

THE IMPACT OF A COMPREHENSIVE **ASTHMA EDUCATION AND MANAGEMENT PROGRAM ON PATIENT ACCESS TO SELF-MANAGEMENT TOOLS IN A PATIENT-CENTERED MEDICAL HOME: A PILOT TRIAL**

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PRECISIONheor

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DISCLOSURES

- **This study was funded through a grant from the National Asthma Educator Certification Board.**
- **Elisabeth Ihler and Brandon Sucher have no relations with industry to disclose.**
- **Patrick Sullivan is currently employed by Precision Medicine. Prior to working with Precision Medicine, Patrick Sullivan received grant funding from Novartis, Amgen, Industrial Economics, and Astra Zeneca in the last two years.**

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OBJECTIVE

- To create, implement, and evaluate an evidence-based comprehensive asthma education and management program (CAEMP) as part of a multidisciplinary approach to patient care
- To evaluate the CAEMP's potential impact on increasing patient access to self-management tools (SMTs)

BACKGROUND

Very poorly controlled vs. not well controlled/well controlled



6.4-fold ↑ risk of hospitalizations, ED visits, and corticosteroid burst



3.2-fold ↑ risk of hospitalizations, ED visits, and corticosteroid burst

Consistently very poorly controlled asthma, as defined by the impairment domain of the Expert Panel Report 3 exacerbations, increases risk for future severe asthma exacerbations in The Epidemiology and Natural History of Asthma: Outcomes and Treatment Regimens (TENOR) study

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Background: Identification of patients at risk for asthma exacerbations can assist physicians in addressing disease management and improve asthma-related health outcomes.

Objective: We sought to evaluate whether level of impairment, as defined by the 2007 asthma guidelines, predicts risk for future asthma exacerbations.

Methods: The study included children aged 6 to 11 years (n = 82) and adolescent/adult patients aged 12 years and older (n = 725) from The Epidemiology and Natural History of Asthma: Outcomes and Treatment Regimens study with data representing all components of the impairment domain of the asthma guidelines at baseline, month 12, and month 24. Patients were categorized into 2 cohorts: (1) consistently very poorly controlled (VPC) asthma from baseline through 2 years of follow-up and (2) improved from VPC asthma at baseline (including patients who improved to not well-controlled or well-controlled asthma), with improvement maintained through 2 years of follow-up. Odds ratios (ORs) and 95% CIs for risk of asthma exacerbations at month 30 were generated by using multivariable logistic regression by age group.

Results: After adjustment, children with consistently VPC asthma over the 2-year period demonstrated a 6-fold increased risk of hospitalization, emergency department visit, or corticosteroid burst (OR, 6.4; 95% CI, 1.2-34.5) compared with the improved group. Adolescent/adult patients with consistently VPC asthma were more likely to have a corticosteroid burst (OR, 2.8; 95% CI, 1.7-4.8) or have a hospitalization, emergency department visit, or corticosteroid burst (OR, 3.2; 95% CI, 1.9-5.3).

Conclusions: Consistently VPC asthma, as defined by the impairment domain of the 2007 asthma guidelines, is strongly predictive of future asthma exacerbations. (J Allergy Clin Immunol 2009;124:995-992.)

Key words: Asthma, asthma guidelines, impairment domain, risk, exacerbations, health care use, asthma control, The Epidemiology and Natural History of Asthma, Outcomes and Treatment Regimens study

Asthma affects more than 22 million persons in the United States, including 16.1 million adults and 6.8 million children.¹ Currently, asthma represents the most common chronic disease in children,² and its global prevalence is projected to increase substantially over the next 2 decades.^{3,4} The physical, emotional, social, professional, and economic challenges conferred by asthma can have a substantial effect on patients' overall quality of life.^{5,6} In addition, asthma imposes a significant burden on the US health care system; total costs of asthma in the United States in 1998 were estimated at \$12.7 billion, of which 58% represented direct

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BACKGROUND

Uncontrolled asthma vs. no asthma

- \$4,423 ↑ medical expenditures
- 4.6-fold ↑ frequency of hospital discharges
- 1.8-fold ↑ frequency for ED visits
- ↓ productivity

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ECONOMICS

The relationship between asthma, asthma control and economic outcomes in the United States

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Abstract
 Objective: Asthma, a serious chronic lung disease affecting approximately 26 million Americans, remains a clinical and economic burden on the healthcare system. Although associations between uncontrolled asthma and poor health outcomes is known, the extent of this impact of uncontrolled asthma on economic outcomes in the United States (US) is unknown. We sought to determine the relationship between asthma, asthma control and economic outcomes in the US. Methods: The 2006-2010 Medical Expenditure Panel Surveys were used to estimate the impact of uncontrolled asthma (asthma-related emergency department [ED] visit, use of ≥3 courses of quick-relief inhaler in past 3 months or asthma attack in past 12 months) on medical expenditures, utilization and productivity. Estimates were generated using multivariate regression controlling for sociodemographic and comorbidity (health). Medical expenditures attributable to asthma were up to \$4423 greater for those with markers of uncontrolled asthma compared with those who did not have asthma. Frequency of hospital discharges were up to 4.6-fold greater for those with uncontrolled asthma than those without asthma (p<0.01), while all direct with asthma did not have significantly more discharges. ED visits were up to 1.8-fold greater for those with uncontrolled asthma compared with those without asthma (p<0.01). Productivity was significantly (p<0.01) downward biased to be unemployed, more days absent from work and more activity limitations for those with uncontrolled asthma. Conclusions: In recent national data, individuals with asthma and markers of uncontrolled asthma had higher medical expenditures, greater utilization and decreased productivity.

Keywords
 Cost analysis, economic burden, medical expenditures, productivity, uncontrolled asthma, utilization outcomes

History
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Introduction
 The burden of asthma is high with 8.4% of the United States (US) population affected by the disease and \$18 billion in additional adult health expenditures due to the disease [1,2]. The extent of the burden of asthma is associated with the level of severity and control as classified in the Expert Panel Report 3: Guidelines for the Diagnosis and Treatment of Asthma (EP3-3) [3]. Asthma control, defined by EP3 as the extent to which asthma therapy minimizes asthma symptoms and meets therapy goals, comprises two domains: impairment (asthma-related symptoms and limitations experienced by the patient) and risk (likelihood of future exacerbations) [3]. One of several accepted methods of measuring asthma control is the administration of patient- and physician-completed questionnaires such as the Asthma Control Questionnaire (ACQ), the Asthma Therapy Assessment Questionnaire (ATAQ) or the Asthma Control Test [4]. Studies assessing outcomes associated with asthma control with these instruments found that uncontrolled asthma significantly impacts patients' healthcare expenditures, utilization and productivity. The The Epidemiology and Natural History of Asthma: Outcomes and Treatment Regimens (TENOR) study showed that individuals with poorly controlled asthma, as assessed by the ATAQ, were more likely to have hospitalizations, emergency room visits and corticosteroid burst treatments [5]. Another US study, using ATAQ-assessed control measures and associated utilization in a HMO population, found that routine and acute asthma care utilization increased with worse asthma control [6]. The 2006 US National Health and Wellness Survey (NHWS) found that individuals with uncontrolled asthma had significantly higher healthcare utilization (emergency department [ED], hospital and physician) and a significantly greater loss of work productivity [7]. However, these studies may not reflect the current general asthma population; the TENOR study was based on a cohort of severe or difficult-to-treat asthma patients, the Vollmer et al. study was collected over 10 years

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BACKGROUND

NAEPP GIP Priority Messages

- 1) Utilize inhaled corticosteroids
- 2) Provide asthma action plans
- 3) Assess asthma severity
- 4) Assess asthma control to guide clinical decisions
- 5) Schedule follow-up visits
- 6) Reduce allergen/irritant exposure

National Asthma Education and Prevention Program

Guidelines Implementation Panel Report for: Expert Panel Report 3—Guidelines for the Diagnosis and Management of Asthma

Partners Putting Guidelines Into Action

U.S. Department of Health and Human Services
 National Heart, Lung, and Blood Institute

BACKGROUND

PCMH Standards and Guidelines and SMTs

- A critical measure
- Help patients manage complex conditions
- Help patients overcome barriers to achieving treatment and function/lifestyle goals

Asthma Action Plan

Name: _____ Date: _____
 Physician: _____ Phone: _____ Personal Best PEF: _____

GREEN ZONE - Asthma Under Control with Almost NO Symptoms

When Well (Smiley face icon)

This Means:

- PEF greater than or equal to **80%** of personal best
- I can do all my usual activities without having asthma symptoms.
- I have **NO** wheezing, coughing, or difficulty breathing at night.
- I do **NOT** cough or wheeze when I exercise.

To Prevent Asthma Symptoms:

- Use **1 or 2 puffs** of albuterol inhaler **OR 1 inhaler** **1 time a day**
- Take **1 or 2 puffs** of albuterol inhaler **1 time a day**
- Take **1 or 2 puffs** of albuterol inhaler **1 time a day**

My Quick-Relief Medication:
 Albuterol inhaler: Take 2 puffs every 4 hours if needed OR Albuterol nebulizer: Use 1 treatment every 4 hours as needed

YELLOW ZONE - Asthma Getting Worse with Symptoms

When NOT Well (Sad face icon)

This Means:

- PEF between **60% to 80%** of personal best
- I get asthma symptoms when doing my usual activities.
- I have wheezing, coughing, or difficulty breathing at night.
- I cough or wheeze when I exercise.
- I am missing school or work due to my asthma.
- I was exposed to a known asthma trigger.

To Relieve Asthma Symptoms:

- Use **2 or 3 puffs** of albuterol inhaler **OR 1 albuterol nebulizer treatment every 20 minutes for 2 hours.** ****If NO Relief, GO to RED ZONE****
- Increase daily dose of **ICS** by 4 times for 7 to 14 days **OR take extra dose of ICS with each albuterol dose for 7 to 14 days.**

RED ZONE - Asthma is Getting Very Bad

When Help is Needed (Very sad face icon)

This Means:

- PEF less than **50%** of personal best
- My quick-relief medication is **NOT** helping my asthma
- I am coughing or wheezing throughout the day.
- I am short of breath while walking or talking.
- I am having trouble going to sleep.
- My fingernails or lips are blue.

In Addition to Yellow Zone:

- Start prednisone 20 mg take 2 tablets by mouth daily for 5 days.
- Contact Primary Care Provider and schedule an appointment as soon as possible.

EMERGENCY - GO TO THE EMERGENCY DEPARTMENT

- Do **NOT** attempt to drive, call 911.

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METHODS

The CAEMP, a 3-visit asthma education curriculum and collaborative drug therapy management agreement between physicians and pharmacists, was designed to address the NAEPP GIP's 6 priority messages.

Abstract

Background: Asthma education interventions exist but are not used in the United States. Having the greatest barrier to the lack of a standardized curriculum for asthma self-management education recognized by a physician and pharmacist collaboration. This study was designed to create a curriculum, a collaborative drug therapy management agreement (CDTMA), and a practice parameter for collaborative drug therapy management (CDTM) for asthma. The curriculum, CDTMA, and CDTM were developed and tested in a pilot study. The curriculum, CDTMA, and CDTM were then tested in a larger study. The curriculum, CDTMA, and CDTM were then tested in a larger study. The curriculum, CDTMA, and CDTM were then tested in a larger study.

Keywords: asthma education, collaborative drug therapy management, curriculum, practice parameter, collaborative drug therapy management agreement.

Conclusion: The curriculum, CDTMA, and CDTM were developed and tested in a pilot study. The curriculum, CDTMA, and CDTM were then tested in a larger study. The curriculum, CDTMA, and CDTM were then tested in a larger study.

Practice Parameter

Management of acute loss of asthma control in the yellow zone: a practice parameter

Practice Parameter: Start prednisone 20 mg take 2 tablets by mouth daily for 5 days. Contact Primary Care Provider and schedule an appointment as soon as possible.

EMERGENCY - GO TO THE EMERGENCY DEPARTMENT

Do NOT attempt to drive, call 911.

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CAEMP VISIT #1

Patient history and assessment
Basic facts about asthma
Roles of long-term control and quick-relief medications
Skills – inhaler technique, inspiratory flow
Provide written instructions with illustrations for each inhaler

1. In the past 4 weeks, how much of the time did your

All of the time ① Most of the time ②



Diskus Dry Powder Inhaler (DPI)



Currently Available Diskus Dry Powder Inhalers (DPI)
Corticosteroids
 Fluticasone (Flovent® Diskus)
Long-Acting β₂-Agonists
 Salmeterol (Serevent® Diskus)
Combination Products
 Fluticasone/Salmeterol (Advair® Diskus)

Steps to Using a Diskus Dry Powder Inhaler (DPI)

1. Hold the outer casing of the Diskus in one hand while pushing the thumb grip away until a click is heard.
2. Hold Diskus with mouthpiece towards you, slide lever away until it clicks. This makes the dose available for inhalation and advances the dose counter.
3. Holding Diskus level, breathe out gently away from the device, put mouthpiece in mouth and inhale in quickly and deeply.
4. Remove Diskus from mouth and hold breath for about 10 seconds.
5. To close, slide thumb grip back towards you as far as it will go until it clicks.
6. For a second dose repeat steps 1-5.
7. Rinse your mouth out and spit the water out after using Advair® Diskus or Flovent® Diskus.

CAEMP VISIT #2



Patient history and assessment
Reeducate on visit #1 elements
Skills – inhaler technique, inspiratory flow
Control environmental factors
Education on PEF monitoring to personal best PEF
Provide spacer and education if appropriate

Peak Flow Meter Monitoring

Record peak flow 3 times in the morning and 3 times in the late afternoon or early evening for 2 weeks (14 days)




Also record peak flow 15 to 20 minutes after using rescue inhaler for the treatment of asthma symptoms or shortness of breath

	Date	First Reading	Second Reading	Third Reading	Best Reading
Day 1 AM					
Day 1 PM					
Day 2 AM					
Day 2 PM					
Day 3 AM					
Day 3 PM					
Day 4 AM					
Day 4 PM					
Day 5 AM					
Day 5 PM					
Day 6 AM					
Day 6 PM					
Day 7 AM					
Day 7 PM					

CAEMP VISIT #3

Patient history and assessment
 Reeducate on visit #1 elements
 Skills – inhaler technique, inspiratory flow
 Provide asthma action plan

Asthma Action Plan		Name: _____	Date: _____
Physician: _____		Phone: _____	Personal Best PEF: _____
Triggers: _____			
GREEN ZONE – Asthma Under Control with Almost NO Symptoms			
When Well 	This Means: • PEF greater than or equal to _____ 80% of personal best • I can do all my usual activities without having asthma symptoms. • I have NO wheezing, coughing, or difficulty breathing at night. • I do NOT cough or wheeze when I exercise.	To Prevent Asthma Symptoms: 1) Take _____ puffs(s) _____ times a day 2) Take _____ puffs(s) _____ times a day 3) Take _____ puffs(s) _____ times a day My Quick-Relief Medication: Albuterol inhaler: Take 2 puffs every 4 hours as needed OR Albuterol nebulizer: Use 1 treatment every 4 hours as needed	
When NOT Well 	This Means: • PEF between _____ to _____ 60% to 80% of personal best • I get asthma symptoms when doing my usual activities. • I have wheezing, coughing, or difficulty breathing at night. • I cough or wheeze when I exercise. • I am missing school or work due to my asthma. • I was exposed to a known asthma trigger.	To Relieve Asthma Symptoms: 1) Use 2 to 4 puffs of albuterol inhaler OR 1 albuterol nebulizer treatment every 20 minutes for 1 hour. **IF NO RELIEF, GO TO RED ZONE** 2) Increase daily dose of _____ by 4 times for 7 to 14 days. OR Take extra dose of _____ with each albuterol dose for 7 to 14 days.	
When Help Is Needed 	This Means: • PEF less than _____ 50% of personal best • My quick-relief medication is NOT helping my asthma symptoms. • I am coughing or wheezing throughout the day. • I am short of breath while walking or talking. • I am having trouble speaking. • My lips/nails or lips are blue.	In Addition to Yellow Zone: • Start prednisone 20 mg take 2 tablets by mouth daily for 5 days. • Contact Primary Care Provider and schedule an appointment as soon as possible. EMERGENCY – GO TO THE EMERGENCY DEPARTMENT • Do NOT attempt to drive, call 911.	
How to Control Things that Make Your Asthma Worse			
Allergens		Irritants	
<p>Vaccines</p> <p><input type="checkbox"/> Try to get someone else to vacuum for you once or twice a week, if possible. Stay out of rooms while they are being vacuumed. If you vacuum, use a dust mask, a double-layered or micro-fiber vacuum cleaner bag, or a vacuum cleaner with a HEPA filter.</p> <p>Dust Mites</p> <p>Many people with asthma are allergic to dust mites, which can be found in every home in mattresses, pillows, carpets, upholstered furniture, bedcovers, clothes, fabric, and other fabric-covered items.</p> <p>Most helpful:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Encase your pillow and mattress in a dust mite-proof impervious cover. <input type="checkbox"/> Wash pillow, sheets, and blankets each week in hot water. <p>Others:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Try not to sleep or lie on cloth-covered cushions or furniture. <input type="checkbox"/> Remove carpets from your bedroom, if possible. <input type="checkbox"/> Replace carpets with tiles, if possible. <p>Animal Dander</p> <p>Most helpful:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Keep animals out of your home. <p>Others:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Wash pillow, sheets, and blankets each week in hot water. <input type="checkbox"/> Keep your pet out of your bedroom. <input type="checkbox"/> Use HEPA air cleaners in the main living areas and bedrooms. <p>Inhaler Mist</p> <ul style="list-style-type: none"> <input type="checkbox"/> Fix leaking faucets or other sources of water. <input type="checkbox"/> Clean moldy surfaces with a cleaner that contains bleach. <p>Polen and Outdoor Mold</p> <p>During your allergy season:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Try to keep windows closed. <input type="checkbox"/> Stay indoors from late morning to afternoon, if possible. <p>Cooking</p> <ul style="list-style-type: none"> <input type="checkbox"/> Keep all food and garbage out of your bedroom, or in closed containers. <input type="checkbox"/> Eliminate cockroaches from your home by using poison or traps. If using a spray, size out of the room until the cock are gone. 		<p>Tobacco Smoke</p> <ul style="list-style-type: none"> <input type="checkbox"/> Do not allow smoking in your home, car, or around you. <p>Smoke, Strong Odors, and Sprays</p> <ul style="list-style-type: none"> <input type="checkbox"/> Try to stay away from strong odors and sprays, such as perfume, hair spray, scented candles, or paint. <input type="checkbox"/> If possible, do not use a wood-burning fireplace. <p>Others</p> <p>Exercise or Sports</p> <ul style="list-style-type: none"> <input type="checkbox"/> Use your quick-relief inhaler (e.g., albuterol) 10 minutes before exercising to prevent symptoms. <input type="checkbox"/> Warm up for a period before you exercise. <input type="checkbox"/> Try not to work hard outside when air pollution or pollen levels are high (check air quality index). <input type="checkbox"/> If you are overweight, weight loss can improve overall health and asthma control. <p>Cold or Dry Air</p> <ul style="list-style-type: none"> <input type="checkbox"/> Maintain indoor humidity ideally between 30% and 50%. <input type="checkbox"/> Cover your nose and mouth with a scarf on cold or windy days. <input type="checkbox"/> Breathe in through your nose and not through your mouth when outside because the nose warms and moistens air for your lungs. <p>Sufflers in Food</p> <ul style="list-style-type: none"> <input type="checkbox"/> Do not drink beer or wine or eat shrimp, dried fruit, or potato chips if they cause asthma symptoms. <p>Stress</p> <ul style="list-style-type: none"> <input type="checkbox"/> Identify goals and strategies to manage emotional stress if it makes your asthma symptoms worse. <input type="checkbox"/> Try relaxation techniques or breathing exercises. 	

METHODS

- PCMH primary care clinic
- Patients with asthma referred to an onsite pharmacist by their physician via the EHR
- Informed written consent obtained during the CAEMP initial visit
- \$40 gift card at 3 month follow-up



SELF-MANAGEMENT TOOLS

Access to SMTs evaluated with pre-post study design

Baseline and 3 months after completing the

CAEMP

All Patients

Only When Appropriate



Asthma Action Plan		Name: _____	Date: _____
		Physician: _____	Personal Best PFR: _____
		Triggers: _____	
GREEN ZONE - Asthma Under Control with Almost NO Symptoms			
<p>The Means:</p> <ul style="list-style-type: none"> FEV1 greater than or equal to _____ 80% of _____ When Well normal/okay Free of all my usual activities without having asthma symptoms. I have NO wheezing, coughing, or difficulty breathing at night. I do NOT cough or wheeze when I exercise. 		<p>To Prevent Asthma Symptoms:</p> <p>1) _____ Take _____ every 2-4 days</p> <p>2) _____ Take _____ every 4-6 days</p> <p>3) _____ Take _____ every 4-6 days</p> <p>My Quick Relief Medication:</p> <p>Reliever Inhaler: Use 2 puffs every 4 hours as needed OR</p> <p>Reliever Inhaler: Use 2 puffs every 4 hours as needed</p>	
YELLOW ZONE - Asthma Getting Worse with Symptoms			
<p>The Means:</p> <ul style="list-style-type: none"> FEV1 between _____ to _____ 60% to 80% When NOT Well not okay I get asthma symptoms when doing my usual activities. I have wheezing, coughing, or difficulty breathing at night. Cough or wheeze when I exercise. Increasing school or work due to my asthma. I am exposed to a known asthma trigger. 		<p>To Relieve Asthma Symptoms:</p> <p>1) Use 2-4 puffs of reliever inhaler (OR 2 inhaler inhaler) every 20 minutes for 3 hours.</p> <p>** DO NOT EXCEED 16 PUFFS TOTAL **</p> <p>2) Increase daily dose of ICS to 4 times for 7 to 14 days. OR</p> <p>Take extra dose of ICS with each abnormal dose for 7 to 14 days.</p>	
RED ZONE - Asthma is Very Bad			
<p>The Means:</p> <ul style="list-style-type: none"> FEV1 less than _____ below 50% When Things are Needed not okay at all My quick relief medication is NOT bringing my asthma symptoms. I am coughing or wheezing throughout the day. I am short of breath while walking or talking. I am having trouble sleeping. My lips/nails turn blue. 		<p>In Addition to Yellow Zone:</p> <ul style="list-style-type: none"> Stop and have 20 puffs of reliever by mouth 4x for 3 days. Contact Primary Care Provider and schedule an appointment as soon as possible. <p>EMERGENCY - GO TO THE EMERGENCY DEPARTMENT</p> <p>© Dr. MD Johnson@asthma.cauph.edu</p>	



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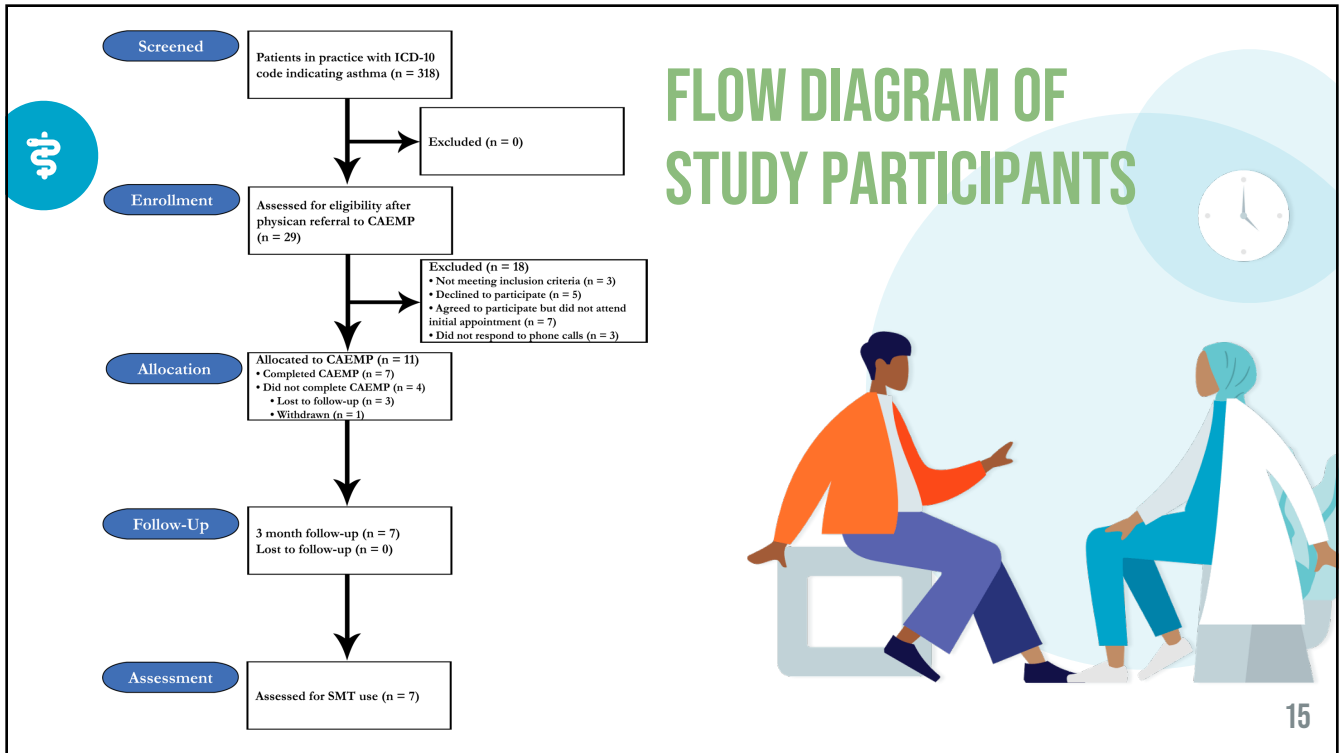
RESULTS

No adverse events related to study participation



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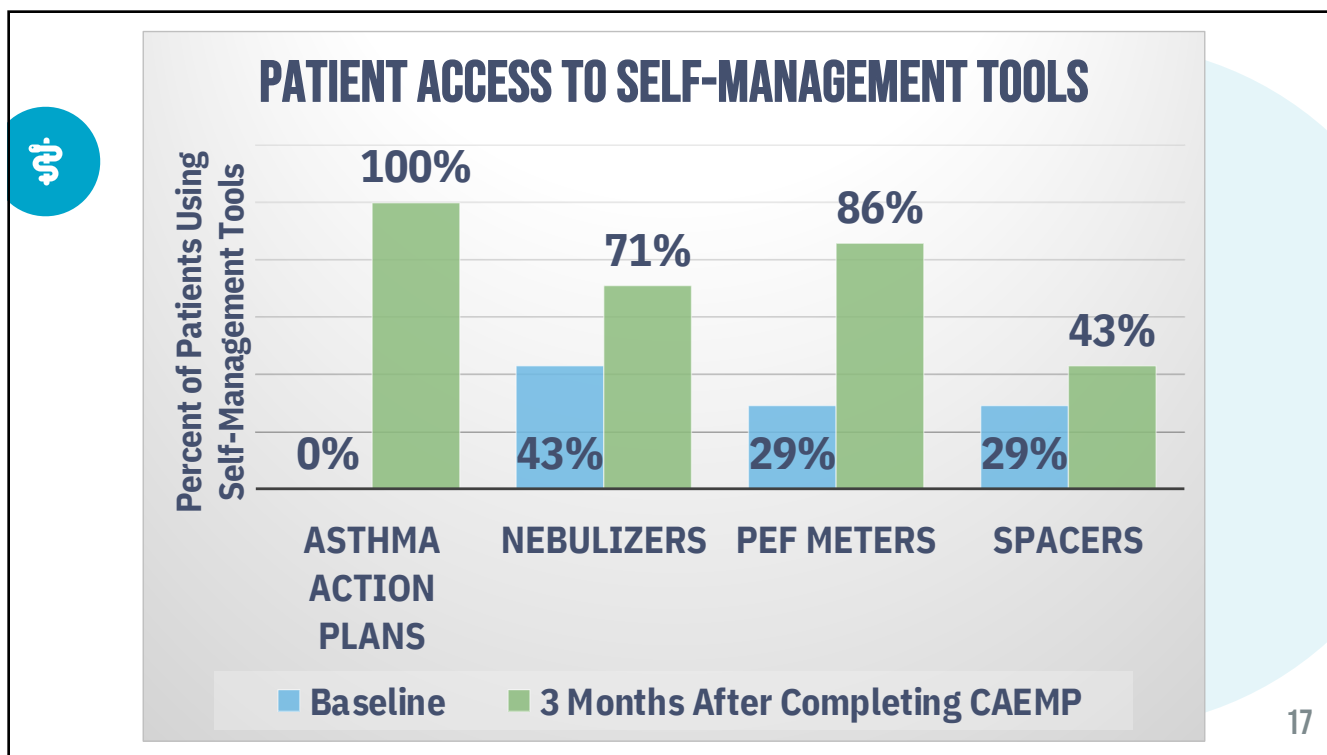


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Demographic and Clinical Characteristics

	Mean (SD)	n (%)
Age	54.57 (10.86)	
Sex		
Male		1 (14%)
Female		6 (86%)
Race		
Native Hawaiian or Pacific Islander		0 (0%)
Asian		1 (12.5%)
White		3 (37.5%)
American Indian / Alaska Native		0 (0%)
Black or African American		4 (50%)
Ethnicity		
Hispanic or Latino		0 (0%)
Not Hispanic or Latino		7 (100%)
Smoking status		
Never smoked		3 (43%)
Currently smoke		1 (14%)
Previously smoked but do not currently smoke		3 (43%)
Total annual household income		
Less than \$10,000		4 (57%)
\$10,000 to \$29,999		1 (14%)
\$30,000 to \$49,999		0 (0%)
\$50,000 to \$69,999		1 (14%)
\$70,000 to \$89,999		0 (0%)
Greater than or equal to \$90,000		0 (0%)
I don't know		1 (14%)
Highest Level of Education		
Eighth grade or less		0 (0%)
Some high school but did not graduate		2 (29%)
High school graduate or GED Certificate		0 (0%)
Technical school graduate or some college		4 (57%)
College graduate		1 (14%)
Post-graduate or professional degree		0 (0%)

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CONCLUSIONS

- The CAEMP was feasible to deliver.
- There was an increase in patient access to SMTs seen 3 months after completing the CAEMP.
- Incorporation of an asthma action plan template within the EHR may improve utilization of this SMT.

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LESSONS LEARNED AND FUTURE DIRECTIONS

- Presenting results on the CAEMP's potential impact on asthma control by reducing risk, asthma control by reducing impairment, quality of life, and HEDIS measures
- Patient recruitment and retention for the CAEMP was challenging and uptake was relatively low.
- Comparing the benefits of the CAEMP to a briefer single asthma education visit

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REFERENCES

1. Haselkorn T, Fish JE, Zeiger RS, Szeffler SJ, Miller DP, Chipps BE, Simons FE, et al; T.S. Group. Consistently very poorly controlled asthma, as defined by the impairment domain of the Expert Panel Report 3 guidelines, increases risk for future severe asthma exacerbations in The Epidemiology and Natural History of Asthma: outcomes and Treatment Regimens (TENOR) study. *J Allergy Clin Immunol* 2009;124:895-902.
2. Sullivan PW, Slejko JF, Ghushchyan VH, Sucher B, Globe DR, Lin SL, Globe G. The relationship between asthma, asthma control and economic outcomes in the United States. *J Asthma* 2014;51:769-78.
3. U.S. Department of Health and Human Services, National Institutes of Health, National Heart, Lung, and Blood Institute. Guidelines Implementation Panel Report for: Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma: Partners Putting Guidelines into Action. Bethesda, MD: U.S. Department of Health and Human Services; 2008 Dec. NIH Publication Number 09-6147. Available from: http://www.nhlbi.nih.gov/guidelines/asthma/gip_rpt.pdf.
4. National Committee for Quality Assurance. NCQA Patient-Centered Medical Home Standards and Guidelines (2014 edition). Accessed July 28, 2014. <https://store.ncqa.org/pcmh-standards-and-guidelines.html>.
5. Dinakar C, Oppenheimer J, Portnoy J, et al. Management of acute loss of asthma control in the yellow zone: A practice parameter. *Ann Allergy Asthma Immunol* 2014;113:143-59.
6. Gardner A, Kaplan B, Brown W, et al. National standards for asthma self-management education. *Ann Allergy Asthma Immunol* 2015;114:178-86.

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ANY QUESTIONS?

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