



**A Computerized Asthma  
Decision Support Tool  
Integrated into an Electronic  
Health Record :  
Putting Guidelines into Action**

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**NO DISCLOSURES**



## eAAP Development: The HIT Asthma Project

- September 2004: IAAP launched by MN Dept of Health; recognized as a top interactive asthma tool.
  - Web or desktop application only
  - Based on NAEPP 2002 Guidelines
- May 2007: Agency for Health Research & Quality requests proposals to demonstrate Quality Improvement uses of Health Information Technology (HIT)
- September 2007: AHRQ awards contract to the Center for Urban Health and Hennepin County Medical Center
  - *Improving Asthma Care in an Integrated Safety Net with a Commercially Available Electronic Medical Record (HIT Asthma Project)*



## Improving Asthma Care (NHLBI-EPR-3)

- Guideline-based practice will improve and standardize the quality of care given to people with asthma
- "Provide all patients with a written asthma action plan for daily treatment and self-management of worsening asthma symptoms" (p93)
- "Asthma self management education is essential to provide patients with the skills needed to control asthma and improve outcomes" (p93)
- "Develop, implement and evaluate system-based interventions to support clinical decision-making." (p95)



## How can Providers Improve Asthma Care?

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- NAEPP EPR-3 guidelines recommend:
  - Use a standardized approach
    - Assess asthma control at each visit
    - Prescribe/adjust daily medications to maximize asthma control
  - Give patients a written asthma plan:
    - What to do every day
    - What actions to take in case of distress



## Clinical Guidelines: How are they Integrated into Practice?

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- Easier said than done....guidelines are:
  - Often very complex
  - Typically have multi-step algorithms
  - Written in text by large committees
  - Difficult to operationalize as clinical decision support

## NAEPP Asthma Guidelines

- Most recent release in 2007 (EPR-3)
  - Lengthy written document
    - 417 pages of narration & references
  - Organized by topic rather than workflow
  - Recommendations difficult to summarize resulting in barriers to implementation

FIGURE 12. ASSESSING ASTHMA CONTROL AND ADJUSTING THERAPY IN CHILDREN

Components of Control		Assessing Asthma Control and Adjusting Therapy in Children						
		Well Controlled		Not Well Controlled		Very Poorly Controlled		
		Ages 0-4	Ages 5-11	Ages 0-4	Ages 5-11	Ages 0-4	Ages 5-11	
Impairment	Symptoms	≤2 days/week but not more than once on each day		≥2 days/week or multiple times on ≥2 days/week		Throughout the day		
	Nighttime awakenings	≤1/month		>1/month	≥2/month	>1x/week	≥2x/week	
	Interference with normal activity	None		Some limitation		Extremely limited		
	Short-acting beta <sub>2</sub> -agonist use for symptom control (not prevention of EIB)	≤2 days/week		>2 days/week		Several times per day		
	Lung function							
	• FEV <sub>1</sub> (predicted) or peak flow personal best	N/A	>80%	N/A	60-80%	N/A	<60%	
	• FEV <sub>1</sub> /FVC		>80%		75-80%		<75%	
Risk	Exacerbations requiring oral systemic corticosteroids	0-1x/year		2-3x/year		>2x/year	>3x/year	≥2x/year
	Reduction in lung growth	N/A	Requires long-term follow-up	N/A		N/A		
	Treatment-related adverse effects	Medication side effects can vary in intensity from none to very troublesome and worrisome. The level of intensity does not correlate to specific level of control but should be considered in the overall assessment of risk.						
	Recommended Action for Treatment	<ul style="list-style-type: none"><li>Maintain current step.</li><li>Regular follow-up every 1-6 months.</li><li>Consider step down if well controlled for at least 3 months.</li></ul>		Step up 1 step	Step up at least 1 step	<ul style="list-style-type: none"><li>Consider short course of oral systemic corticosteroids.</li><li>Step up 1-2 steps</li></ul>		
(See "Stepwise Approach for Managing Asthma" for treatment steps.)  The stepwise approach is meant to assist, not replace, clinical decisionmaking required to meet individual patient needs.		<ul style="list-style-type: none"><li>Before step up: Review adherence to medication, inhaler technique, and environmental control. If alternative treatment was used, discontinue it and use preferred treatment for that step.</li><li>Reevaluate the level of asthma control in 2-6 weeks to achieve control; every 1-6 months to maintain control.</li><li>Children 0-4 years old: If no clear benefit is observed in 4-6 weeks, consider alternative diagnosis or adjusting therapy.</li><li>Children 5-11 years old: Adjust therapy accordingly.</li><li>For side effects, consider alternative treatment options.</li></ul>						

Key: EIB, exercise-induced bronchospasm; FEV<sub>1</sub>, forced expiratory volume in 1 second; FVC, forced vital capacity; ICU, intensive care unit; N/A, not applicable

Notes:

- The level of control is based on the most severe impairment or risk category. Assess impairment domain by patient's or caregiver's recall of previous 2-4 weeks. Symptom assessment for longer periods should reflect a global assessment, such as whether the patient's asthma is better or worse since the last visit.
- At present, there are inadequate data to correspond frequencies of exacerbations with different levels of asthma control. In general, more frequent and intense exacerbations (e.g., requiring urgent, unscheduled care, hospitalization, or ICU admission) indicate poorer disease control.

FIGURE 13. STEPWISE APPROACH FOR MANAGING ASTHMA LONG TERM IN CHILDREN, 0–4 YEARS OF AGE AND 5–11 YEARS OF AGE

		Step up if needed (first check inhaler technique, adherence, environmental control, and comorbid conditions) Step down if possible (use asthma is well controlled at least 3 months)					
		Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Children 0–4 Years of Age	Preferred	Intermittent Asthma	Persistent Asthma: Daily Medication Consult with asthma specialist if step 3 care or higher is required. Consider consultation at step 2.				
		SABA PRN	Low-dose ICS	Medium-dose ICS	Medium-dose ICS + LABA or Montelukast	High-dose ICS + LABA or Montelukast	High-dose ICS + LABA or Montelukast + Oral corticosteroids
	Alternative		Low-dose ICS + Cromolyn or Nedocilil				
	Quick-Relief Medication	Each Step: Patient Education and Environmental Control • SABA as needed for symptoms. Intensity of treatment depends on severity of symptoms. • With viral respiratory symptoms: SABA q 4–6 hours up to 24 hours (longer with physician consult). Consider short course of oral systemic corticosteroids if exacerbation is severe or patient has history of previous severe exacerbations. Caution: Frequent use of SABA may indicate the need to step up treatment. See text for recommendations on initiating daily long-term control therapy.					
Children 5–11 Years of Age	Preferred	Intermittent Asthma	Persistent Asthma: Daily Medication Consult with asthma specialist if step 4 care or higher is required. Consider consultation at step 3.				
		SABA PRN	Low-dose ICS	Low-dose ICS + LABA, LTRA, or Theophylline	Medium-dose ICS + LABA	High-dose ICS + LABA	High-dose ICS + LABA + Oral corticosteroids
	Alternative		Cromolyn, LTRA, Nedocilil, or Theophylline	Medium-dose ICS	Medium-dose ICS + LTRA or Theophylline	High-dose ICS + LTRA or Theophylline	High-dose ICS + LTRA or Theophylline + Oral corticosteroids
	Quick-Relief Medication	Each Step: Patient Education, Environmental Control, and Management of Comorbidities Steps 2–4: Consider subcutaneous allergen immunotherapy for patients who have persistent, allergic asthma. • SABA as needed for symptoms. Intensity of treatment depends on severity of symptoms: up to 3 treatments at 20-minute intervals as needed. Short course of oral systemic corticosteroids may be needed. Caution: Increasing use of SABA or use >2 days a week for symptom relief (not prevention of EEB) generally indicates inadequate control and the need to step up treatment.					

## HIT Asthma Project: Primary Goal

- To improve the quality and patient-centeredness of ambulatory asthma care for children and adults at Hennepin County Medical Center's outpatient primary care clinics, by providing easy access to a clinical decision support tool (CDST) that would be integrated into the patient care process.



## HIT Asthma Project: Secondary Goal

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- CSDT application to produce an asthma registry for ongoing quality improvement
- Produce a modular CDST application that can be easily launched from the electronic health record (Epic) at HCMC.



## Assessing Asthma Control

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- The medical interview (history) is the “major medium of medical care” <sup>(1)</sup>
- Global questions overestimate asthma control <sup>(2)</sup>
- Symptom specific questions improve control assessment <sup>(2)</sup>

1. Lipkin, M., S. Putnam, and A. Lazarre, *The Medical Interview: Clinical Care, Education, and Research*. 1995, New York: Springer-Verlag
2. Cabana, M.D., et al., *Asking the Correct Questions to Assess Asthma Symptoms*. *Clinical Pediatrics*, 2005. **44**: p. 319-325.



## Assessing Asthma Control is Only the First Step....

- Is there a way to help integrate asthma control assessment (impairment and risk) and corresponding treatment decision support into a patient visit?
- Can an Asthma Action Plan be generated with the same tool?



### e-AAP:

#### Asthma decision support from EHR

- Translated complex algorithm from guidelines into executable code (CDST)
- Launched during patient encounter from EHR
- Facilitates:
  - Focused patient-provider communication
  - Treatment plan/medication selection
- Produces:
  - Written (English or Spanish) chronic care document (Asthma Action Plan)
    - Joint Commission compliant
  - Note for provider documentation

GAIL M B - MED BLUE CL HCMC - HCMC PRC Environment

Epic Home In Basket Clinical Encounters Schedule Refill Medication Telephone Call Patient Lists PCP Print Log Out

Deere, Merry

MRN: 3600443 Sex: Female Allergies: Not on File Inf: Lang: Ins: PCP: (None) MyChart: No AdvDir: No Code Hy

DOB: 05/01/62 Age: 48 y.o.

Place orders (Enc Date: 5/20/2010) - Wt: 68.04 kg (150 lb) Ht: 1.727 m (5' 8") BMI: 22.81 kg/m<sup>2</sup> BSA: 1.81 m<sup>2</sup>

CodeSearch PrefList Interactions Pharmacy Providers CC Results Open Orders Pend Orders Sign Orders Sign & Hold Financial M

New order: aapl Search

New order defaults: Not using defaults

After visit Procedures (1 Order)

ASTHMA ACTION PLAN

Order details

F7- Prev Order F8- Next Order

Diagnoses Associate... Associate All Auto Associate Level of service:

Add Diagnosis

P Diagnosis Code

1. MODERATE PERSISTENT ASTHMA 493.90AL

New Problem

Link Problem Code Note

MODERATE PERSISTENT ASTHMA 493.90AL 5/20/10

Auth Prov: BROTTMAN, GAIL M 119216 Pharmacy: <none selected> 1 order entered

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Deere, Merry

MRN: 3600443 Sex: Female Allergies: Not on File Inf: Lang: Ins: PCP: (None) MyChart: No AdvDir: No Code Hy

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CodeSearch PrefList Interactions Pharmacy Providers CC Results Open Orders Pend Orders Sign Orders Sign & Hold Financial More

New order: Search

New order defaults: Not using defaults

After visit Procedures (1 Order)

ASTHMA ACTION PLAN

Order details

F7- Prev Order F8- Next Order

Diagnoses Associate... Associate All Auto Associate Level of service: Edit

Add Diagnosis

P Diagnosis Code

1. MODERATE PERSISTENT ASTHMA 493.90AL

New Problem

Link Problem Code Note

MODERATE PERSISTENT ASTHMA 493.90AL 5/20/10



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Report Viewer

Deere, Merry (CSN: 3619) (48 y.o. F)

### Order

ASTHMA ACTION PLAN [AAP0000001 (Custom)] (Order 43687839)

Order Information	Order Date/Time	Start Date/Time
	5/20/2010 10:30 AM	5/20/2010

Provider Information	Ordering User	Authorizing Provider
	Gail M Brotzman, MD	Gail M Brotzman, MD

Linked Information: [Asthma Action Plan](#)

Associated Diagnoses: MODERATE PERSISTENT ASTHMA - Primary

Order Details	Frequency	Duration	Priority	Order Class
	None	None	Routine	Normal

Encounter Details	Enc. Provider	Pager No.	Enc. Department	Dept. Phone No.
	Becky Provider	612-530-0267	Med Blue Cl Hcmc	612-873-2300

Close

Auth Prov: BROTTMAN, GAIL M (192161) Pharmacy: none selected No unsigned

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Patient Profile - Windows Internet Explorer

Deere, Merry

Place order

Code Search

New order: New order defaults:

Previous: ASTHMA AC

ASTHMA ACTION PLAN (Electronic Asthma Action Plan)

Welcome BROTTMAN, GAIL M | Home | Patient Profile | Admin | Logout

**Merry Deere**  
ID: 444 | Age: 48 | Female

**Patient Profile**

**Patient Information**

Height (cm): 173 (05/20/2010)

Weight (kg): 68 (05/20/2010)

Best Peak Flow:

Predicted Peak Flow: 614

**Asthma Triggers**

☐ Allergies ☐ Dust Mites

☐ Pets ☐ Mold

☒ Smoke ☐ Pollen

☐ Cockroaches ☐ Strong smells

☒ Colds/flu

**Diagnoses**

Add Diagnosis

1. MODERATE PERSISTENT ASTHMA - Primary

[Create New Plan](#)

Information brought in from Epic via URL

Local intranet 100%

GAIL M B - MED BLUE CL HMC - HMC PRC Environment

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Deere Classify Severity Or Assess Control - Windows Internet Explorer

https://mcd-app-hit/aap-test/patient/viewSeverityOrControl/patientVis

Live Search

e-AAP  
(Electronic Asthma Action Plan)

Welcome BROTTMAN, GAIL M | Home | Patient Profile | Admin | Logout

**Merry Deere**  
ID: 444 | Age: 48 | Female

**New Asthma Action Plan**

Documented severity in Problem List: **Moderate Persistent**(edited on 05/20/2010)

☒ **Assess Control** for Moderate Persistent severity.

☐ **Change Severity and Assess Control**

- ☐ Intermittent
- ☐ Mild Persistent
- ☐ Severe Persistent

☐ **Classify severity**  
For patients not currently treated for asthma, or for patients whose current treatment is unknown, or for patients not taking controller meds as prescribed for at least three months.

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Diagnoses

Add Diagnosis

P Diag

1. MODP

Done

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Deere Assess Control - Windows Internet Explorer

https://mcd-app-hit/aap-test/control/index?patientVisitId=2108&astPatientVisitId=

Live Search

Assess Control

**REQUIRED**

**Daytime Symptoms**

- ☐ Throughout the day
- ☒ > 2 days/week
- ☐ (< or =) 2 days/week

**Interference with Normal Activity**

- ☐ Extremely limited
- ☐ Some limitation
- ☒ None

**Short-acting beta agonist (SABA) for Symptom Control (Not exercise induced)**

- ☐ Several times a day
- ☐ > 2 days/week
- ☒ (< or =) 2 days/week

**Exacerbations requiring oral steroids**

- ☐ (> or =) 2/year
- ☒ 0-1/year

**Nighttime Symptoms**

- ☐ > 4x/week
- ☐ 1-3x/month
- ☐ <2 times a month

**OPTIONAL**

**Asthma Control Test(ACT)**

If Score is known:

- ☐ < 15
- ☒ 16-19
- ☐ > 20

If Score is unknown:

- ☐ Click here to complete ACT

**Spirometry Results**

☐ FEV1(%Predicted)

☐ FEV1/FVC a.k.a FEV1%(actual value)

PEAK FLOW from meter:

- ☐ Make peak flow from meter the new "best".
- ☒ Leave best peak flow as N/A.

Done

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Identify Treatment Step From Meds - Windows Internet Explorer

https://mcd-app-hit/aap-test/control/index

Identify Treatment Step From Meds

e-AAP  
(Electronic Asthma Action Plan)

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**Merry Deere**  
ID: 444 | Age: 48 | Female

**Identify Treatment Step From Meds**

Severity: **Moderate Persistent**  
Control: **Not Well Controlled**

To treat the patient properly, you must know the current treatment step. To determine the step, answer these questions about **Currently Prescribed Daily Controller Meds**

**Daily Controller Meds** ☒ YES ☐ NO

**Inhaled Corticosteroid (ICS) Meds**

☐ No ICS  
☐ Low dose (Help With Doses)  
☒ Medium dose  
☐ High dose

**Daily Controller Meds Besides ICS**  
(Check all that apply)

☐ LABA (Long-acting beta antagonist)  
☐ LTRA(Leukotriene receptor antagonist)  
☐ Montelukast(Singulair)  
☐ Zafirlukast (Accolade)

**Patient is taking meds as prescribed:**

☐ Yes  
☐ No  
☐ Cannot determined.

☐ Oral Corticosteroid

Other

☐ Theophylline  
☐ Cromolyn

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Choose New Treatment Step - Windows Internet Explorer

https://mcd-app-hit/aap-test/control/index

Choose New Treatment Step

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**Merry Deere**  
ID: 444 | Age: 48 | Female

**Select Next Treatment Step**

Severity: **Moderate Persistent**  
Control: **Not Well Controlled**  
Current Treatment Step: **Step 3**  
Current Treatment Plan: **Preferred**

Current NAEPP guidelines recommend that you **Review environmental triggers. Consider short course of oral systemic steroids. Step up one or two.**

☒ Treat patient at **Step 4 (recommended)**

-OR-

Choose Different Step-

☐ Step 1  
☐ Step 2  
☐ Step 3  
☐ Step 5  
☐ Step 6

Document reason for not accepting recommended step

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Choose Daily Controller Treatment Plan - Windows Internet Explorer

https://mcd-app-hit/aap-test/treatmentPlan/index

Choose Daily Controller Treatment Plan

**e-AAP**  
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**Merry Deere**  
ID: 444 | Age: 48 | Female

**Choose Daily Controller Treatment Plan**

Severity: **Moderate Persistent**  
Control: **Not Well Controlled**  
Current Treatment Plan (Step 4): **Medium-dose Inhaled Corticosteroids AND Leukotriene Receptor Antagonists**  
Newly Selected Treatment Step: **Step 4**

**Step 4 Preferred Plans (NAEPP-3 Guidelines)**

Medium-dose Inhaled Corticosteroids AND Long-acting Inhaled Beta2-agonists Combination

-- Select Treatment Plan --  
Medium-dose Inhaled Corticosteroids AND Long-acting Inhaled Beta2-agonists  
Medium-dose Inhaled Corticosteroids AND Long-acting Inhaled Beta2-agonists Combination

**Step 4 Alternative Plans (NAEPP-3 Guidelines)**

-- Select Treatment Plan --

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Done

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Choose Daily Controller Meds - Windows Internet Explorer

https://mcd-app-hit/aap-test/treatmentPlan/viewControllers?patientVisitId=2108lastPatientVis

Choose Daily Controller Meds

**e-AAP**  
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**Merry Deere**  
ID: 444 | Age: 48 | Female

**Choose Daily Controller Medications**

Severity: **Moderate Persistent**  
Control: **Not Well Controlled**  
Selected Treatment Step: **Step 4**  
Selected Treatment Plan: **Medium-dose Inhaled Corticosteroids AND Leukotriene Receptor Antagonists**

Remember to check for medication allergies in EPIC

	Rx	Strength	Instructions for Use
Daily 1	-- Select --	-- Select --	-- Select --
Daily 2	-- Select --	-- Select --	-- Select --

-- Select --  
Beclomethasone (QVAR) MDI Inhaler  
Budesonide (Pulmicort) DPI Inhaler  
Flunisolide (AeroBid) MDI Inhaler  
Flunisolide (AeroSpan) MDI Inhaler  
Fluticasone (Flovent) MDI Inhaler  
Fluticasone (Flovent) DPI Inhaler  
Triamcinolone (Azmacort) MDI Inhaler  
Mometasone Furoate (Asmanex) Twisthaler  
Ciclesonide (Alvesco) Inhaler

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Choose Daily Controller Meds - Windows Internet Explorer

https://mcd-app-hit/aap-test/treatmentPlan/viewControllers?patientVisitId=210&lastPatientVis...

Choose Daily Controller Meds

**e-AAP**  
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**Merry Deere**  
ID: 444 | Age: 48 | Female

**Choose Daily Controller Medications**

Severity: **Moderate Persistent**  
Control: **Not Well Controlled**  
Selected Treatment Step: **Step 4**  
Selected Treatment Plan: **Medium-dose Inhaled Corticosteroids AND Long-acting Inhaled Beta2-agonists Combination**

Remember to check for medication allergies in EPIC

	Rx	Strength	Instructions for Use
Daily 1	Fluticasone/Salmeterol (Advair) DPI Inhaler	250 mcg/50 mcg	1 puff twice a day

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**e-AAP**  
(Electronic Asthma Action Plan)

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**Merry Deere**  
ID: 444 | Age: 48 | Female

**Choose Quick Relievers**

Severity: **Moderate Persistent**  
Control: **Not Well Controlled**  
Selected Treatment Step: **Step 4**  
Selected Treatment Plan: **Medium-dose Inhaled Corticosteroids AND Long-acting Inhaled Beta2-agonists Combination**

Device	Rx Name	Strength
Neb	-- Select -- Albuterol Ipratropium Levalbuterol	2.5mg/3 ml

Take 2.5mg/3 ml before or during exercise, if needed.


**Yellow Zone Instructions**

Take 2.5mg/3 ml every 20 minutes for up to an hour, then every 4-6 hours for 1-2 days.

**Red Zone Instructions**

Take 2.5mg/3 ml IMMEDIATELY. Take again after 20 minutes, if still in red zone.

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**e-AAP**  
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**Merry Deere**  
 ID: 444 | Age: 48 | Female

**Choose oral steroid (burst) medication**

Severity: **Moderate Persistent**  
 Control: **Not Well Controlled**  
 Selected Treatment Step: **Step 4**  
 Selected Treatment Plan: **Medium-dose Inhaled Corticosteroids AND Long-acting Inhaled Beta2-agonists Combination**

For Asthma exacerbations, treat with oral corticosteroids, 30 - 60 mg/day, as a single or 2 divided doses max 60 mg/day. Treat for 3-10 days.  
  
 Patient Weight: 68 kg  
 Recommended: 30 - 60 mg/day

Steroid	Dose (mg)	Administered	Days	Daily Total (mg)
<div> <div>Prednisone Tablet</div> <div>-- Select --</div> <div>Methylprednisolone Tablet</div> <div>Prednisone Tablet</div> <div>Prednisone Liquid</div> <div>Prednisolone Liquid</div> <div>Prednisolone Dissolving Tablet</div> </div>	30	Twice a day	5	60.00


**e-AAP**  
 (Electronic Asthma Action Plan)

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**Merry Deere**  
 ID: 444 | Age: 48 | Female

**Next Visit Info**

Severity: **Moderate Persistent**  
 Control: **Not Well Controlled**  
 Selected Treatment Step: **Step 4**  
 Selected Treatment Plan: **Medium-dose Inhaled Corticosteroids AND Long-acting Inhaled Beta2-agonists Combination**

Guidelines recommend that your patient be seen again in 2-6 weeks.

☐ Follow up in  days  
☐ Follow up in  weeks  
☒ Follow up in  months


**Clinic and phone for followup**  
 HCMC General Medicine. 612-873-2300

**Patient's primary clinic (and phone)**  
 HCMC General Medicine. 612-873-2300  
 HFA Internal Medicine. 612-347-7534  
 Adult Pulmonary Clinic. 612-873-2300  
 Hennepin Care North. 612-873-8800  
 Hennepin Care South. 612-798-8260  
 Family Medical Center. 612-545-9000  
 Hennepin Family Care - East Lake. 612-873-8100  
 North Point Health and Wellness. 612-543-2500  
 HCMC Pediatrics. 612-873-2435  
 HFA Pediatrics. 612-347-6820  
 Hennepin Care South. 612-798-8260  
 Other

**Name of the person who will receive the Asthma**  
 Person receiving printed asthma action plan: The patient

**Electronic signature on Asthma Action Plan.**

<b>Provider Name</b>	<b>Credential</b>
Brottman	MD


**e-AAP**  
 (Electronic Asthma Action Plan)





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**Merry Deere**  
 ID: 444 | Age: 48 | Female


[View/Print AAP](#)

Severity: **Moderate Persistent**  
 Control: **Not Well Controlled**  
 Selected Treatment Step: **Step 4**  
 Selected Treatment Plan: **Medium-dose Inhaled Corticosteroids AND Long-acting Inhaled Beta2-agonists Combination**

You still must complete pharmacy order in EPIC.

 [Asthma Action Plan \(English\)](#)  
 [Asthma Action Plan \(Spanish\)](#)  
 [Trigger Control Sheet \(English\)](#)  
 [Trigger Control Sheet \(Spanish\)](#)  
[Treatment Plan & Meds](#)  
[Asthma Note w/Meds](#) (You may copy and paste this asthma note into the Epic Progress Note)



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### My Asthma Action Plan

Name: **Merry Deere**  
 Date: **05/20/2010**  
 My Doctor or Clinic: **HCMC General Medicine**  
 My Doctor or Clinic Phone: **612-873-2300**

My Asthma Severity: **Moderate Persistent**  
 My Peak Flow Number: **618**  
 Avoid your asthma triggers: **Smoke , Colds/flu**




**GO**


**Green Zone: Asthma in good control**

- I feel good
- No cough or wheeze
- Can work, sleep and play without asthma symptoms

My peak flow number is above **494**

- Take your asthma control medicine every day:
  - Fluticasone/Salmeterol Inhaler 250 mcg/50 mcg (Advair) 1 puff twice a day**
- If exercise triggers your asthma, take:
  - Albuterol Neb (AccuNeb) 0.63mg/3ml**
  - 15 minutes before exercise or sports, and
  - during exercise if you have asthma symptoms
- Spacer to use with inhaler: **No inhaler**


**Slow**




**Yellow Zone: Asthma getting worse**

I have any of these:

- I do not feel good
- Cough or wheeze
- Chest feels tight
- Wake up at night

My peak flow number is between **309 and 494**

- Keep taking your Green Zone medicines.
- Start taking your rescue medicine:
  - Albuterol Neb (AccuNeb) 0.63mg/3ml** every 20 minutes for up to 1 hour. Then every 4 hours for 24-48 hours.
- If you do not return to the Green Zone in 12-24 hours, or you get worse, start taking your oral steroid medicine:
  - Prednisone Tablet, 30.0 mg, Twice a day for 5 days.**
- If you stay in the Yellow Zone for more than 12-24 hours, call your doctor.


**Stop**


**Red Zone - Medical Alert - Get help**

I have any of these:

- I feel awful
- Medicine not helping
- Breathing getting harder
- Trouble walking or talking
- Nose opens wide to breathe

My peak flow number is below **309**

- Take your rescue medicine NOW:
  - Albuterol Neb (AccuNeb) 0.63mg/3ml**
- Take your oral steroid medicine NOW:
  - Prednisone Tablet, 30.0 mg, Twice a day for 5 days.**
- Call your doctor NOW.
- If you are still in the Red Zone after 20 minutes, and you have not reached your doctor:
  - Take your rescue medicine again, and
  - Call 911 or go to the emergency room right away.

Clinic or provider for follow up: **HCMC General Medicine, 612-873-2300**      When: **1 months**  
 Electronically signed by: **Brotzman, MD**  
 Person given Asthma Action Plan and Trigger Control sheet: **The patient**

GAIL M B - MED BLUE CL HCMC - HCMC PRC Environment

Epic Home In Basket Clinical Encounters Schedule Refill Medication Telephone Call Patient Lists PCP Print Log Out

Deere, Merry MRN: 05/01/62 Sex: Female Allergies: Not on File Inf: Lang: Ins: PCP: (None) MyChart: No AdvDir: No Code Hx

Snapshot

Deere, Merry #3600443 (CSN: N/A) (48 y.o. F)

Problem List MODERATE PERSISTENT ASTHMA Chronic Allergies Not on File

Report Viewer

Diagnoses MODERATE PERSISTENT ASTHMA [493.90AL] - Primary

Orders with Associated Diagnosis ASTHMA ACTION PLAN [AAP0000001] (Order#: 43687839) Qty: 1

Priority and Order Details

Priority	Class
Routine	Normal

Result Information

Provider Status
Ordered

Recipient List for Order

Linked Information Asthma Action Plan

You have written no outpatient progress notes for this patient.

Epic Home In Basket Clinical Encounters Schedule Refill Medication Telephone Call Patient Lists PCP Print Log Out

Deere, Merry MRN: 05/01/62 Sex: Female Allergies: Not on File Inf: Lang: Ins: PCP: (None) MyChart: No AdvDir: No Code Hx

Snapshot

Merry Deere | Previous Visits - Windows Internet Explorer

https://imcd-app-hit/aap-test/epic?data=38395054338312018182122 Live Search

Merry Deere | Previous Visits

e-AAP (Electronic Asthma Action Plan)

Welcome BROTTMAN, GAIL M | Home | Admin | Logout

Merry Deere (Previous Visits) ID: 444 | Age: 48 | Female

Previous Visits Asthma Action Plan 05/20/10 English Spanish

Close Window

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## e-AAP Implementation at HCMC

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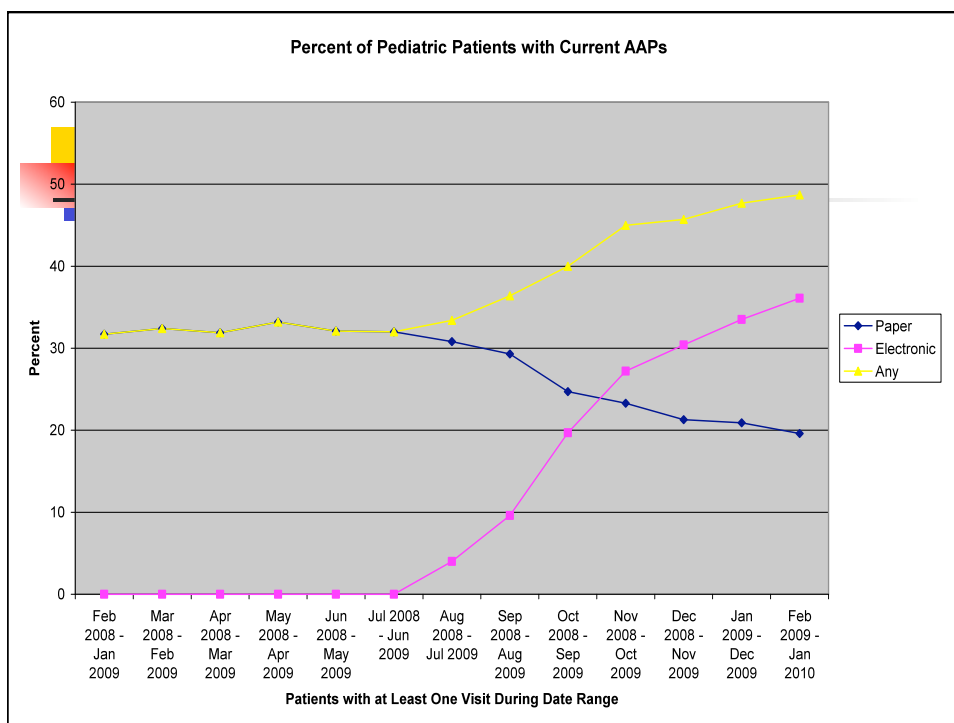
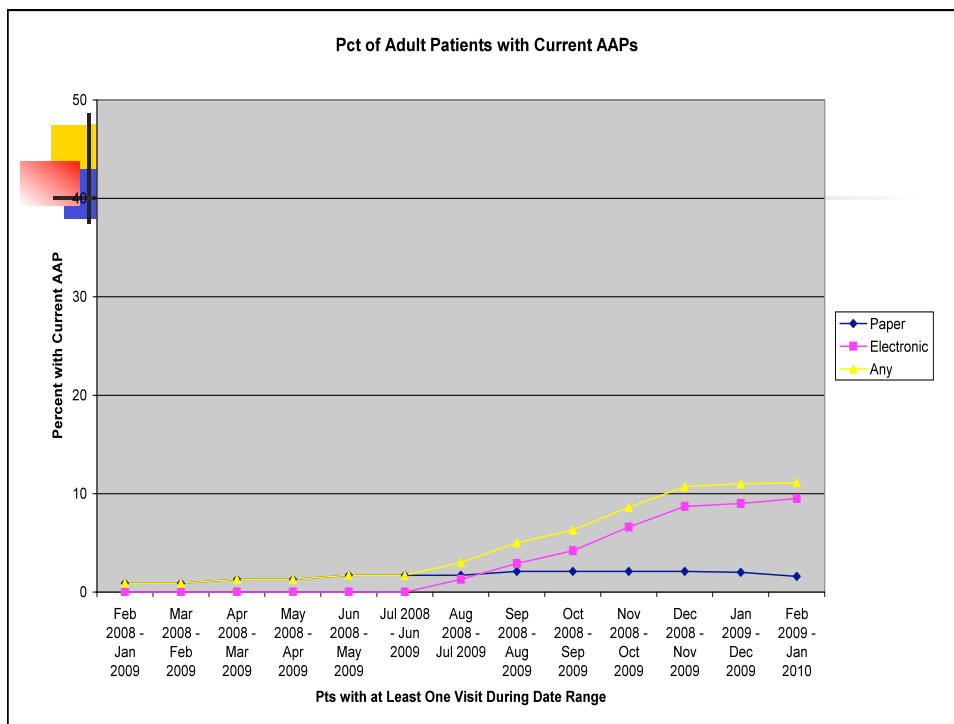
- 8 Primary-Care clinics in intervention
- Implementation divided into 2 phases:
  - Before “go-live” focused presentations to key opinion leaders and at staff meetings
  - After “go-live” group trainings and individual provider instruction initiated
    - “Tip sheets” and “Quick step” pocket cards created for providers
  - Ongoing “circle-back” individual instruction offered



## HCMC Asthma CDST Implementation Experience

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- e-AAP launched June 18, 2009
- From July 1, 2009 through January 31, 2010, 5117 patients believed to have asthma had at least one office visit at one of the eight clinics in which the eAAP was introduced.
  - ED and/or inpatient hospitalizations not included
- Of these 5117 patients, 897 had at least one electronic asthma action plan created for them (17.5%)





## HCMC Asthma CDST Implementation Experience

- Implementation challenges:
  - Variable provider comfort with EHR
  - Infrequent eAAP application users:
    - Internists aap use low to non-existent prior to our study
    - Forgot the launch sequence
    - Took longer to complete eAAP
  - Time issues during visits with patients with multiple complex medical problems
  - Providers expected the eAAP to be “tailored” specifically for their patient population



## Asthma Control Assessment Implementation Challenges:

- Perception that asthma control documentation and writing AAP's is just “another piece of paper” that needs to be reported
  - This really IS about improving patient care!
- Identifying and testing better workflows to help streamline the asthma care visit
- Using electronic tools to help with documentation and data collection



## Summary

- e-AAP: A novel technology that brings clinical guidelines to the point of care
- Implementation of a CDST continues to be a challenge, even when incorporated into the EHR
- Clinics need to look for innovative ways to incorporate asthma control assessment into the clinical workflow
- **For more information about the e-AAP go to the website: [www.e-aap.net](http://www.e-aap.net)**



## HIT Asthma Team

Prime contractor: **Denver Health and Hospital Association.**  
 Subcontractor: **Minneapolis Medical Research Foundation.** Project site: **Hennepin County Medical Center, Mpls MN**  
 AHRQ Contract No. **HHS290200600020**, Task Order No. 5

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