</tr>
<tr>
<td>Medicine change</td>
<td>40</td>
<td>28</td>
<td>1.4 (1.1–1.8)</td>
<td>8.3</td>
</tr>
<tr>
<td>Any of the above</td>
<td>67</td>
<td>49</td>
<td>1.4 (1.2–1.6)</td>
<td>5.6</td>
</tr>
</tbody>
</table>

RR, relative risk; CI, confidence interval.

* Unadjusted $\chi^2$ test (no significant change when adjust for age, gender, insurance, interval of albuterol at admission, previous hospitalization in logistic regression).

* Calculated from the inverse of the absolute difference in documented change in care plans.

* Documentation not identification.
in 2011 were compared with all sampled in 2010, the size and consistency of the effect increased.

Second, the choice to use or not to use the H&P template may not be random. The comparison of all patients sampled in 2011 with all sampled in 2010 should minimize the effect this may have, and, if anything, bias findings toward the null.

Third, we were unable to report subsequent asthma control or asthma-related acute health service utilization. In addition, documentation of plans in any H&P may not always have led to interventions actually happening.

Therefore, we cannot address the effect more complete histories and changes in care plans may have had on post-discharge asthma morbidity.

Fourth, there were differences between patients admitted in 2011 and 2010. For example, patients admitted in 2011 were more likely to report previous hospitalization. We are unable to tell, from these data, whether such a difference made caregivers more (or less) likely to volunteer relevant historical information.

Finally, our sample was limited to a single institution with a strong philosophical and financial commitment to asthma improvement efforts. Also, the electronic H&P template had been preceded by a paper version before EHR transition. Consequently, our baseline and postimplementation findings may not be generalizable to populations in other regions or at other institutions.

**Future Directions**

Patient-level outcomes must be evaluated for those receiving the H&P template and connected to the new interventions. In addition, the H&P template should continue to adapt to changing evidence and availability of resources. Templates devoted to other common pediatric conditions could

**FIGURE 3** Annotated run charts of selected process measures included in the analysis.
also be developed and tested with similar processes.

CONCLUSIONS

Use of a specific and structured H&P template for asthma was associated with more complete and less variable documentation of important history elements and likely led to associated changes in care plans. The use of inpatient templates to target and inform evidence-based assessments and interventions is a potential strategy to improve the health of children with poorly controlled chronic disease.

REFERENCES


(Continued From First page)
HISTORY AND PHYSICAL FOR SUSPECTED OR KNOWN ASTHMA

Evidence-Based Care Recommendations

PCP:  
Doctor in charge of asthma:  ***
Source of Information:  ***
History of Present Illness:  ***

Chronic Asthma History
Typical Pulmonary Symptoms:  {SYMPTOMS:304400020}
Triggers:  {TRIGGERS:304400019}
Season Symptoms at Worst:  {SEASON:304400018}

Severity Assessment
Symptoms:  {SYMPTOMS:304400017}
Nighttime Awakenings:  {AWAKENINGS:304400016}
Short acting bronchodilator (rescue):  {USE AS RESCUE:304400015}
Activity Limitation:  {ACTIVITY LIMITATION:304400014}
Need for Oral Steroids:  {ORAL STEROIDS:304400021}

Asthma Related Utilization
Hospitalization (overnight stays):  {Yes/No:304400022}
Visits to ER or Urgent Care Center:  {Yes/No:304400022}
Oral Steroid Courses:  {Yes/No:304400022}
ICU Stays:  {Yes/No:304400022}
Intubations:  {Yes/No:304400022}

Medication Management
Medications needed for use at more than one place? - {OTHER ADDRESS:304400024}
Medication Delivery Method - {DELIVERY:304400025}

How many doses of asthma controller medication missed?
Yesterday?  ***
In past 2 weeks?  ***

Social History -
Responsible for Care - {SOCIAL:304400027}
Caregiver Marital Status - {MARITAL:304400028}
At the end of the month, the family ends up with - {END OF THE MONTH:304400029}
Do you or your family have any concerns about public benefit programs (Medicaid, Food Assistance, etc.) that you would like to discuss with a social worker during this visit?  {BENEFIT PROGRAMS:304400030}
Does family have trouble getting to doctor appointments or pharmacy due to transportation problems?  {YES,NO:28659}

Additional social history -  ***

**Environmental History**
Do you own or rent your home?  {HOME:304400031}

Exposures at home or any other place where the patient spends more than one day/night a week.  {EXPOSURES:304400032}

Exposures at home or any other place where the patient spends more than one day/night a week that may be amenable to referral to CLEAR Program (referral to Cincinnati Health Department for code enforcement)  {Clear Referral:304400035}

CLEAR FAQs

**Review of Symptoms:**
The listed systems were reviewed and reveal the following in addition to any already discussed in the HPI:
Constitutional: {general:30470128::"no additional concerns noted"}
Eyes: {eyes:30470130::"no additional concerns"}
HENT: {ROS HENT:30470044::"no additional concerns noted"}
Lungs: {ROS lungs:30470045::"no additional concerns noted"}
Cardiovascular: {ROS CV:30470046::"no additional concerns noted"}
Endocrine: {endo:30470132::"no additional concerns noted"}
GI: {ROS GI:30470047:a:"no additional concerns noted"}
GU: {ROS GU:30470049::"no additional concerns noted"}
Musculoskeletal: {ROS msk:30461064::"no additional concerns noted"}
Neurologic: {ROS neuro:30470051:a:"no additional concerns noted"}
Skin: {skin:30470129::"no additional concerns noted"}
Psychiatric: {ROS Psych:30470052:a:"no additional concerns noted"}
Hematologic/Allergic: {hem/all:30470133::"no additional concerns noted"}

**Past Medical History:**  {ADD HX:304400026}

**Past Medical History**

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Home Medications**

**Prescriptions Prior to Admission**

<table>
<thead>
<tr>
<th>Medication</th>
<th>Sig</th>
<th>Dispense</th>
<th>Refill</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Allergies - No Known Allergies

Immunizations - {imm:30470029::"stated as up to date, no records available"}

**Family History** - {ADD HX:304400026}

Family History -

<table>
<thead>
<tr>
<th>Problem</th>
<th>Relation</th>
<th>Age of Onset</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Physical Exam**

Patient Vitals for the past 24 hrs:

<table>
<thead>
<tr>
<th>Date/Time</th>
<th>Patient Status/Events</th>
<th>BP</th>
<th>Temp</th>
<th>Temp src</th>
<th>Pulse</th>
<th>Resp</th>
<th>SpO2</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>07/26/17 1609</td>
<td></td>
<td>-</td>
<td>36.9 °C (98.4 °F)</td>
<td>Axillary</td>
<td>145</td>
<td>28</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>07/26/17 1055</td>
<td></td>
<td>-</td>
<td>36.2 °C (97.2 °F)</td>
<td>Axillary</td>
<td>116</td>
<td>30</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>07/26/17 0800</td>
<td>pt agitated</td>
<td>101/44</td>
<td>36.2 °C (97.2 °F)</td>
<td>Axillary</td>
<td>160</td>
<td>25</td>
<td>98 %</td>
<td>-</td>
</tr>
<tr>
<td>07/26/17 0757</td>
<td></td>
<td>-</td>
<td>36.2 °C (97.2 °F)</td>
<td>Axillary</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>07/26/17 0721</td>
<td></td>
<td>-</td>
<td>36.2 °C (97.2 °F)</td>
<td>Axillary</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>07/26/17 0444</td>
<td></td>
<td>-</td>
<td>36.1 °C (97 °F)</td>
<td>Axillary</td>
<td>76</td>
<td>20</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>07/26/17 0030</td>
<td></td>
<td>-</td>
<td>36.8 °C (98.2 °F)</td>
<td>Axillary</td>
<td>88</td>
<td>22</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>07/25/17 1955</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>88</td>
<td>20</td>
<td>100 %</td>
<td>-</td>
</tr>
</tbody>
</table>

7 %ile (Z= -1.50) based on CDC 2-20 Years BMI-for-age data using weight from 7/26/2017 and height from 7/25/2017.

<1 %ile (Z= -2.60) based on CDC 2-20 Years stature-for-age data using vitals from 7/25/2017.

<1 %ile (Z= -3.15) based on CDC 2-20 Years weight-for-age data using vitals from 7/26/2017.

Blood pressure percentiles are 92.6 % systolic and 57.1 % diastolic based on NHBPEP's 4th Report. (This patient's height is below the 5th percentile. The blood pressure percentiles above assume this patient to be in the 5th percentile.)

Body surface area is 0.47 meters squared.

General: {gen app:30470117::"alert, well developed, well nourished, in no acute distress"}

Skin: {skin:30470007::"warm","well perfused","no rashes"}
Head: {head:30470227::"normocephalic and atraumatic"}
Eyes: {Eye exam:30461026:a:"Extraocular movements intact"}
ENT: {ENT:30470005::"ENT exam normal, mucous membranes moist"}
Neck: {Neck exam:30461017::"neck is supple and there is full active range of motion"}
Breast: {Document name of chaperone when performing sensitive exam:30470068::"not examined"}
Lungs: {Lungs:30452019::"respiratory effort normal, clear to auscultation, normal breath sounds bilaterally"}
Cardiac: {cardiac:30480185}
Abdomen: {Abdomen:30461003::"abdomen is soft, nontender, and nondistended without hepatosplenomegaly or masses","normoactive bowel sounds are present","there are no peritoneal signs"}
Back: {pe spine peds:310601::"spine normal, symmetric"}
GU: {Document name of chaperone when performing sensitive exam:30470157::"not examined"}
Lymphadenopathy: {Lymph exam:30461011::"normal","no adenopathy noted"}
Musculoskeletal/Ext: {musculoskeletal:30470019:a:"normal muscle bulk with no contractures or deformities"}
Neurological: {pe neuro peds:310602::"gross motor exam normal by observation"}
Labs: {lab review:30470101::"no additional or new labs"}

Radiology: ***

Assessment - ***

Asthma Severity Diagnosis - {PUL ASTHMA SEVERITY DIAGNOSIS:304400033}
Other Potential Diagnosis Include - {ALT DIAGNOSIS:304400034}

Plan -
Admitted for asthma exacerbation
Asthma protocol per Cincinnati Children's Hospital Medical Center Guidelines

Acute asthma management -
Initiation of bronchodilator therapy - {PUL INITIATION:304400037}
Wean bronchodilators as tolerated
Steroids - {STEROIDS:304400038}

Chronic asthma management
Controller Medication - {CHRONIC:304400039}
In-hospital consults and referrals - {CONSULTS/REFERRALS:304400040}
Home Health (if the patient lives in Ohio, has frequent admissions/ED visits, any caregiver requires more in-depth education) {CONSULT ASTHMA HOME HEALTH:30432085}
CLEAR Program (Eligible if live within the City of Cincinnati/Hamilton County, rent home/apartment, and report environmental risk noted above) {y/n:314532}

Asthma action plan and medications in hand prior to discharge

Close follow up with primary care physician

Flu shot for asthma patients - {flu shot:304610390}

Additional problems managed during this hospitalization - ***

**Lab Schedule for patient (include one-time labs and recurring labs)**
Lab, Days of the Week, Time, Rationale***

Disposition - ***

**Medical Readiness D/C Goals**

<table>
<thead>
<tr>
<th>Start</th>
<th>Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>07/25/17</td>
<td>07/25/17</td>
</tr>
<tr>
<td>1332</td>
<td>13</td>
</tr>
<tr>
<td>Medically Ready Discharge Criteria</td>
<td>CONT, Routine</td>
</tr>
<tr>
<td>Question: Additional discharge criteria</td>
<td>Answer:</td>
</tr>
</tbody>
</table>
• Section A asks for general information regarding the date of the assessment, the child's date of birth, and the child's age. Section A also asks for an assessment name. Choose an assessment name that will be helpful for you for future reference when reviewing the report. For example, you may choose to name the assessment the name of the child for whom you are filling out the assessment.

• Most questions in Section B and Section C are answered by choosing the appropriate answer from the list of answers for that question. If you do not have the child's allergy skin test results, skip Section C.

• For any questions that you do not know the answer to, choose 'No response.'

Completed by: 

A1. Completion Date: / / MM/DD/YYYY
A2. Child's Date of Birth: / / MM/DD/YYYY
A3: Assessment Name: 
A4. Child's Age: 

B1. What grade is your child in?  
[If summer, enter the child's grade for next fall.]  
0 - Kindergarten  
1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
Not in school  

B2. Do any of your child's parents, brothers, sisters, or grandparents have asthma?  
Yes  
No  
No Response  

B2a. All together, how many of these relatives have asthma?
B3. Do you have a regular doctor or health care provider who treats your child's asthma? [Does not have to be an asthma specialist.]

- Yes
- No
- No Response

B4. During the past 12 months, when your child went to a doctor for asthma care, was it usually in an ER or clinic/doctor's office?

- ER
- Clinic/office
- Both, mostly ER
- Both, mostly clinic/office
- Never had doctor's visit
- No Response

B4a. Did your child usually see the same doctor at the clinic or office?

- Yes
- No
- No Response

B5. During the past 12 months, did your child take medicines for asthma?

- Yes
- No
- No Response

B6. Some asthma medicines are taken only when the child is having asthma signs or symptoms. Other medicines are taken even when the child is not having symptoms. Does your child take medicines only when he/she is having signs or symptoms or even when he/she is not having symptoms, or both times?

- Only for symptoms
- Only when no symptoms
- Both
- No Response

B7. Has a doctor or health care provider ever given you written instructions for what to do about taking medicines?

- Yes
- No
- No Response

B8. Has your child had any problems taking medications at school?

- Yes
- No
- No Response

B9. Many people have problems making and keeping doctor's appointments for their child's asthma. At other times, it is hard to get to the office or they are not open at good times. In the past year, have you had any of these types of problems making or keeping appointments for your child's asthma?

- Yes
- No
- No Response

B10. Does your child's pillow have a zipped plastic cover for allergies?

- Yes
- No
- No Response
<table>
<thead>
<tr>
<th>Question</th>
<th>Response Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>B11. Does your child's mattress have a zipped plastic cover for allergies?</td>
<td>Yes, No, No Response</td>
</tr>
<tr>
<td>B12. Do you use a humidifier/vaporizer in your child's bedroom?</td>
<td>Yes, No, No Response</td>
</tr>
<tr>
<td>B13. Do you have carpeting (or rugs) in your child's bedroom?</td>
<td>Yes, No, No Response</td>
</tr>
<tr>
<td>B14. Do you have carpeting (or rugs) in your TV/family room?</td>
<td>Yes, No, No Response</td>
</tr>
<tr>
<td>B15. Does your kitchen have a gas stove?</td>
<td>Yes, No, No Response</td>
</tr>
<tr>
<td>B16. Do you sometimes use the gas stove to help heat your house?</td>
<td>Yes, No, No Response</td>
</tr>
<tr>
<td>B17. Is there any moisture or mildew anywhere in the house on the...</td>
<td></td>
</tr>
<tr>
<td>a. Ceiling?</td>
<td>Yes, No, No Response</td>
</tr>
<tr>
<td>b. Walls?</td>
<td>Yes, No, No Response</td>
</tr>
<tr>
<td>c. Windows?</td>
<td>Yes, No, No Response</td>
</tr>
</tbody>
</table>
B18. Have you had any problems with...

   a. Cockroaches?  
        Yes  
        No  
        No Response
   b. Mice?  
        Yes  
        No  
        No Response
   c. Rats?  
        Yes  
        No  
        No Response

B19. Do you have any pets?

   a. Dog?  
        Yes  
        No  
        No Response
   b. Cat?  
        Yes  
        No  
        No Response
   c. Hamster, guinea pig, or rabbit?  
        Yes  
        No  
        No Response

B20. Do you smoke cigarettes?

        Yes  
        No  
        No Response

B21. Does your child smoke cigarettes?

        Yes  
        No  
        No Response

B22. How many other people who live in your home smoke?

B23. Does anyone else who takes care of your child smoke?
        Yes  
        No  
        No Response

B24. Have you ever run out of medicines for your child's asthma and not had any on hand when your child had an asthma attack?

        Yes  
        No  
        No Response

B25. For many reasons, children do not always get their medicines exactly when they are supposed to.

        On a scale of 1 to 5, how many problems do you usually face when trying to be sure your child gets his/her medicines?  [1 is no problems with medicines and 5 is a lot of problems with medicines.]

        1-No problems  
        2  
        3  
        4  
        5-A lot of problems  
        No Response
B26. On a scale of 1 to 5, how would you rate your child's experience with taking his/her medicines exactly on schedule? [1 means never missing a dose of medicine and 5 means often missing a dose of medicine.]

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Never misses a dose</td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Often misses a dose</td>
</tr>
<tr>
<td>No Response</td>
<td></td>
</tr>
</tbody>
</table>

B27. Does your child take asthma medication on his/her own? Would you say...

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
</tr>
<tr>
<td>Once in a while</td>
</tr>
<tr>
<td>Quite a bit</td>
</tr>
<tr>
<td>All of the time</td>
</tr>
<tr>
<td>No meds</td>
</tr>
<tr>
<td>No Response</td>
</tr>
</tbody>
</table>

B28. Are you concerned about your child's behavior or emotions?

<table>
<thead>
<tr>
<th>Concern level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
</tr>
<tr>
<td>Once in a while</td>
</tr>
<tr>
<td>Quite a bit</td>
</tr>
<tr>
<td>All of the time</td>
</tr>
<tr>
<td>No Response</td>
</tr>
</tbody>
</table>

B29. Do you have any concerns about how you have been coping with things in the past few months?

<table>
<thead>
<tr>
<th>Concern level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
</tr>
<tr>
<td>Once in a while</td>
</tr>
<tr>
<td>Quite a bit</td>
</tr>
<tr>
<td>All of the time</td>
</tr>
<tr>
<td>No Response</td>
</tr>
</tbody>
</table>

B30. Have you been feeling unusually stressed lately?

<table>
<thead>
<tr>
<th>Concern level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
</tr>
<tr>
<td>Once in a while</td>
</tr>
<tr>
<td>Quite a bit</td>
</tr>
<tr>
<td>All of the time</td>
</tr>
<tr>
<td>No Response</td>
</tr>
</tbody>
</table>

For questions B31-35, please indicate whether you agree or disagree with the statement.

B31. It is possible to control my child's asthma so that he/she can play like other children.

<table>
<thead>
<tr>
<th>Agreement Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
</tr>
<tr>
<td>Agree</td>
</tr>
<tr>
<td>Disagree</td>
</tr>
<tr>
<td>Strongly disagree</td>
</tr>
<tr>
<td>No Response</td>
</tr>
</tbody>
</table>

B32. It is possible to manage my child's asthma so he/she is free of symptoms.

<table>
<thead>
<tr>
<th>Agreement Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
</tr>
<tr>
<td>Agree</td>
</tr>
<tr>
<td>Disagree</td>
</tr>
<tr>
<td>Strongly disagree</td>
</tr>
<tr>
<td>No Response</td>
</tr>
</tbody>
</table>
B33. My child should not have problems from the asthma medicine he/she takes.  

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>No Response</th>
</tr>
</thead>
</table>

B34. I have little control over my child's asthma.  

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>No Response</th>
</tr>
</thead>
</table>

B35. I often feel helpless in dealing with my child's asthma.  

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>No Response</th>
</tr>
</thead>
</table>

**CHILD SKIN TEST RESULTS**

C1. Are skin test results available for this child?  

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>No Response</th>
</tr>
</thead>
</table>

C2. Does the skin test indicate that your child is sensitive to dust mites?  

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>No Response</th>
</tr>
</thead>
</table>

C3. Does the skin test indicate that your child is sensitive to cockroaches?  

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>No Response</th>
</tr>
</thead>
</table>

C4. Does the skin test indicate that your child is sensitive to rodents?  

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>No Response</th>
</tr>
</thead>
</table>

C5. Does the skin test indicate that your child is sensitive to cats?  

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>No Response</th>
</tr>
</thead>
</table>

C6. Does the skin test indicate that your child is sensitive to dogs?  

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>No Response</th>
</tr>
</thead>
</table>

C7. Does the skin test indicate that your child is sensitive to mold?  

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>No Response</th>
</tr>
</thead>
</table>
Identifying Information

Child’s Name ____________________________________________

Child’s Date of Birth ___________________________ Child’s Age ____________

MM/DD/YYYY

Parent/Guardian’s Name(s) ____________________________________________

________________________________________

Current telephone number ___________________________ Alternative number ________________

Email address (if applicable) ____________________________________________

Current address(es) ____________________________________________

What grade is your child in? (If summer, check the child’s grade for the upcoming school year)

☐ Daycare
☐ Preschool
☐ Kindergarten
☐ Grade _____

What school or daycare does your child attend? ____________________________________________

Does your child have medication at school or daycare? ☐ Yes ☐ No

Does your child have any problems taking medication at school or daycare? ☐ Yes ☐ No

How many of your child’s immediate family members have asthma, if any? ______

Section A: Medical Care

A1. Does your child usually see the same doctor each time he/she receives medical care? ☐ Yes ☐ No

A1a. If yes, what is the name of the provider? ____________________________________________

☐ PPC ☐ Hopple ☐ Asthma Center ☐ Other

A2. When your child is having problems with asthma, where does he/she usually go to receive treatment?

☐ Emergency room/Urgent Care ☐ Clinic ☐ Asthma specialist ☐ Other: ______________

A2a. If emergency room, what are the reasons your child went there instead of the clinic?

☐ Clinic was closed ☐ Transportation ☐ Availability ☐ Severity of problem

☐ Other: ________________________________
A3. What asthma medicine(s) is your child currently prescribed?

- QVAR® (beclomethasone)
- Flovent® (fluticasone)
- Advair®
- Symbicort®
- Pulmicort® (budesonide)
- Singulair® (montelukast)
- albuterol
- Other: ___________________________

A3a. What pharmacy do you use most often? ___________________________

Name, Location, Phone # (if known)

A3b. Please describe your child’s daily routine for taking his/her medication.

A4. When do you think your child has asthma:
- All of the time
- Only when he/she is having symptoms
- Unsure

A5. Do you have an up-to-date printed Asthma Action Plan? Yes No Unsure

Section B: Environment

B1. Does your child’s pillow have a zipped plastic cover? Yes No
   Does your child’s mattress have a zipped plastic cover? Yes No

B2. Does your child have a humidifier/vaporizer in his/her bedroom? Yes No

B3. Does your child’s bedroom have carpeting or rugs? Yes No

B4. Do you have carpeting or rugs in your TV/family area? Yes No

B5. Do you have a gas stove or a fireplace in your home? Yes No

B6. Is there any moisture or mildew in your home on the:
   a. Ceiling Yes No Unsure
   b. Walls Yes No Unsure
   c. Windows Yes No Unsure

Comments: ________________________________

B7. Have you had any problems with:
   a. Cockroaches Yes No Unsure
   b. Mice Yes No Unsure
   c. Rats Yes No Unsure

Comments: ________________________________

B8. Do you or anyone else who provides care for your child smoke?
- Yes – Inside the home
- Yes – Outside the home
- No

B8a. If yes, is there any interest in quitting? Yes No

B9. Do you have regular exposure to any of the following pets:
   a. Dog Yes No Unsure
   b. Cat Yes No Unsure
   c. Hamster, guinea pig, or rabbit Yes No Unsure
   d. Other _________________________ Yes No Unsure
Section C: Child Well-Being

C1. Do you think your child has any behavioral or emotional problems that make it difficult to care for his/her asthma?  
☐ Yes  ☐ No

C2. Do you think your child has allergies?  
☐ Yes  ☐ No

C2a. If yes, please name any triggers you have noticed:  
___________________________________________________
(Examples: strong smells, grass, exercise, animals, cold symptoms, etc…)

C3. What time of year does your child experience the most asthma symptoms?  
☐ Spring/Summer  ☐ Fall/Winter  ☐ Any change in the weather

C4. Has your child ever had skin testing for allergies?  
☐ Yes  ☐ No

C4a. If yes, did the skin test indicate that your child is sensitive to any of the following:

- Dust mites  ☐ Yes  ☐ No  ☐ Unsure
- Cockroaches  ☐ Yes  ☐ No  ☐ Unsure
- Mice/Rats  ☐ Yes  ☐ No  ☐ Unsure
- Cats  ☐ Yes  ☐ No  ☐ Unsure
- Dogs  ☐ Yes  ☐ No  ☐ Unsure
- Mold  ☐ Yes  ☐ No  ☐ Unsure

Section D: Adult Well-Being

D1. Are you having difficulty with any of the following:

☐ Insurance coverage  
☐ Affording your child’s medication  
☐ Transportation problems (not able to get to doctor’s appointments or the pharmacy)  
☐ Housing

D1a. Do you currently own or rent your property?  
☐ Own  ☐ Rent

D2. Do you feel that the basic needs of your family are currently being met?  
☐ Yes  ☐ No

D3. Are you currently feeling more stressed than usual?  
☐ Yes  ☐ No

D4. Do you have any concerns about how you have been coping with things during the past few months?  
☐ Yes  ☐ No  Comments:  ____________________________________________________________

For questions D5 – E2 please indicate the level to which you agree or disagree with the statement

D5. I have little control over my child’s asthma.  
☐ Strongly agree  ☐ Agree  ☐ No opinion  ☐ Disagree  ☐ Strongly disagree

D6. I often feel helpless in dealing with my child’s asthma.

Based upon the Child Asthma Risk Assessment Tool (CARAT) developed by the National Cooperative Inner-City Asthma Study, June 2008
Section E: Education and Adherence

E1. It is possible to control my child’s asthma so he/she can play like other children.
   - [ ] Strongly agree 
   - [ ] Agree 
   - [ ] No opinion 
   - [ ] Disagree 
   - [ ] Strongly disagree

E2. It is possible to manage my child’s asthma so he/she is free of symptoms.
   - [ ] Strongly agree 
   - [ ] Agree 
   - [ ] No opinion 
   - [ ] Disagree 
   - [ ] Strongly disagree

E3. Have you ever run out of medication during an asthma attack?  
   - [ ] Yes  
   - [ ] No

   E3a. If yes, what was the reason?
   - [ ] Medicine was expired 
   - [ ] We weren’t at home and didn’t have an inhaler with us 
   - [ ] Unable to get a prior refill 
   - [ ] Other: ____________________________

E4. Is your child responsible for taking his/her medication without your help?  
   - [ ] Yes  
   - [ ] No

E5. On a scale of 1 to 5, how many problems do you usually face when trying to be sure your child takes his/her medication?
   - [ ] 1  
   - [ ] 2  
   - [ ] 3  
   - [ ] 4  
   - [ ] 5  

   A lot of problems

   Comments: __________________________________________________________________________

E6. On a scale of 1 to 5, how would you rate your child’s experience with taking his/her medication exactly on schedule?
   - [ ] 1  
   - [ ] 2  
   - [ ] 3  
   - [ ] 4  
   - [ ] 5  

   Often misses a dose

   Comments: __________________________________________________________________________
Welcome to the CARAT website.

The CARAT is a Child Asthma Risk Assessment Tool designed to help clinicians, asthma counselors and parents determine potential risks for children with asthma. Asthma is a chronic disease with multiple risk factors and causes; recent research has shown that the factors responsible for asthma symptoms and attacks can vary widely from child to child.

The 'Risk Profile' section offers the risk assessment tool that is designed to rapidly provide a personal risk profile for a child with asthma. This tool looks at a variety of potential risks for a child and then reports only those factors affecting that child. Discover what factors affect your child’s asthma by completing the risk profile.

The remainder of the CARAT website provides details on what asthma is, what causes asthma symptoms, and what can be done to reduce exposure to these asthma triggers. It is here that you can learn more about the specific factors affecting your child's asthma that were highlighted in the risk profile.

**What is Asthma?**

Asthma is the most common chronic disease among children in the United States. Learn the facts about childhood asthma.

**Asthma Risk Factors**

Allergies, tobacco smoke, medications, attitudes, and the environment all affect asthma. Understand how these and other factors can trigger asthma symptoms and what you can do to lower the risk.

**Risk Profile**

Complete a survey and immediately review the results to discover what factors affect YOUR child's asthma.

**NIAID Asthma Studies**

The National Institute of Allergy and Infectious Diseases conducts many asthma research studies. Find out more about this research and its findings.
Asthma Resources
Find out more about asthma from these helpful websites.

Frequently Asked Questions
Read the answers to commonly asked questions.

CARAT - Child Asthma Risk Assessment Tool
Home | Top | Glossary | Help | Privacy Statement
Local Pharmacy Partnership to Prevent Pediatric Asthma Reutilization in a Satellite Hospital

Hadley S. Sauers-Ford, MPH, a Jennifer L. Moore, MSN, b Amy B. Guiot, MD, a Blair E. Simpson, MD, a Caitlin R. Clohessy, BA, c David Yost, RPh, c David C. Mayhaus, PharmD, MSc, b Jeffrey M. Simmons, MD, MSc, b Craig H. Gosdin, MD, MSHA a

OBJECTIVES: In our previous work, providing medications in-hand at discharge was a key strategy to reduce asthma reutilization (readmissions and emergency revisits) among children in a large, urban county. We sought to spread this work to our satellite hospital in an adjacent county. A key initial barrier was the lack of an outpatient pharmacy on site, so we sought to determine if a partnership with community pharmacies could improve the percentage of patients with medications in-hand at discharge, thus decreasing reutilization.

METHODS: A multidisciplinary team partnered with community pharmacies. Using rapid-cycle improvement methods, the team aimed to reduce asthma reutilization by providing medications in-hand at discharge. Run charts were used to display the proportion of patients with asthma discharged with medications in-hand and to track 90-day reutilization rates.

RESULTS: During the intervention period, the median percentage of patients with asthma who received medications in-hand increased from 0% to 82%. A key intervention was the expansion of the medication in-hand program to all patients. Additional changes included expanding team to evening stakeholders, narrowing the number of community partners, and building electronic tools to support key processes. The mean percentage of patients with asthma discharged from the satellite who had a readmission or emergency department revisit within 90 days of their index admission decreased from 18% to 11%.

CONCLUSIONS: Impacting population-level asthma outcomes requires partnerships between community resources and health providers. When hospital resources are limited, community pharmacies are a potential partner, and providing access to medications in-hand at hospital discharge can reduce asthma reutilization.
to discharge patients with asthma with their medications in-hand.\textsuperscript{3}

In 2008, Cincinnati Children’s Hospital Medical Center (CCHMC) began an asthma-improvement initiative focusing on reducing 30-day and 90-day reutilization, defined as readmissions or revisits to the ED for asthma after an index asthma admission for Medicaid patients from our primary service county, Hamilton County. The medications in-hand intervention was a critical piece of the initiative and had 2 main components: relabeling the inhalers (rescue and controller) the patient used during admission for home use, and using our institution’s outpatient pharmacy to fill the patient’s oral steroid, rescue inhaler, and controller medication prescriptions.\textsuperscript{3} From 2007 to 2013, a median of 86% of patients left with relabeled inhalers, and 71% left with their oral steroid medication in-hand. The asthma 30-day reutilization rate from the county Medicaid population was reduced from 11.1% to 5.4%.\textsuperscript{3} This work originally focused on Medicaid patients, then expanded to include all patients discharged after an asthma exacerbation, including those from our 8-county primary service area.

CCHMC opened a satellite facility, Liberty Campus, in the northern Cincinnati suburbs in August 2008. Although discharged patients could receive their relabeled inhalers at this satellite facility, no outpatient pharmacy existed on site to fill the oral steroids or inhalers. Initial efforts at establishing medications in-hand at discharge from Liberty Campus included relabeling inhalers and encouraging families to fill their prescriptions at nearby pharmacies before discharge. However, interim analysis of 30- and 90-day readmission outcomes from our 8-county service area revealed we had not yet improved outcomes for children from the second most populous county, Butler County, where the Liberty Campus is located. Further, most asthma discharges among children living in Butler County were from the Liberty Campus. With guidance from our CCHMC outpatient pharmacy colleagues, we worked to form a partnership with 2 local, family-owned pharmacies located near the satellite facility with existing home medication delivery programs. After feedback from families and primary care providers, we planned to build a process to deliver discharge medications directly to patients at our satellite facility before discharge.

With a global aim of decreasing 90-day reutilization, beginning in August 2013, the specific aim of this study was to increase the percentage of patients with asthma admitted to the satellite facility who receive medication delivery from 0% to 80% by December 2014.

### METHODS

#### Setting

CCHMC’s Liberty Campus, a satellite facility of CCHMC’s Burnet Campus, is a 12-bed, suburban hospital located in Butler County, OH, with an on-site ED, approximately 40 surgeries per day, many multispecialty outpatient clinics, but no ICU or outpatient pharmacy. The Hospital Medicine (HM) Service admits ~800 pediatric medical patients per year to Liberty compared with about 5000 HM pediatric admissions per year at the base Burnet Campus. Patients at the Liberty Campus differ significantly from patients at the Burnet Campus with respect to race, insurance, and age (Table 1). Typically, the Liberty Campus inpatient unit is staffed by an HM provider, with intermittent resident or medical student presence. During most of this study period, ~40% of weekend shifts were staffed by non-HM moonlighters.

<table>
<thead>
<tr>
<th>Race</th>
<th>Liberty % (n)</th>
<th>Burnet % (n)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caucasian</td>
<td>72.1 (670)</td>
<td>61.4 (3184)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>African American</td>
<td>11.0 (102)</td>
<td>27.9 (1448)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>16.9 (157)</td>
<td>10.7 (554)</td>
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<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Male</td>
<td>55.8 (518)</td>
<td>52.5 (2722)</td>
<td>0.075</td>
</tr>
<tr>
<td>Female</td>
<td>44.2 (411)</td>
<td>47.5 (2462)</td>
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<tr>
<td>Insurance</td>
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<tr>
<td>Public</td>
<td>52.9 (553)</td>
<td>65.7 (3405)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Private</td>
<td>44.8 (355)</td>
<td>32.1 (1665)</td>
<td></td>
</tr>
<tr>
<td>Self-pay</td>
<td>2.3 (21)</td>
<td>2.2 (116)</td>
<td></td>
</tr>
<tr>
<td>Age, y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>2.37</td>
<td>3.05</td>
<td>0.003</td>
</tr>
<tr>
<td>Interquartile range</td>
<td>0.5–7.8</td>
<td>0.6–10.1</td>
<td></td>
</tr>
</tbody>
</table>

### Planning the Intervention

Because Liberty Campus did not have an outpatient pharmacy on site to provide medications in-hand to discharged patients, a strong partnership with local pharmacies was necessary to provide this service. We had kickoff phone calls with 2 local pharmacies chosen due to close proximity to the satellite facility and preexistence of home delivery programs. On the kickoff call, we explained our goals for the program, discussed ways to facilitate communication regarding the program, and designed initial tests to share insurance information needed to fill prescriptions for eligible patients. The improvement team, consisting of a project manager, nurse manager, 2 physicians, and a floor nurse, met weekly to discuss tests of change and program feedback.
Evaluation

Eligible patients for the program were identified by weekly census lists for the unit, with patients with asthma eligible if they were discharged on the asthma care pathway. The nurse manager collected data on success rate from nurse process stickers and the electronic medical record (EMR). Before the beginning of the intervention, the patients included in the reutilization data were taken from system-wide data, which only included patients between 2 and 18 years old. Once we began the intervention, we began tracking reutilization outcomes for all patients included in the medication delivery program.

Analysis

Two primary methods were used for evaluation of the ongoing performance of the program. The percentage of patients with asthma receiving medication delivery was shown on a monthly run chart. Run charts display data in a timed sequence to help detect special causes of variation. Special cause is reached when there are 8 points above or below the median line. Finally, weekly phone calls were used for qualitative feedback from the improvement team, to assess success of tests and plan for next steps. Three main outcomes were tracked: the percentage of patients with asthma who received their medications in-hand, the percentage of patients with asthma discharged from the satellite who had an asthma reutilization (at a CCHMC hospital, ED, or urgent care) 90 days after an index admission, and finally, the percentage of patients discharged within 2 hours of meeting medically ready criteria, used as a balancing measure. Our institution has been working on improving discharge efficiency since 2012, by tracking when patients meet medically ready criteria and assessing if patients are discharged within 2 hours of meeting that goal. One of their primary failure reasons was due to medications/pharmacy, so efforts were made to ensure our medication delivery program did not delay discharge.

Human Subject Protection

The CCHMC institutional review board reviewed the project and considered it to be a local quality improvement (QI) initiative and not research involving human subjects. Informed consent beyond the standard consent for treatment of all inpatients was not required.

RESULTS

The median percentage of patients with asthma who received medication delivery increased from 0% to 82% by December 2014 (Fig 1). The mean percentage of patients with asthma discharged from the satellite who had a readmission or ED revisit within 90 days of their index admission decreased from 18% to 11% (Fig 2). During the study period, the median percentage of patients discharged within 2 hours of meeting medically ready criteria ranged from 88% to 95%, although only 2 patients (2% of all failures) had delayed discharge due to medications.

The improvement team, consisting of a project manager, nurse manager, 2 physicians, and a floor nurse, met weekly to discuss tests of change and program feedback. Early on, the team identified providers forgetting or being confused about the program as the main reason for failure, especially with the high number of weekend moonlighters. The team believed that if we expanded the program to all conditions, we would increase reliability for patients with asthma. We worked with our local pharmacy colleagues, as well as Liberty staff and providers to determine a spread plan, and expanded the program to all conditions in April 2014. Although the median of patients with asthma who received their medications in-hand had already begun to increase, it was stabilized at or above 80% after the program expansion (Fig 1). We also tracked the median percentage of all eligible patients who received medication delivery, and it was 64% in December 2014. After the program expanded to
all conditions, the 90-day asthma reutilization rate mean decreased to 11%. We believe this is likely due to increased reliability for patients with asthma.

To better engage the night staff and further educate the providers at the Liberty Campus regarding the expansion of this program, the team was expanded to include the unit medical director, 2 evening nurses, the evening unit clerk, and 2 additional physicians. The night staff in particular was essential to the team, because often they started the process on admission. We tested having the admitting nurse complete the demographic form containing weight, allergy, and insurance information for all patients on admission, which allowed for necessary information to be sent to the delivery pharmacy as soon as medications were decided. This test improved the process, increased reliability, and was adopted.

There were a few interventions that used the EMR. We added a reminder about the medication delivery program to the Liberty-specific Asthma History and Physical Admission Note template. This document was used previously in our institution to increase referrals to a community program.6, 7 By reminding the physicians on admission, it ensured that the process started early in the patient’s stay. A reminder was also built into the EMR-based attending handoff tool. Finally, the staff began documenting the process in the EMR. This let all providers and staff know if the family had elected to use the medication delivery program, if the prescriptions had been sent, and if they had been delivered to the family. A description of the remaining tests can be found in Table 2.

Shortly after the initial phase, CCHMC decided to select 1 community pharmacy to continue with. This community pharmacy was willing...
to deliver medications at any time during their delivery hours (even if it was just 1 medication), offered to reformulate medications for specific patients (ie, making a liquid formulation, cutting pills for ease of use), and engaged in communication with the study team.

**DISCUSSION**

By leveraging an existing community resource to provide a service that was lacking at a satellite hospital, we were able to parallel a service that had shown success at an urban, academic pediatric hospital. We were able to increase the percentage of patients discharged with their medications in-hand, which was associated with a reduction in the percentage of patients with asthma with a 90-day reutilization. Although we showed limited success when this work was just focused on patients with asthma, \(^5\) once we expanded our eligibility criteria to all patients being discharged with medications, we were able to increase awareness and adherence to the programs by staff and physicians. Our primary reason for expansion to all patients was to increase reliability and improve outcomes; however, there was also strong willingness from staff, providers, and our pharmacy partners to offer this service to all patients.

The involvement of other key stakeholders, such as front-line nurses, unit clerks, nurse managers, hospitalists, and hospitalist leadership, was also instrumental to our success. They led each testing cycle and provided weekly feedback on what needed adoption and what needed to be abandoned. Staff input is known to be highly valuable in the use of QI in the health care setting, as many QI projects involve active participation and buy-in from a multidisciplinary staff.\(^8\)\(^-\)\(^10\) By engaging night staff when we expanded the program to all patients, we were able to begin the process on admission. During the asthma-only phase of the program, we were relying primarily on the daytime staff, which caused us to miss patients who were admitted late in the day and ready to be discharged the following day. As the night staff began discussing the program with families on admission, and completing the demographic form to be sent to the pharmacy after they agreed, we were using the most appropriate staff to complete necessary steps of the process.

By engineering key interventions into the EMR, such as the reminders in the Liberty-specific Asthma History and Physical Admission Note template and the attending handoff, as well as documentation of the process in the nursing notes, we were able to increase the reliability of the process. Increased reliability due to utilization of the EMR has been shown in both the inpatient setting\(^6\)\(^,\)\(^7\)\(^,\)\(^11\) and the outpatient setting.\(^12\)\(^-\)\(^14\) Although the prescriptions themselves were also sent through the EMR, limitations of that system still required staff to send the demographic form, containing relevant demographic information, such as weight and allergies, as well as the patient’s insurance information, via fax. As the process of e-prescribing expands, there may be further efficiency gains.

Other studies have shown success leveraging community partnerships in unique ways\(^7\)\(^,\)\(^15\)\(^,\)\(^16\) although to our knowledge no previous study has partnered with a community pharmacy to ensure that patients are discharged with their medications in-hand. Having an engaged community partner in one pharmacy was essential to our success. The study team communicated with the owner frequently to discuss challenges, potential interventions, and study progress. The pharmacy team showed incredible flexibility and willingness to help our patient population.

Along with an active pharmacy partner, buy-in from other key stakeholders was important. Early staff and provider adopters were essential to getting the program started. Throughout the project, by focusing our efforts on patients willing and able to use the program, as opposed to expending effort on families ineligible for the program due to insurance reasons or unwilling to participate, we were able to increase staff buy-in. Family participation and buy-in are also essential, and overall qualitative feedback solicited from families was positive.

This study was not without limitations. It was conducted at 1 satellite hospital of a larger, academic institution, where a robust culture of QI exists. The local pharmacies we chose had existing home medication delivery programs, so this program was an expansion of their existing process and not a new program. Although we started with 2 local pharmacies, we eventually chose to focus on the partnership with the one that had been an active member of the improvement process. Previous work has shown that there are likely willing partners in many communities and identifying them is the first step to success.

**CONCLUSIONS**

Impacting population-level asthma outcomes requires partnerships between community resources and health providers. We were able to mirror a process from our main hospital of ensuring patients have medications in-hand before discharge at a satellite hospital by partnering with local pharmacies. Providing access to medications
in-hand at hospital discharge may reduce reutilization for children with asthma. Community pharmacy partnerships have strong potential, as providers and health systems are increasingly held accountable for population health outcomes.

ACKNOWLEDGMENTS
We thank the members of our improvement team: Michael Faller, Claudia Lares, Shawna McKinney, Julie Mullaney, and Elizabeth Wright. We could not have succeeded with this work without the staff and providers at the Liberty Campus. We thank Dr Andrew Beck for his statistical assistance, Ms Allison Loechtenfeldt for her data assistance, and Dr Patrick Brady for reviewing the revised manuscript. Preliminary data from this work was presented at the Pediatric Hospital Medicine Conference, July 25, 2014 (Orlando).

REFERENCES
2. Lee JK, Grace KA, Taylor AJ. Effect of a pharmacy care program on medication adherence and persistence, blood pressure, and low-density lipoprotein cholesterol: a randomized controlled trial. JAMA. 2006;296(21):2563–2571

ABBREVIATIONS
CCHMC: Cincinnati Children’s Hospital Medical Center
ED: emergency department
EMR: electronic medical record
HM: Hospital Medicine
QI: quality improvement

FINANCIAL DISCLOSURE: Mr Yost is the owner of Yost Pharmacy. The other authors have indicated they have no financial relationships relevant to this article to disclose.

FUNDING: No external funding.

POTENTIAL CONFLICT OF INTEREST: Mr Yost is the owner of Yost Pharmacy. The other authors have indicated they have no potential conflicts of interest to disclose.
Local Pharmacy Partnership to Prevent Pediatric Asthma Reutilization in a Satellite Hospital
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Pediatrics 2016;137; originally published online March 16, 2016; DOI: 10.1542/peds.2015-0039

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*Pediatrics* 2016;137; originally published online March 16, 2016; DOI: 10.1542/peds.2015-0039

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/content/137/4/e20150039.full.html
Tobacco Coding Fact Sheet for Primary Care Pediatrics


Physician Evaluation & Management Services

Outpatient

99201  Office or other outpatient visit, new patient; self limited or minor problem, 10 min.
99202  low to moderate severity problem, 20 min.
99203  moderate severity problem, 30 min.
99204  moderate to high severity problem, 45 min.
99205  high severity problem, 60 min.

A new patient is one who has not received any professional face-to-face services rendered by physicians and other qualified health care professionals who may report evaluation and management services reported by a specific CPT code(s) from the physician/qualified health care professional or another physician/qualified health care professional of the exact same specialty and subspecialty who belongs to the same group practice, within the past three years.

99211  Office or other outpatient visit, established patient; minimal problem, 5 min.
99212  self limited or minor problem, 10 min.
99213  low to moderate severity problem, 15 min.
99214  moderate severity problem, 25 min.
99215  moderate to high severity problem, 40 min.

+99354 Prolonged physician services in office or other outpatient setting, with direct patient contact; first hour (use in conjunction with time-based codes 99201-99215, 99241-99245, 99301-99350)
+99355 each additional 30 min. (use in conjunction with 99354)

• Used when a physician provides prolonged services beyond the usual service (ie, beyond the typical time).
• Time spent does not have to be continuous.
• Prolonged service of less than 15 minutes beyond the first hour or less than 15 minutes beyond the final 30 minutes is not reported separately.

99406 Smoking and tobacco use cessation counseling visit; intermediate, greater than 3 minutes up to 10 minutes
99407 intensive, greater than 10 minutes

Codes 99406-99407 can only be reported under the person being counseled. The codes cannot be reported under the pediatric patient if a parent or guardian is counseled on smoking cessation. Time spent counseling the parent or guardian falls under the E/M service time unless billing under the parent or guardian’s name and ID.

99420 Administration and interpretation of health risk assessment instruments

Inpatient

99238  Hospital discharge day management; 30 min.
99239  more than 30 min.

+ Codes are add-on codes, meaning they are reported separately in addition to the appropriate code for the service provided


*To find your state’s quitline fax referral form, visit http://www2.massgeneral.org/ceasetobacco/states.htm
- Indicates that an additional character is required for the ICD-10-CM code
Initial hospital care, per day: admitting problem of low severity, 30 min.
admitting problem of moderate severity, 50 min.
admitting problem of high severity, 70 min.

Subsequent hospital care, per day, also used for follow-up inpatient consultation services; patient is stable, recovering or improving, 15 min.
patient is responding inadequately to therapy or has developed minor complication, 25 min.
patient is unstable or has developed a significant complication or new problem, 35 min.

Initial observation care, per day: admitting problem of low severity, 30 min,
admitting problem of moderate severity, 50 min,
admitting problem of high severity, 70 min.

Subsequent observation care, per day: patient is stable, recovering or improving, 15 min.
patient is responding inadequately to therapy or has developed a minor complication, 25 min.
patient is unstable or has developed a significant new problem, 35 min.

Normal newborn care: Initial Day
Subsequent day, per day
Same Day Admit and Discharge

Prolonged services in the inpatient/observation setting; first hour (use in conjunction with time-based codes 99221-99223, 99218-99220, 99224-99226)
each additional 30 min. (use in conjunction with 99356)

Reporting E/M services using “Time”
• Only pertains to E/M codes with a typical time. For purposes of this fact sheet, this refers only to codes 99201-99215, 99218-99220, 99221-99226, 99231-99233).

• When counseling or coordination of care dominates (more than 50%) the physician/patient or family encounter (face-to-face time in the office or other outpatient setting or floor/unit time in the hospital or nursing facility), then time shall be considered the key or controlling factor to qualify for a particular level of E/M services.

• This includes time spent with parties who have assumed responsibility for the care of the patient or decision making whether or not they are family members (eg, foster parents, person acting in loco parentis, legal guardian). The extent of counseling and/or coordination of care must be documented in the medical record.

• For coding purposes, face-to-face time for outpatient services (eg, office) is defined as only that time that the physician spends face-to-face with the patient and/or family. This includes the time in which the physician performs such tasks as obtaining a history, performing an examination, and counseling the patient. For reporting purposes, intraservice time for inpatient (eg, hospital care) services is defined as unit/floor time, which includes the time present on the patient’s hospital unit and at the bedside rendering services for that patient. This includes the time to establish and/or review the patient’s chart, examine the patient, write notes, and communicate with other professionals and the patient’s family. In the hospital, pre- and post-time includes time spent off the patient’s floor performing such tasks as reviewing pathology and radiology findings in another part of the hospital.

+ Codes are add-on codes, meaning they are reported separately in addition to the appropriate code for the service provided

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When codes are ranked in sequential typical times (such as for the office-based E/M services or consultation codes) and the actual time is between 2 typical times, the code with the typical time closest to the actual time is used.

Prolonged services can only be added to codes with listed typical times such as the ones listed above. In order to report physician or other qualified health care professional prolonged services the reporting provider must spend a minimum of 30 minutes beyond the typical time listed in the code level being reported. When reporting outpatient prolonged services only count face-to-face time with the reporting provider. When reporting inpatient or observation prolonged services you can count face-to-face time, as well as unit/floor time spent on the patient’s care. However, if the reporting provider is reporting their service based on time (ie, counseling/coordinating care dominate) and not key components, then prolonged services cannot be reported unless the provider reaches 30 minutes beyond the listed typical time in the highest code in the set (eg, 99205, 99226, 99223). It is important that time is clearly noted in the patient’s chart. For clinical staff prolonged services refer to CPT codes 99415-99416 in the CPT manual.

**Physician Non-Face-to-Face Services**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>99339</td>
<td>Care Plan Oversight Individual physician supervision of a patient (patient not present) in home, domiciliary or rest home (e.g., assisted living facility) requiring complex and multidisciplinary care modalities involving regular physician development and/or revision of care plans, review of subsequent reports of patient status, review of related laboratory and other studies, communication (including telephone calls) for purposes of assessment or care decisions with health care professional(s), family member(s), surrogate decision maker(s) (e.g., legal guardian) and/or key caregiver(s) involved in patient’s care, integration of new information into the medical treatment plan and/or adjustment of medical therapy, within a calendar month; 15-29 minutes</td>
</tr>
<tr>
<td>99340</td>
<td>30 minutes or more</td>
</tr>
<tr>
<td>99358</td>
<td>Prolonged physician services without direct patient contact; first hour Note: This code is no longer an “add-on” service and can be reported alone.</td>
</tr>
<tr>
<td>+99359</td>
<td>each additional 30 min. (use in conjunction with 99358)</td>
</tr>
<tr>
<td>99367</td>
<td>Medical team conference by physician with interdisciplinary team of healthcare professionals, patient and/or family not present, 30 minutes or more</td>
</tr>
<tr>
<td>99441</td>
<td>Telephone evaluation and management to patient, parent or guardian not originating from a related E/M service within the previous 7 days nor leading to an E/M service or procedure within the next 24 hours or soonest available appointment; 5-10 minutes of medical discussion</td>
</tr>
<tr>
<td>99442</td>
<td>11-20 minutes of medical discussion</td>
</tr>
<tr>
<td>99443</td>
<td>21-30 minutes of medical discussion</td>
</tr>
<tr>
<td>99444</td>
<td>Online evaluation and management service provided by a physician or other qualified health care professional who may report evaluation and management services provided to an established patient or guardian, not originating from a related E/M service provided within the previous 7 days, using the internet or similar electronic communications network</td>
</tr>
</tbody>
</table>

+ Codes are add-on codes, meaning they are reported separately in addition to the appropriate code for the service provided


*To find your state’s quitline fax referral form, visit [http://www2.massgeneral.org/ceasetobacco/states.htm](http://www2.massgeneral.org/ceasetobacco/states.htm)

- Indicates that an additional character is required for the ICD-10-CM code
Care Management and Transition Care Management Services:
Care management and transition care management are reported under the directing physician or other qualified health care professional, however, the time requirement can be met by clinical staff working under the direction of the reporting physician or other qualified health care professional.

Care Management codes are selected based on the amount of time spent by clinical staff providing care coordination activities. CPT clearly defines what is defined as care coordination activities. In order to report chronic care or complex chronic care management codes, you must
1. provide 24/7 access to physicians or other qualified health care professionals or clinical staff;
2. use a standardized methodology to identify patients who require chronic complex care coordination services
3. have an internal care coordination process/function whereby a patient identified as meeting the requirements for these services starts receiving them in a timely manner
4. use a form and format in the medical record that is standardized within the practice
5. be able to engage and educate patients and caregivers as well as coordinate care among all service professionals, as appropriate for each patient.

99490 Chronic care management services, at least 20 minutes of clinical staff time directed by a physician or other qualified health care professional, per calendar month, with the following required elements:
• multiple (two or more) chronic conditions expected to last at least 12 months, or until the death of the patient;
• chronic conditions place the patient at significant risk of death, acute exacerbation/decompensation, or functional decline;
• comprehensive care plan established, implemented, revised, or monitored.
Do not report 99490 for chronic care management services that do not take a minimum of 20 minutes in a calendar month.

99487 Complex chronic care management services; first hour of clinical staff time directed by a physician or other qualified health care professional with no face-to-face visit, per calendar month
• multiple (two or more) chronic conditions expected to last at least 12 months, or until the death of the patient;
• chronic conditions place the patient at significant risk of death, acute exacerbation/decompensation, or functional decline;
• establishment or substantial revision of a comprehensive care plan;
• moderate or high complexity medical decision making;
• 60 minutes of clinical staff time directed by a physician or other qualified health care professional, per calendar month.
Do not report 99487 for chronic care management services that do not take a minimum of 60 minutes in a calendar month.

99488 first hour of clinical staff time directed by a physician or other qualified health care professional with one face-to-face visit, per calendar month
+99489 each additional 30 minutes of clinical staff time directed by a physician or other qualified health care professional, per calendar month

Complex chronic care management services are is reported by the physician or qualified health care professional who provides or oversees the management and coordination of all of the medical, psychosocial, and daily living needs of a patient with a chronic medical condition. Typical pediatric patients
1. receive three or more therapeutic interventions (eg, medications, nutritional support, respiratory therapy)
2. have two or more chronic continuous or episodic health conditions expected to last at least 12 months (or until death of the patient) and places the patient at significant risk of death, acute exacerbation or decompensation, or functional decline.

3. commonly require the coordination of a number of specialties and services.

99495 **Transitional care management (TCM) services** with the following required elements:
   - Communication (direct contact, telephone, electronic) with the patient and/or caregiver within 2 business days of discharge
   - Medical decision-making of at least moderate complexity during the service period
   - Face-to-face visit, within 14 calendar days of discharge

99496 **Transitional care management services** with the following required elements:
   - Communication (direct contact, telephone, electronic) with the patient and/or caregiver within 2 business days of discharge
   - Medical decision-making of high complexity during the service period
   - Face-to-face visit, within 7 calendar days of discharge

These services are for a patient whose medical and/or psychosocial problems require moderate or high complexity medical decision-making during transitions in care from an inpatient hospital setting (including acute hospital, rehabilitation hospital, long-term acute care hospital), partial hospital, observation status in a hospital, or skilled nursing facility/nursing facility to the patient’s community setting (home, domiciliary, rest home, or assisted living). TCM commences on the date of discharge and continues for the next 29 days and requires a face-to-face visit, initial patient contact, and medication reconciliation within specified timeframes. Any additional E/M services provided after the initial may be reported separately.

Refer to the CPT manual for complete details on reporting chronic care management and TCM services.

**Non-Physician Provider (NPP) Services**

99366 **Medical team conference** with interdisciplinary team of healthcare professionals, face-to-face with patient and/or family, 30 minutes or more, participation by a nonphysician qualified healthcare professional

99368 **Medical team conference** with interdisciplinary team of healthcare professionals, patient and/or family not present, 30 minutes or more, participation by a nonphysician qualified healthcare professional

96150 **Health and behavior assessment** performed by nonphysician provider (health-focused clinical interviews, behavior observations) to identify psychological, behavioral, emotional, cognitive or social factors important to management of physical health problems, 15 min., initial assessment

96151 re-assessment

96152 **Health and behavior intervention** performed by nonphysician provider to improve patient’s health and well-being using cognitive, behavioral, social, and/or psychophysiological procedures designed to ameliorate specific disease-related problems), individual, 15 min.

96153 group (2 or more patients) 96154 family (with the patient present)

96155 family (without the patient present)

+ Codes are add-on codes, meaning they are reported separately in addition to the appropriate code for the service provided


*To find your state’s quitline fax referral form, visit http://www2.massgeneral.org/ceasetobacco/states.htm

- Indicates that an additional character is required for the ICD-10-CM code
Non-Face-to-Face Services: NPP

98966 Telephone assessment and management service provided by a qualified nonphysician healthcare professional to an established patient, parent or guardian not originating from a related assessment and management service provided within the previous seven days nor leading to an assessment and management service or procedure within the next 24 hours or soonest available appointment; 5-10 minutes of medical discussion

98967 11-20 minutes of medical discussion

98968 21-20 minutes of medical discussion

98969 Online assessment and management service provided by a qualified nonphysician healthcare professional to an established patient or guardian, not originating from a related assessment and management service provided within the previous seven days nor using the internet or similar electronic communications network

Miscellaneous Services

99071 Educational supplies, such as books, tapes or pamphlets, provided by the physician for the patient’s education at cost to the physician

International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM) Codes

- Use as many diagnosis codes that apply to document the patient’s complexity and report the patient’s symptoms and/or adverse environmental circumstances.
- Once a definitive diagnosis is established, report the appropriate definitive diagnosis code(s) as the primary code, plus any other symptoms that the patient is exhibiting as secondary diagnoses that are not part of the usual disease course or are considered incidental.
- ICD-10-CM codes are only valid on or after October 1, 2015. Respiratory Conditions

J06.9 Acute upper respiratory infection, unspecified

For J44 codes
Code also type of asthma, if applicable (J45.-)

For J44 and J45 codes use additional code to identify: exposure to environmental tobacco smoke (Z77.22) history of tobacco use (Z87.891) occupational exposure to environmental tobacco smoke (Z57.31) tobacco dependence (F17.-) tobacco use (Z72.0)

J44.0 Chronic obstructive pulmonary disease with acute lower respiratory infection (use additional code to identify the infection)

J44.1 Chronic obstructive pulmonary disease with (acute) exacerbation

J44.9 Chronic obstructive pulmonary disease, unspecified (Chronic obstructive airway disease NOS)

J45.20 Mild intermittent asthma, uncomplicated (NOS)

J45.21 Mild intermittent asthma with (acute) exacerbation

J45.22 Mild intermittent asthma with status asthmaticus

J45.30 Mild persistent asthma, uncomplicated (NOS)

J45.31 Mild persistent asthma with (acute) exacerbation

J45.32 Mild persistent asthma with status asthmaticus

J45.40 Moderate persistent asthma, uncomplicated (NOS)

J45.41 Moderate persistent asthma with (acute) exacerbation

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- Indicates that an additional character is required for the ICD-10-CM code
J45.42  Moderate persistent asthma with status asthmaticus
J45.50  Severe persistent asthma, uncomplicated (NOS)
J45.51  Severe persistent asthma with (acute) exacerbation
J45.52  Severe persistent asthma with status asthmaticus
J45.901 Unspecified asthma with (acute) exacerbation
J45.902 Unspecified asthma with status asthmaticus
J45.909 Unspecified asthma, uncomplicated (NOS)
J45.990 Exercise induced bronchospasm
J45.991 Cough variant asthma
J45.998 Other asthma
R06.02  Shortness of breath
R06.2   Wheezing

Substance-Related and Addictive Disorders:
If a provider documents multiple patterns of use, only one should be reported. Use the following hierarchy: use—abuse—dependence (eg, if use and dependence are documented, only code for dependence).

When a minus symbol (-) is included in codes F10—F17, a last digit is required. Be sure to include the last digit from the following list:
0 anxiety disorder  2 sleep disorder  8 other disorder  9 unspecified disorder

[C]Alcohol
F10.10  Alcohol abuse, uncomplicated
F10.14  Alcohol abuse with alcohol-induced mood disorder
F10.159 Alcohol abuse with alcohol-induced psychotic disorder, unspecified
F10.18- Alcohol abuse with alcohol-induced
F10.19  Alcohol abuse with unspecified alcohol-induced disorder
F10.20  Alcohol dependence, uncomplicated
F10.21  Alcohol dependence, in remission
F10.24  Alcohol dependence with alcohol-induced mood disorder
F10.259 Alcohol dependence with alcohol-induced psychotic disorder, unspecified
F10.28- Alcohol dependence with alcohol-induced
F10.29  Alcohol dependence with unspecified alcohol-induced disorder
F10.94  Alcohol use, unspecified with alcohol-induced mood disorder
F10.959 Alcohol use, unspecified with alcohol-induced psychotic disorder, unspecified
F10.98- Alcohol use, unspecified with alcohol-induced
F10.99  Alcohol use, unspecified with unspecified alcohol-induced disorder

[C]Cannabis
F12.10  Cannabis abuse, uncomplicated
F12.18- Cannabis abuse with cannabis-induced
F12.19  Cannabis abuse with unspecified cannabis-induced disorder
F12.20  Cannabis dependence, uncomplicated
F12.21  Cannabis dependence, in remission
F12.28- Cannabis dependence with cannabis-induced
F12.29  Cannabis dependence with unspecified cannabis-induced disorder
F12.90  Cannabis use, unspecified, uncomplicated
F12.98- Cannabis use, unspecified with
F12.99  Cannabis use, unspecified with unspecified cannabis-induced disorder

+ Codes are add-on codes, meaning they are reported separately in addition to the appropriate code for the service provided
*To find your state’s quitline fax referral form, visit http://www2.massgeneral.org/ceasetobacco/states.htm
- Indicates that an additional character is required for the ICD-10-CM code
[C]Sedatives
F13.10  Sedative, hypnotic or anxiolytic abuse, uncomplicated
F13.12  Sedative, hypnotic or anxiolytic abuse with intoxication, unspecified
F13.14  Sedative, hypnotic or anxiolytic abuse w sedative, hypnotic or anxiolytic-induced mood disorder
F13.18- Sedative, hypnotic or anxiolytic abuse with sedative, hypnotic or anxiolytic-induced mood disorder
F13.21  Sedative, hypnotic or anxiolytic dependence, in remission
F13.90  Sedative, hypnotic, or anxiolytic use, unspecified, uncomplicated
F13.94  Sedative, hypnotic or anxiolytic use, unspecified with sedative, hypnotic or anxiolytic-induced mood disorder
F13.98- Sedative, hypnotic or anxiolytic use, unspecified with sedative, hypnotic or anxiolytic-induced mood disorder
F13.99  Sedative, hypnotic or anxiolytic use, unspecified with unspecified sedative, hypnotic or anxiolytic-induced disorder

[C]Stimulants (eg, Caffeine, Amphetamines)
F15.10  Other stimulant (amphetamine-related disorders or caffeine) abuse, uncomplicated
F15.14  Other stimulant (amphetamine-related disorders or caffeine) abuse with stimulant-induced mood disorder
F15.18- Other stimulant (amphetamine-related disorders or caffeine) abuse with stimulant-induced mood disorder
F15.19  Other stimulant (amphetamine-related disorders or caffeine) abuse with unspecified stimulant-induced disorder
F15.20  Other stimulant (amphetamine-related disorders or caffeine) dependence, uncomplicated
F15.21  Other stimulant (amphetamine-related disorders or caffeine) dependence, in remission
F15.24  Other stimulant (amphetamine-related disorders or caffeine) dependence with stimulant-induced mood disorder
F15.28- Other stimulant (amphetamine-related disorders or caffeine) dependence with stimulant-induced disorder
F15.29  Other stimulant (amphetamine-related disorders or caffeine) dependence with unspecified stimulant-induced disorder
F15.90  Other stimulant (amphetamine-related disorders or caffeine) use, unspecified, uncomplicated
F15.94  Other stimulant (amphetamine-related disorders or caffeine) use, unspecified with stimulant-induced mood disorder
F15.98- Other stimulant (amphetamine-related disorders or caffeine) use, unspecified with stimulant-induced disorder
F15.99  Other stimulant (amphetamine-related disorders or caffeine) use, unspecified with unspecified stimulant-induced disorder

[C]Nicotine (eg, Cigarettes)
F17.200 Nicotine dependence, unspecified, uncomplicated
F17.201 Nicotine dependence, unspecified, in remission
F17.203 Nicotine dependence unspecified, with withdrawal
F17.20- Nicotine dependence, unspecified, with
F17.210 Nicotine dependence, cigarettes, uncomplicated
F17.211 Nicotine dependence, cigarettes, in remission
F17.213 Nicotine dependence, cigarettes, with withdrawal
F17.218- Nicotine dependence, cigarettes, with

Depressive Disorders
F30- Report for bipolar disorder, single manic episode
F30.10 Manic episode without psychotic symptoms, unspecified
F30.11 Manic episode without psychotic symptoms, mild
F30.12 Manic episode without psychotic symptoms, moderate
F30.13 Manic episode, severe, without psychotic symptoms
F30.2 Manic episode, severe with psychotic symptoms
F30.3 Manic episode in partial remission
F30.4 Manic episode in full remission
F30.8 Other manic episodes
F30.9 Manic episode, unspecified
F31.0 Bipolar disorder, current episode hypomanic
F31.10 Bipolar disorder, current episode manic without psychotic features, unspecified
F31.11 Bipolar disorder, current episode manic without psychotic features, mild
F31.12 Bipolar disorder, current episode manic without psychotic features, moderate
F31.13 Bipolar disorder, current episode manic without psychotic features, severe
F31.2 Bipolar disorder, current episode manic severe with psychotic features
F31.30 Bipolar disorder, current episode depressed, mild or moderate severity, unspecified
F31.31 Bipolar disorder, current episode depressed, mild
F31.32 Bipolar disorder, current episode depressed, moderate
F31.4 Bipolar disorder, current episode depressed, severe, without psychotic features
F31.5 Bipolar disorder, current episode depressed, severe, with psychotic features
F31.60 Bipolar disorder, current episode mixed, unspecified
F31.61 Bipolar disorder, current episode mixed, mild
F31.62 Bipolar disorder, current episode mixed, moderate
F31.63 Bipolar disorder, current episode mixed, severe, without psychotic features
F31.64 Bipolar disorder, current episode mixed, severe, with psychotic features
F31.70 Bipolar disorder, currently in remission, most recent episode unspecified
F31.71 Bipolar disorder, in partial remission, most recent episode hypomanic
F31.72 Bipolar disorder, in full remission, most recent episode hypomanic
F31.73 Bipolar disorder, in partial remission, most recent episode manic
F31.74 Bipolar disorder, in full remission, most recent episode manic
F31.75 Bipolar disorder, in partial remission, most recent episode depressed
F31.76 Bipolar disorder, in full remission, most recent episode depressed
F31.77 Bipolar disorder, in partial remission, most recent episode mixed
F31.78 Bipolar disorder, in full remission, most recent episode mixed
F31.81 Bipolar II disorder
F31.89 Other bipolar disorder (Recurrent manic episodes NOS)
F31.9 Bipolar disorder, unspecified
F34.1 Dysthymic disorder (depressive personality disorder, dysthymia neurotic depression)

Anxiety Disorders
F40.10 Social phobia, unspecified
F40.11 Social phobia, generalized
F40.8 Phobic anxiety disorders, other (phobic anxiety disorder of childhood)
F40.9 Phobic anxiety disorder, unspecified
F41.1 Generalized anxiety disorder

Behavioral/Emotional Disorders
F90.0 Attention-deficit hyperactivity disorder, predominantly inattentive type
F90.1 Attention-deficit hyperactivity disorder, predominantly hyperactive type
F90.8 Attention-deficit hyperactivity disorder, other type
F90.9 Attention-deficit hyperactivity disorder, unspecified type

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- Indicates that an additional character is required for the ICD-10-CM code
F91.1  Conduct disorder, childhood-onset type  
F91.2  Conduct disorder, adolescent-onset type  
F91.3  Oppositional defiant disorder  
F91.9  Conduct disorder, unspecified  

**Neurodevelopmental/Other Developmental Disorders**  
F81.0  Specific reading disorder  
F81.2  Mathematics disorder  
F81.89  Other developmental disorders of scholastic skills  
F81.9  Developmental disorder of scholastic skills, unspecified  

**Other**  
R45.851  Suicidal ideations  
R48.0  Alexia/dyslexia, NOS  

**Poisoning and Adverse Effects**  
For codes T40 – T65 use the following as the 5th or 6th digit to define the poisoning or adverse effect  
Accidental (unintentional)  
Intentional self-harm  
Assault  
Undetermined  
Adverse effect  

Codes T40 – T65 require a 7th digit to define the encounter.  
A  Initial encounter  
D  Subsequent encounter  
S  Sequela  

T40.0X-  Opium  
T40.1X-  Heroin  
T40.2X-  Opioids (other)  
T40.3X-  Methadone  
T40.5X-  Cocaine  
T40.60-  Narcotics, unspecified  
T40.7X-  Cannabis (derivatives)  
T40.8X-  Lysergide (LSD)  
T40.90-  Hallucinogens, unspecified  
T42.3X-  Barbiturates  
T42.7-  Sedative-hypnotics, unspecified (need to add a 6th digit placeholder X)  
T43.60-  Psychostimulants, unspecified  
T43.9-  Psychotropic drugs, unspecified (need to add a 6th digit placeholder X)  
T65.22-  Toxic effect of tobacco cigarettes  

**Z Codes**  
Z codes represent reasons for encounters. Categories Z00–Z99 are provided for occasions when circumstances other than a disease, injury, or external cause classifiable to categories A00–Y89 are recorded as 'diagnoses' or 'problems'. This can arise in 2 main ways:  
(a) When a person who may or may not be sick encounters the health services for some specific purpose, such as to receive limited care or service for a current condition, to donate an organ or tissue, to receive prophylactic vaccination (immunization), or to discuss a problem is in itself not a disease or injury.  
(b) When some circumstance or problem is present which influences the person's health status but is not in itself a current illness or injury.  

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- Indicates that an additional character is required for the ICD-10-CM code
Z13.89 Encounter for screening for other disorder
Z57.31 Occupational exposure to environmental tobacco smoke
Z59.5 Extreme poverty
Z59.6 Low income
Z59.7 Insufficient social insurance and welfare support
Z59.8 Other problems related to housing and economic circumstances
Z60.4 Social exclusion and rejection
Z60.8 Other problems related to social environment
Z60.9 Problem related to social environment, unspecified
Z62.0 Inadequate parental supervision and control
Z62.21 Foster care status (child welfare)
Z62.22 Institutional upbringing (child living in orphanage or group home)
Z62.29 Other upbringing away from parents
Z62.6 Inappropriate (excessive) parental pressure
Z62.810 Personal history of physical and sexual abuse in childhood
Z62.811 Personal history of psychological abuse in childhood
Z62.812 Personal history of neglect in childhood
Z62.819 Personal history of unspecified abuse in childhood
Z62.820 Parent–biological child conflict
Z62.821 Parent-adopted child conflict
Z62.822 Parent–foster child conflict
Z63.31 Absence of family member due to military deployment
Z63.32 Other absence of family member
Z63.4 Disappearance and death of family member
Z63.5 Disruption of family by separation and divorce
Z63.8 Other specified problems related to primary support group
Z65.3 Problems related to legal circumstances
Z69.010 Encounter for mental health services for victim of parental child abuse
Z69.020 Encounter for mental health services for victim of non-parental child abuse
Z71.6 Tobacco abuse counseling
Z71.89 Counseling, other specified
Z72.0 Tobacco use
Z73.4 Inadequate social skills, not elsewhere classified
Z77.22 Exposure to environmental tobacco smoke
Z81.1 Family history of alcohol abuse and dependence (conditions classifiable to F10.-)
Z81.2 Family history of tobacco abuse and dependence (conditions classifiable to F17.-)
Z81.3 Family history of other psychoactive substance abuse and dependence (conditions classifiable to F11–F16, F18–F19)
Z81.8 Family history of other mental and behavioral disorders
Z86.69 Personal history of other diseases of the nervous system and sense organs
Z87.891 Personal history of nicotine dependence (tobacco)
Vignettes

Vignette #1
A mother brings her two-year old child (established patient) in for a well-baby check. In social history, you ask the mother whether she smokes and she admits that she smokes 1 pack a day and has been doing so for the past 10 years. You explain to her that besides the fact that smoking can be detrimental to her health, her child is at increased risk for respiratory problems including asthma, colds, upper respiratory infections and ear infections. You spend 10 minutes face to face explaining to her the serious implications this can have on her child’s health. When the parent shows interest in quitting, you discuss various options for smoking cessation, refer her to the state quitline using a fax referral form*, and give her literature on smoking cessation programs in your area.

How do you code this encounter?

<table>
<thead>
<tr>
<th>CPT</th>
<th>ICD-10-CM</th>
</tr>
</thead>
<tbody>
<tr>
<td>99392</td>
<td>Z00.129 Encounter for routine child health examination without abnormal findings</td>
</tr>
<tr>
<td>1 - 4 years</td>
<td>Z77.22 Exposure to environmental tobacco smoke</td>
</tr>
<tr>
<td></td>
<td>Z81.2 Family history of tobacco abuse and dependence</td>
</tr>
<tr>
<td></td>
<td>Z71.89 Counseling, other specified</td>
</tr>
</tbody>
</table>

Teaching Point: Since you are not counseling the patient, you cannot report the smoking cessation codes 99406-99407. Preventive medicine service codes take into account all preventive medicine counseling. Since the patient is healthy and the smoking cessation counseling is being done to prevent future illness you cannot report a “sick” E/M services based on time spent, in addition to the preventive medicine service.

Vignette #2
A mother brings her 5-year old son in for sudden onset of wheezing. You diagnose an acute exacerbation of his moderate persistent asthma and initiate nebulizer treatment. His mother admits to being a 1.5 pack per day smoker and has tried to quit smoking in the past without success. You explain to the mother that her smoking has contributed to the exacerbation of the asthma. You give her literature on the various options for smoking cessation and explain the various modalities available to her, including local options such as the state quitline*. You then spend 10 additional minutes face to face discussing the relative risks and benefits of each. Overall face-to-face time is 20 minutes. You are at a level 4 office visit given the key components.

How do you code this encounter?

<table>
<thead>
<tr>
<th>CPT</th>
<th>ICD-10-CM</th>
</tr>
</thead>
<tbody>
<tr>
<td>99214 (modifier 25)</td>
<td>J45.41 Moderate persistent asthma with (acute) exacerbation</td>
</tr>
<tr>
<td></td>
<td>Z77.22 Exposure to environmental tobacco smoke</td>
</tr>
<tr>
<td></td>
<td>Z81.2 Family history of tobacco abuse and dependence</td>
</tr>
<tr>
<td></td>
<td>Z71.89 Counseling, other specified</td>
</tr>
<tr>
<td>94640</td>
<td>J45.41 Moderate persistent asthma with (acute) exacerbation</td>
</tr>
</tbody>
</table>

Teaching Point: Unless you are going to bill under the mother’s name to the insurance for the time spent counseling, the time spent would be subsumed under the E/M service for the patient. Since counseling does take up 50% of the total face-to-face time, you can use it to report your E/M service, however, the 20 minutes would only lead you to a 99213. Since your key components support the higher level, report the 99214.

* Codes are add-on codes, meaning they are reported separately in addition to the appropriate code for the service provided


*To find your state’s quitline fax referral form, visit http://www2.massgeneral.org/ceasetobacco/states.htm

- Indicates that an additional character is required for the ICD-10-CM code
Vignette #3
You are evaluating a teenager (16 year-old) that has come for a sports physical examination and yearly check-up. On review of systems, she admits to some shortness of breath on exertion. Direct questioning reveals that she smokes 5-6 cigarettes a day and has also experimented with smokeless tobacco. She began smoking when her parents got divorced as it helped her cope with the depression she was feeling at that time. Since then, she has continued to smoke as she has heard that stopping smoking could cause her to gain weight. She is concerned, however, as she knows that smoking is bad for her health and could cause respiratory problems. You confirm that smoking has been shown to be detrimental to general health, and especially to the respiratory system. You briefly discuss options to assist her in stopping smoking. You then refer her to counseling for the depression as well as smoking cessation. Total time spent on smoking cessation counseling is 5 minutes.

How do you code this encounter?

<table>
<thead>
<tr>
<th>CPT</th>
<th>ICD-10-CM</th>
</tr>
</thead>
<tbody>
<tr>
<td>99394 Preventive Medicine Service; 12-17 years</td>
<td>Z00.121 Encounter for routine child health examination with abnormal findings</td>
</tr>
<tr>
<td>99406 (modifier 25) Smoking cessation counseling; 3-10 mins</td>
<td>F17.210 Nicotine dependence, cigarettes, uncomplicated Z71.6 Tobacco abuse counseling</td>
</tr>
</tbody>
</table>

Teaching Point: You will not report the sports physical separately in ICD-10-CM. The Z00.121 is all that is needed.

Vignette #4
You see a 15 year-old boy in the after-hours clinic for his third visit in two months for an upper respiratory tract infection. He is an otherwise healthy boy with no chronic medical problems. However, this time, he has developed a persistent cough and shortness of breath when he plays soccer. You ask his parents to leave the room and discover that he has been smoking a pack of cigarettes a day for the past two years. He started when he started a new high school, as he wanted to fit in with the popular boys. A spirometry is performed. You find that his tidal volume is decreased by 15% and he has some rhonchi. A chest X-ray is negative for pneumonia. You explain to the boy that his smoking is making him susceptible to repeated episodes of upper respiratory tract infection. In addition, he is developing reactive airway disease that could make him susceptible to asthma and other problems. You show him literature that describes the various complications of smoking. You also tell him about the various smoking cessation programs available in the county and answer his questions about options that he would be able to obtain without his parents’ knowledge. You spend 40 minutes face to face total, with 20 minutes in counseling and 10 minutes strictly discussing smoking cessation options. He is diagnosed with exercise induced bronchospasms.

How do you code this encounter?

<table>
<thead>
<tr>
<th>CPT</th>
<th>ICD-10-CM</th>
</tr>
</thead>
<tbody>
<tr>
<td>99214 (modifier 25)</td>
<td>J45.990 Exercise induced bronchospasm</td>
</tr>
<tr>
<td>99406 (modifier 25)</td>
<td>F17.210 Nicotine dependence, cigarettes, uncomplicated Z71.6 Tobacco abuse counseling</td>
</tr>
<tr>
<td>94010 Spirometry</td>
<td>J45.990 Exercise induced bronchospasm</td>
</tr>
</tbody>
</table>

Teaching Point: While the overall time spent was 40 minutes, 10 minutes of that time will be separately reported under the smoking cessation code so it cannot be counted towards your overall E/M service.
Vignette #5
You are evaluating a male adolescent (15 year old) patient that has come for his yearly routine visit. When asking about substance use, he offers that he experimented with e-cigarettes within the past month. He denies traditional cigarette use, offering that he would never use such a product because he cares about his health. You congratulate that patient for caring about his health and avoiding cigarette use. You then spend 10 minutes informing him of the potential health hazards related to e-cigarettes, focusing on both the highly addictive and toxic nature of nicotine. You emphasize that nicotine addiction could lead to future cigarette use and encourage him to avoid any use of nicotine containing product.

How do you code this encounter?

<table>
<thead>
<tr>
<th>CPT</th>
<th>ICD-10-CM</th>
</tr>
</thead>
<tbody>
<tr>
<td>99394</td>
<td>Z00.121 Encounter for routine child health examination with abnormal findings</td>
</tr>
</tbody>
</table>
| 99406 (modifier 25) | F17.210 Nicotine dependence, cigarettes, uncomplicated  
|                   | Z71.6 Tobacco abuse counseling                  |

Vignette #6
While covering the newborn nursery, you discharge a first-time mother who plans to breastfeed. As you routinely do, you ask her about smoking and she admits to smoking 1 pack or more a day for the past 10 years. She decreased this to half a pack while pregnant but could not decrease it any further due to cravings. Her husband is a smoker too and smokes 2 packs a day. You explain to the mother that smoking is very harmful, especially to the lungs of a newborn. You spend 15 minutes face to face explaining the various complications of smoking including asthma, recurrent upper respiratory infections, and ear infections. You explain to her that merely smoking outside the baby’s room would not eliminate the risk as she would be exposed to nicotine through breast milk which could lead to irritability and decreased sleep. You explain the various options for smoking cessation and give her literature to share with her husband for the same. You offer to refer her to a smoking cessation program in the hospital, as well as the state quitline*. Overall the discharge service takes 35 minutes to complete.

How do you code this encounter?

<table>
<thead>
<tr>
<th>CPT</th>
<th>ICD-10-CM</th>
</tr>
</thead>
</table>
| 99239             | Z38.00 Single liveborn infant, delivered vaginally  
|                   | Z81.2 Family history of tobacco abuse and dependence  
|                   | Z71.89 Counseling, other specified                  |

* Codes are add-on codes, meaning they are reported separately in addition to the appropriate code for the service provided


*To find your state’s quitline fax referral form, visit http://www2.massgeneral.org/ceasetobacco/states.htm

- Indicates that an additional character is required for the ICD-10-CM code
**Vignette #7**

You see an infant admitted in the hospital for his second episode of wheezing in the last three months. He is the only child and does not attend day care. Both parents smoke in the house and in the car. He has had three ear infections in the last six months and is being considered for tube placements by his pediatrician. As part of the management of the infant you discuss the increased risk of ear infections and frequent respiratory symptoms, amongst others, as a consequence of their smoking. You assess their willingness to quit smoking and assist with arranging smoking cessation resources, both available in the hospital and through the state quitline*. This initial hospital encounter takes 80 minutes to complete, including unit/floor time. Of that time 45 minutes is spent in counseling and coordinating care.

How do you code this encounter?

<table>
<thead>
<tr>
<th>CPT</th>
<th>ICD-10-CM</th>
</tr>
</thead>
<tbody>
<tr>
<td>99223</td>
<td>R06.2 Wheezing</td>
</tr>
<tr>
<td></td>
<td>Z86.69 Personal history of other diseases of the nervous system and sense organs</td>
</tr>
<tr>
<td></td>
<td>Z77.22 Exposure to environmental tobacco smoke</td>
</tr>
<tr>
<td></td>
<td>Z81.2 Family history of tobacco abuse and dependence</td>
</tr>
<tr>
<td></td>
<td>Z71.89 Counseling, other specified</td>
</tr>
</tbody>
</table>

* Codes are add-on codes, meaning they are reported separately in addition to the appropriate code for the service provided


*To find your state's quitline fax referral form, visit [http://www2.massgeneral.org/ceasetobacco/states.htm](http://www2.massgeneral.org/ceasetobacco/states.htm)

- Indicates that an additional character is required for the ICD-10-CM code
VIP Tobacco Smoke Exposure Identification and Intervention Change Package

Identification of Tobacco Smoke Exposure (TSE)

A. Identify TSE-children by asking in non-judgmental, open-ended ways
   a. “Does your child live with anyone who smokes cigarettes?”
   b. “Do you ever smell cigarette smoke in your home?”
   c. If positive, then try to assess exposure:
      i. “Who smokes cigarettes and how often are they with your child?”
      ii. “Where do they smoke cigarettes?”
      iii. Ask specifically if they smoke in the home or vehicle.
   d. Adopt standardized documentation of TSE at your institution

B. If you have an Electronic Health Record (EHR) or Computerized Prescriber Order Entry (CPOE):
   a. Add identification questions to nursing intake form.
      i. Note: If positive response, trigger automatic actions by nursing staff
   b. Add identification questions to electronic HPI forms.
   c. Add referral to cessation for parents to order sets.

C. If you do not have EHR:
   a. Add identification questions to nursing intake form.
   b. Institute policy of making it another “vital” sign for all children

D. Education for multidisciplinary staff
   a. Find champions among respiratory therapists, social workers, bedside nurses, nurse clinicians, and physicians
   b. Training for champions
      i. Basic training
         http://www2.aap.org/richmondcenter/Training_CME_Courses.html
      ii. Advanced training: To become a certified tobacco treatment specialist training
         http://www.attud.org/findprog.php
   c. Online resources for further information
      i. AAP Richmond Center
         http://www2.aap.org/richmondcenter/index.html
      ii. American Lung Association
         http://www.lung.org/
      iii. Smokefree.gov
         http://www.smokefree.gov/
Interventions for family and caretakers with child identified as having Tobacco Smoke Exposure

A. The 2 A’s and R: Ask, Advise and Refer
   a. Ask:
      i. Identification of TSE
   b. Advise: Consider motivational interviewing techniques
      i. Offer suggestions, not rules - personalized to patient.
      ii. Give clear recommendation to stop smoking
          “As your child’s pediatrician, I just want to say that one of the best things you can do for your child’s health is to stop smoking”
   c. Refer:
      i. Give state quitline number 1-800-QUIT-NOW (generally states provide pocket cards free to health care providers, check with health department)
      ii. Provide community and internet resources
      iii. Offer every family with child exposed to Tobacco Smoke and/or tobacco user brochure or information about quitting and effects of TSE on children
          a. DVD “Smoking and Kids Don't Mix”
          b. Brochures

http://www2.aap.org/richmondcenter/pdfs/helpsmokers.pdf
http://www2.aap.org/richmondcenter/pdfs/QuittingHelpsYouHeal.pdf
http://www2.aap.org/richmondcenter/pdfs/You_Can_Quit_Smoking.pdf

B. The 5 A’s: Ask, Advise, Assess, Advise and Assist
   a. Ask:
      i. Identification of TSE
   b. Advise: Consider motivational interviewing techniques
      i. Offer suggestions, not rules personalized to patient.
      ii. Give clear recommendation to stop smoking
          “As your child’s doctor, I wanted to tell you that one of the best things you can do for your child’s health is to stop smoking”
   c. Assess: Assess readiness to quit.
      i. “Are you interested in cutting down or quitting smoking cigarettes?”
      ii. “On a scale of 1-10, how ready are you to quit smoking?”
   d. Assist:
      i. Provide state quitline number (1-800-QUIT-NOW)
      ii. Provide community and internet resources
      iii. Offer every family with child exposed to Tobacco Smoke and/or tobacco user brochure or information about quitting and effects of TSE on children
          a. DVD “Smoking and Kids Don't Mix”
          b. Brochures

http://www2.aap.org/richmondcenter/pdfs/helpsmokers.pdf
http://www2.aap.org/richmondcenter/pdfs/QuittingHelpsYouHeal.pdf
iv. Assist in setting quit date
v. Recommend use of pharmacotherapy
   a. Over the counter: Nicotine Replacement Therapy: gum, patch, and lozenge
   b. Prescription: bupropion (zyban) or varenicline (chantix)
e. Arrange:
   i. Follow-up by phone using quitline or in office with PMD
Now.....where were we?

Pediatric smoking-related deaths - 5,900

1.8 million excess visits for asthma

Why focus on parents?

- Low SES and low parental educational levels correlate with increasing TSE exposure (1,2)

- You have access to smokers that do not otherwise interact with healthcare.

But, they won’t listen to me……

• 5-10% of smokers spontaneously quit with success

• 13% of smokers quit after an appropriately designed brief message from a healthcare provider

• Up to 30% of smokers quit using guideline recommended treatment

But, they don’t even want to quit….

Percent of Current Smokers Who Want to Quit by Age and Number of Previous Quit Attempts – United States, 2000
Well, they don’t want to hear it from me?

- Parents do not object to smoking cessation messages from pediatricians and may even welcome the access to medical advice.

- Some interventions in pediatric settings have been as successful as interventions in other medical settings.


Principles of Tobacco Dependence Treatment

- Effective treatments exist
- Every person who uses tobacco should be offered treatment
2 As and an R: **ASK**

- Ask about tobacco use and SHS exposure *at every visit*

- Make asking routine, consistent, and systematic
  - Use standardized documentation
  - Document as a “vital sign”

- Just *asking* can double quit attempts
How Do You Ask?

• Don’t lead: “You don’t smoke, do you?”

• Depersonalize the question: “Does anyone living in your home use tobacco in any way?” “Who is it?” “Where do they smoke?” “Is that inside the house?”

• Explore: “You say no one smokes around your son. What does that mean?”

• Don’t judge – check your body language, tone of voice, the phrasing of the question
2 As and an R: ADVISE

• Strongly advise every tobacco user to quit

• Provide information about cessation to all tobacco users

• Look for “teachable moments”

• Personalize the message
What Do You Say?

- **Clear**: “I advise you to quit smoking.”

- **Strong**: “Eliminating smoke exposure to your son with asthma is the most important thing you can do to protect and improve his health.”

- **Personalized**: “I know it is very hard to quit, but I believe in your ability to quit because I have seen what a good parent you are.”
Brief Intervention

• Minimal interventions lasting less than 3 minutes increase overall tobacco use abstinence rates.
  – Strength of Evidence = A

• Every tobacco user should be offered at least a minimal intervention, whether or not he or she is referred to an intensive intervention.
• To quit line - 1-800-QUIT-NOW

• To community and internet resources

• Give every tobacco user something that contains information about quitting, the harms of tobacco use, etc.
Quitlines

- It only takes 30 seconds to refer a patient to a toll-free tobacco use cessation quitline.
- Quitlines are staffed by trained cessation experts who tailor a plan and advice for each caller.
- 1-800-QUIT-NOW callers are routed to state-run quitlines.
Counseling IS Effective

As little as 3 minutes doubles quit attempts

Intensive counseling is more effective
  • Dose-response relationship

Most effective:
  • Problem-solving skills
  • Support from clinician
  • Social support outside of treatment
Code Smoking by Household Smoker

ICD-10

• Z77.22 - Secondhand Smoke Exposure
• Z81.2 – Family history of tobacco abuse and dependence
• Z71.89 – counseling, other specified
Time

• An explicit factor to assist in selecting the most appropriate level of E/M services

• When counseling and/or coordination of care are more than 50% of the face to face encounter, time is the key controlling factor

• Documentation of time in the medical record is a must in this situation including total time spent and total time spent in counseling/coordination of care
## SHSE and Acute Illness: Billing

<table>
<thead>
<tr>
<th>ICD 10</th>
<th>CPT</th>
</tr>
</thead>
<tbody>
<tr>
<td>J45.41 moderate persistent asthma with acute exacerbation</td>
<td>992** by components</td>
</tr>
<tr>
<td>Z77.22 SHS</td>
<td></td>
</tr>
<tr>
<td>Z81.2 FH tobacco dependence</td>
<td></td>
</tr>
<tr>
<td>Z71.89 – Other counseling</td>
<td></td>
</tr>
</tbody>
</table>
Add to Note: Use DotPhrases & SmartLists

Second/Thirdhand Smoke Exposure Assessment:

Tobacco smoke exposure? {yes no: 314532}
Smoking inside house? {yes no: 314532}
Smoking in car? {yes no: 314532}

Relationship of smoker to patient: {FAMILY MEMBERS TITLE CASE: 20758}
Is the smoker interested in quitting? {yes no: 314532}

If the smoker is present:
Prescription given for NRT? ***
Referred to CA Smoker’s Helpline? {yes no: 314532}
Quit Date? ***
Follow up plans? ***

Education Provided:
Education provided to family about impact of second and third hand smoke.
Add to Problem List, Visit Diagnoses

Database Matches

<table>
<thead>
<tr>
<th>ID</th>
<th>Name</th>
<th>Code</th>
<th>Code Set</th>
<th>Billable?</th>
</tr>
</thead>
<tbody>
<tr>
<td>321801</td>
<td>Secondhand smoke exposure</td>
<td>V15.89</td>
<td>ICD-9-CM</td>
<td>Y</td>
</tr>
<tr>
<td>726341</td>
<td>No secondhand smoke exposure</td>
<td>V49.89</td>
<td>ICD-9-CM</td>
<td>Y</td>
</tr>
<tr>
<td>321798</td>
<td>Exposure to secondhand smoke</td>
<td>V15.89</td>
<td>ICD-9-CM</td>
<td>Y</td>
</tr>
<tr>
<td>323720</td>
<td>Toxic effect of secondhand tobacco smoke</td>
<td>989.84</td>
<td>ICD-9-CM</td>
<td>Y</td>
</tr>
</tbody>
</table>
exposure can cause as Create SmartPhrase who have previously not had any symptoms. Other health effects on children from secondhand smoke exposure include:

- Low birth weight and lung problems in infants
- Acute lower respiratory tract infections (bronchitis and pneumonia)
- Middle-ear infections
- Chronic respiratory symptoms or problems

Secondhand smoke is also a serious health threat for nonsmoking adults. It causes lung cancer in those who haven't previously smoked and increases the risk for heart disease, stroke and chronic lung problems.

The best thing you can do for your child's health and for your own health is to quit smoking now.

To Quit:

1. Talk to your doctor or your child's doctor
2. Call the California Smoker's Helpline at 1-800-NO-BUTTS. It's free! They may be able to provide you with the nicotine patch/gum.
3. If your doctor prescribed the nicotine patch/gum today, use as directed.

If you are not ready to quit:

1. Never smoke in the car with your kids - this is against the law!
2. Never smoke inside the house. Don't let others smoke in the house.
3. If you smoke outside, wear a "smoking jacket". Leave it outside, put it on before you start smoking, and take it off when you're done. Tobacco particles are sticky and will stick to your body and your clothes, so make sure the jacket stays outside. Wash your hands and face well when you come back inside.
W56.22
STRUCK BY ORCA, INITIAL ENCOUNTER