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7-28-2022

## Get SMART: Implementation of Updated Asthma Guidelines for Pediatric Hospitalists

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2022**

# Get SMART

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## Implementation of Updated Asthma Guidelines for Pediatric Hospitalists

Alexander Hogan, MD, MS; Connecticut Children's; Hartford, CT

Kathryn Kyler, MD, MS; Children's Mercy Kansas City

Claire Seguin, MD; Children's Mercy Kansas City

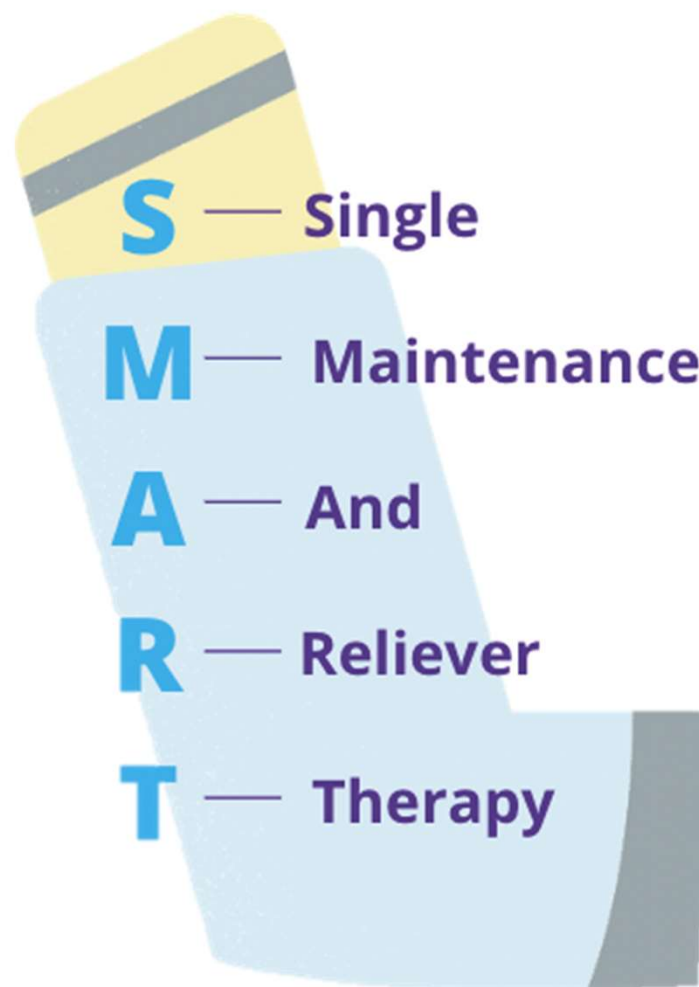
# Session Objectives

1. Select appropriate candidates for SMART therapy and successfully formulate a SMART-based asthma action plan
2. Anticipate barriers to implementation of new SMART guidelines on both individual and institutional levels
3. Generate an actionable plan, tailored to participants' care settings, to begin implementation of SMART

# What is SMART?

- One inhaler for both controller and rescue:

Inhaled corticosteroid (ICS)  
+  
Long acting beta agonist (LABA)



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# EPR-4 Guideline Update

- Published in December 2020



Alphabet Soup!

EPR - Expert Panel Report  
NAEPCC - National Asthma Education and Prevention Program  
Coordination Committee  
NHLBI - National Heart, Lung, and Blood Institute

- Series of recommended practice updates – some very relevant to PHM practice

# EPR-4 Recommendations – Section IV

EPR-3 (2007)	EPR-4 (2020)	
	Clinical scenario	EPR-4 Recommendations
<p><b><u>0-4 years of age:</u></b> mild symptoms or recurrent wheezing: SABA q 4-6 hrs for 24 hrs, for more than 24 hrs, need evaluation</p>	<p><b><u>0-4 years of age:</u></b> - Recurrent wheezing with viral illnesses:</p> <p><b><u>&gt; 4 years of age:</u></b> - Mild/moderate persistent asthma:</p> <p>- Mod/severe persistent asthma:</p>	<p>Short course of ICS + PRN SABA at onset of respiratory illness (Conditional)</p> <p>Recommend <u>against</u> short term increase in ICS dose (Conditional)</p> <p>Low or moderate dose ICS/formoterol as daily and quick relief therapy compared to ICS/LABA + PRN SABA or high dose ICS + PRN SABA (Strong)</p>

# EPR-4 Recommendations – Section IV

EPR-3 (2007)	EPR-4 (2020)	
	Clinical scenario	EPR-4 Recommendations
<p><b><u>&gt;12 years of age:</u></b>                      -daily ICS for persistent asthmatics with low/med/high dosing based on severity with use of SABA prn for all steps.                      - consideration of medium dose ICS/LABA at Step 4 (mod/severe)</p>	<p><b><u>&gt;12 years of age:</u></b></p> <ul style="list-style-type: none"> <li>- Mild persistent asthma:</li>   <li>- Mod/severe persistent asthma:</li> </ul>	<p>Daily low dose ICS + PRN SABA or option of adding ICS to PRN SABA at illness (Conditional)</p> <p>ICS/formoterol as daily and quick reliever therapy compared to higher dose ICS/LABA as daily with PRN SABA (Conditional)</p>



# Our focus: SMART-specific recommendations

## EPR-4 (2020)

Clinical scenario	EPR-4 Recommendations
<b>0-4 years of age:</b> - Recurrent wheezing with viral illnesses:	Short course of ICS + PRN SABA at onset of respiratory illness (Conditional)
<b>&gt; 4 + years of age:</b> - Mild/moderate persistent asthma:	Recommend <u>against</u> short term increase in ICS dose (Conditional)
- Mod/severe persistent asthma:	Low or moderate dose ICS/formoterol as daily and quick relief therapy compared to ICS/LABA + PRN SABA or high dose ICS + PRN SABA (Strong)
<b>&gt;12+ years of age:</b> - Mild persistent asthma:	Daily low dose ICS + PRN SABA or option of adding ICS to PRN SABA at illness (Conditional)
- Mod/severe persistent asthma:	ICS/formoterol as daily and quick reliever therapy compared to higher dose ICS/LABA as daily with PRN SABA (Conditional)



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It is critical for hospitalists to understand the updated EPR-4 guidelines, but also to IMPLEMENT them

But.... How?

# How to Participate in Audience Polling

- ▶ Navigate to <https://phm.cnf.io> and tap the session titled "Get SMART: Implementation of Updated Asthma Guidelines for Pediatric Hospitalists"
- ▶ OR just point your phone's camera at the QR code to join directly



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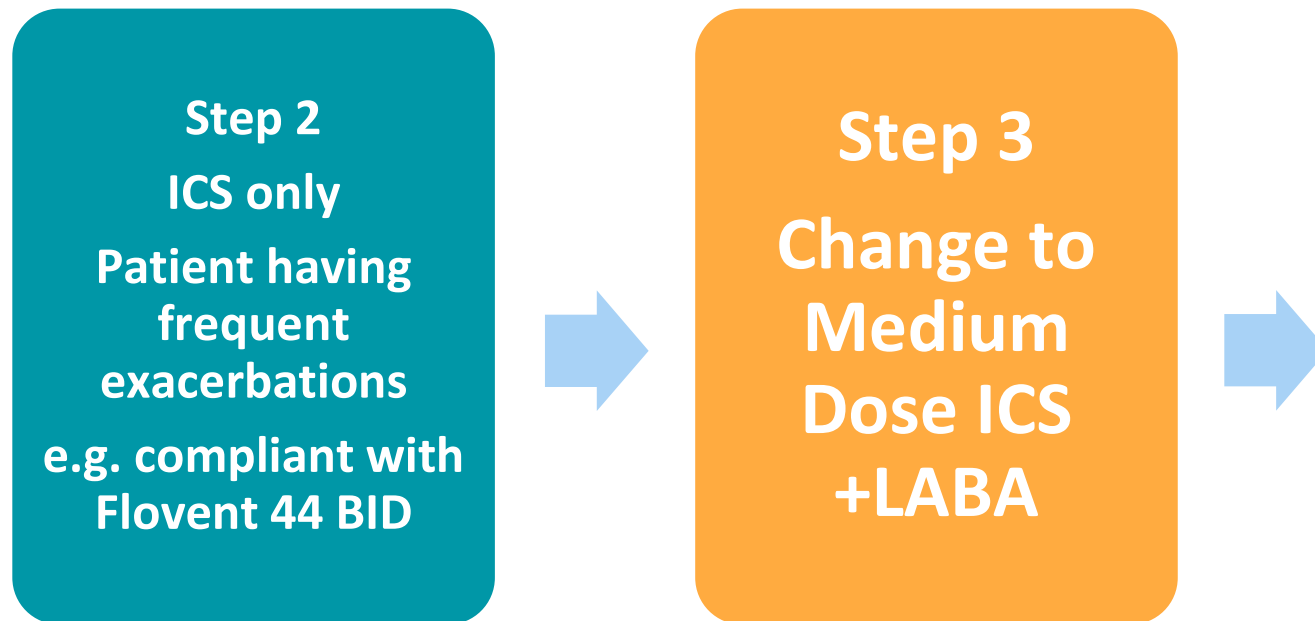
**Have you ever started  
SMART?**

## *Live Content Slide*

*When playing as a slideshow, this slide will display live content*

**Poll: Have you ever started SMART?**

# Single Maintenance and Reliever Therapy (SMART)



# Single Maintenance and Reliever Therapy (SMART)

**Step 2**

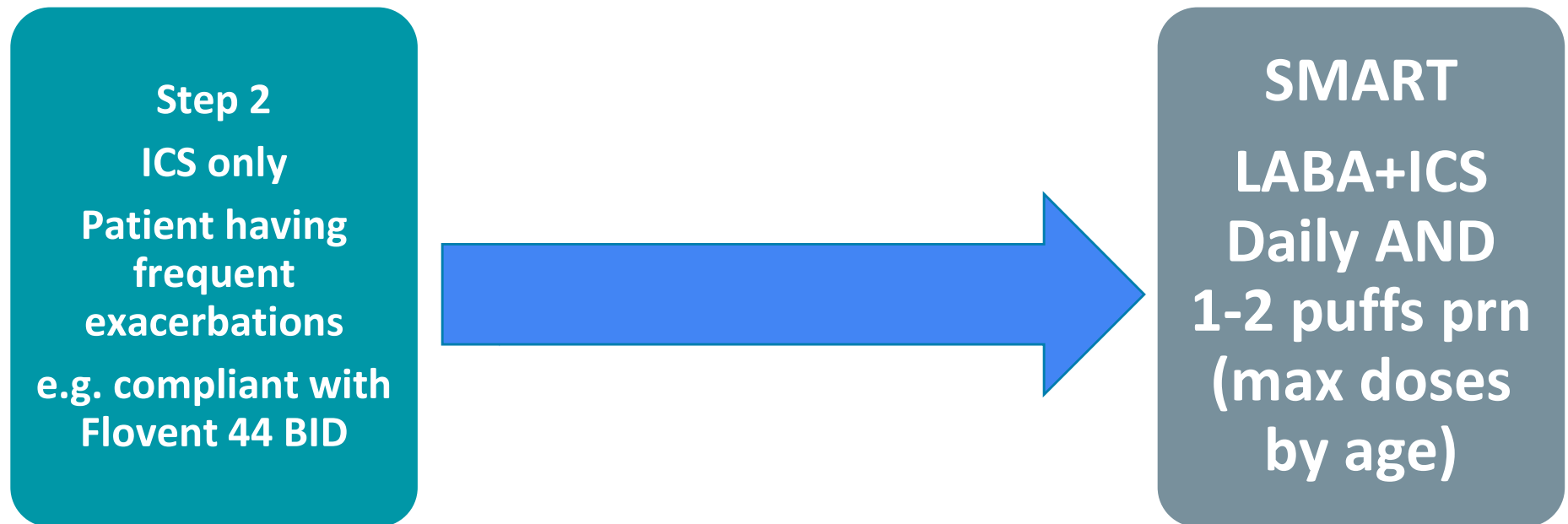
**ICS only**

**Patient having  
frequent  
exacerbations**

**e.g. compliant with  
Flovent 44 BID**



# Single Maintenance and Reliever Therapy (SMART)





# Which patients to consider?

## Target Population:

- Moderate to Severe Persistent Asthma  $\geq$  Age 4
- Severe exacerbation in the prior year
- Uncontrolled on ICS LABA with prn SABA

## AGES 5-11 YEARS: STEPWISE APPROACH FOR MANAGEMENT OF ASTHMA

	Intermittent Asthma	Management of Persistent Asthma in Individuals Ages 5-11 Years				
Treatment	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6
<b>Preferred</b>	PRN SABA	Daily low-dose ICS and PRN SABA	Daily and PRN combination low-dose ICS + formoterol <sup>▲</sup>	Daily and PRN combination medium-dose ICS + formoterol <sup>▲</sup>	Daily high-dose ICS-LABA and PRN SABA	Daily high-dose ICS-LABA + oral systemic corticosteroid and PRN SABA
<b>Alternative</b>		Daily LTRA,* or Cromolyn,* or Nedocromil,* or Theophylline,* and PRN SABA	Daily medium-dose ICS and PRN SABA or Daily low-dose ICS-LABA, or daily low-dose ICS + LTRA,* or daily low-dose ICS + Theophylline,* and PRN SABA	Daily medium-dose ICS-LABA and PRN SABA or Daily medium-dose ICS + LTRA* or daily medium-dose ICS + Theophylline,* and PRN SABA	Daily high-dose ICS + LTRA* or daily high-dose ICS + Theophylline,* and PRN SABA	Daily high-dose ICS + LTRA* + oral systemic corticosteroid or daily high-dose ICS + Theophylline* + oral systemic corticosteroid, and PRN SABA
		Steps 2-4: Conditional recommend the use of subcutaneous immunotherapy as an adjunct treatment to standard pharmacotherapy in individuals $\geq$ 5 years of age whose asthma is controlled at the initiation, build up, and maintenance phases of immunotherapy <sup>▲</sup>			Consider Omalizumab <sup>**▲</sup>	

# Which patients to consider?

- **Who should not receive this treatment:** Do not use ICS-formoterol as reliever therapy in individuals taking ICS-salmeterol as maintenance therapy.

# Benefits & Risks

## Potential benefits:

- Reduced asthma exacerbations
  - Unscheduled medical visits
  - Systemic corticosteroids
- Improved asthma control and quality of life
- In children ages 4–11 years, there may be a lower risk of growth suppression among those taking SMART versus daily higher-dose ICS treatment!

## Potential risks:

- No difference in harms between SMART and daily ICS, or ICS-LABA, with SABA PRN

# Implementing SMART Therapy

Age	Budesonide/ formoterol dose	Moderate Persistent		Max puffs/ day
		Step 3	Step 4	
4-11 Maintenance	80 µg/4.5	1 puff daily	1 puff bid	8
Relief		1 puff prn	1 puff prn	
12+ Maintenance	160µg/4.5	1 bid or 2 puffs daily	2 puffs bid	12
Relief		1 puff prn	1 puff prn	
<b>Total daily ICS</b>		<b>&lt; 400 µg/day (medium)</b>	<b>400-800 µg/day (high)</b>	

# Disclaimer

- Budesonide/formoterol (Symbicort)
  - Most studied for SMART therapy
  - Approved age 8 and above in US for maintenance
- Mometasone/formoterol (Dulera)
  - Approved age 5 and above in US for maintenance

**1-month supply of ICS-formoterol medication that is sufficient for maintenance therapy may not last a month if the inhaler is used for reliever therapy as well.**

(Example of action plan template for budesonide/formoterol.

A similar action plan could be constructed for other ICS/formoterol formulations, e.g. mometasone/formoterol)

<b>My Asthma Action Plan</b> For Single Inhaler Maintenance and Reliever Therapy (SMART) with budesonide/formoterol	Name: _____ Action plan provided by: _____	
	Date: _____ Doctor: _____	
	Usual best PEF: _____ L/min Doctor's phone: _____ <i>(If used)</i>	
<b>Normal mode</b>	<b>Asthma Flare-up</b>	<b>Asthma Emergency</b>
<p><input type="checkbox"/> <b>My SMART Asthma Treatment is:</b></p> <ul style="list-style-type: none"><li><input type="checkbox"/> budesonide/formoterol 160/4.5 (12 years or over)</li><li><input type="checkbox"/> budesonide/formoterol 80/4.5 (4-11 years)</li></ul> <p><input type="checkbox"/> <b>My Regular Treatment Every Day:</b> <i>(Write in or circle the number of doses prescribed for this patient)</i></p> <p>Take [1, 2] inhalation(s) in the morning and [0, 1, 2] inhalation(s) in the evening, every day</p> <p><input type="checkbox"/> <b>Reliever</b> Use 1 inhalation of budesonide/formoterol whenever needed for relief of my asthma symptoms I should always carry my budesonide/formoterol inhaler</p> <p><input type="checkbox"/> <b>My asthma is stable if:</b></p> <ul style="list-style-type: none"><li>I can take part in normal physical activity without asthma symptoms</li></ul> <p><b>AND</b></p> <ul style="list-style-type: none"><li>I do not wake up at night or in the morning because of asthma</li></ul> <p><b>Other Instructions</b></p> <p>_____</p> <p>_____</p>	<p><input type="checkbox"/> <b>If over a Period of 2-3 Days:</b></p> <ul style="list-style-type: none"><li>My asthma symptoms are getting worse <b>OR NOT</b> improving <b>OR</b></li><li>I am using more than 6 budesonide/formoterol reliever inhalations a day (if aged 12 years and older) or more than 4 inhalations a day (if 4-11 years)</li></ul> <p><b>I should:</b></p> <ul style="list-style-type: none"><li><input checked="" type="checkbox"/> Continue to use my regular everyday treatment <b>PLUS</b> 1 inhalation budesonide/formoterol whenever needed to relieve symptoms</li><li><input type="checkbox"/> Start a course of prednisolone</li><li><input type="checkbox"/> Contact my doctor</li></ul> <p><b>Course of Prednisolone Tablets:</b> Take _____ mg prednisolone tablets per day for _____ days <b>OR</b></p> <p>_____</p> <p><input type="checkbox"/> If I need more than <b>12 budesonide/formoterol inhalations (total)</b> in any day, (or more than 8 inhalations for children 4-11 years) I <b>MUST</b> see my doctor or go to the hospital the same day</p>	<p><input type="checkbox"/> <b>Signs of an Asthma Emergency:</b></p> <ul style="list-style-type: none"><li>Symptoms getting worse quickly</li><li>Extreme difficulty breathing or speaking</li><li>Little or no improvement from my budesonide/formoterol reliever inhalations.</li></ul> <p><b>If I have any of the above danger signs, I should dial _____ for an ambulance and say I am having a severe asthma attack.</b></p> <p><input type="checkbox"/> <b>While I am waiting for the ambulance start my asthma first aid plan:</b></p> <ul style="list-style-type: none"><li>Sit upright and stay calm</li><li>Take 1 inhalation of budesonide/formoterol. Wait 1-3 minutes. If there is no improvement take another inhalation of budesonide/formoterol (up to a maximum of 6 inhalations on a single occasion)</li><li>If only albuterol is available, take 4 puffs as often as needed until help arrives</li><li>Start a course of prednisolone tablets (as directed) while waiting for the ambulance</li><li>Even if my symptoms appear to settle quickly, I should see my doctor immediately after a serious attack</li></ul>

Modified from Australian action plan with permission from National Asthma Council Australia and AstraZeneca Australia



# Successful Prescribing

## **Budesonide/formoterol (Symbicort) 80/4.5**

Sig: 1 puff daily and then 1-2 puffs  
as needed for up to 6 additional  
puffs (max of 8 total puffs per day)  
Dispense: 1 for home, 1 for school

## **Budesonide/formoterol (Symbicort) 160/4.5**

Sig: Maintenance 2 puffs daily  
Dispense 60  
Sig: Reliever 1-2 puffs prn up to  
7 inhalations per day  
Dispense 120

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# Outpatient exacerbation management

- Anticipatory guidance
  - Ensure families understand not just to start nebulizing albuterol
  - Summarize data for them to enhance partnership
- “Sick Plan”
  - 1-2 puffs ICS/LABA every 5-10 minutes (with age appropriate max)
- **Increasing therapy**
  - **Patients should call if exceeding daily puff max**
  - **Patients should call if using max puffs for more than 2-3 days**
    - **Oral Steroids 1 mg/kg bid (max of 30 mg bid)**

# When SMART fails

- Review MDI/Spacer technique
- Ensure family understands SMART
  - If unable to execute switch to alternative pathway (traditional plan)
- Have family keep journal/calendar of therapy
- Referral to allergy or pulmonology
  - Consideration of biologic therapy
  - Implementation of high dose inhaled ICS therapy
  - Implementation of oral corticosteroid therapy

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**“OK, yeah I guess can do that.  
But it’s just so hard to change.”**

From individual understanding and use, to moving a group to implement something new; change is hard

# The implementation lag:

*17 years to incorporate research into common clinical practice*

-Morris et al 2011

## 17 years ago this year

Brad and Jen Divorced

Hurricane Katrina

Destiny's Child broke up

Lance won the Tour de France, (7 years later was stripped of the win)

*The Office* premiered

First complete genome of a dog published



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# Implementation science (IS)

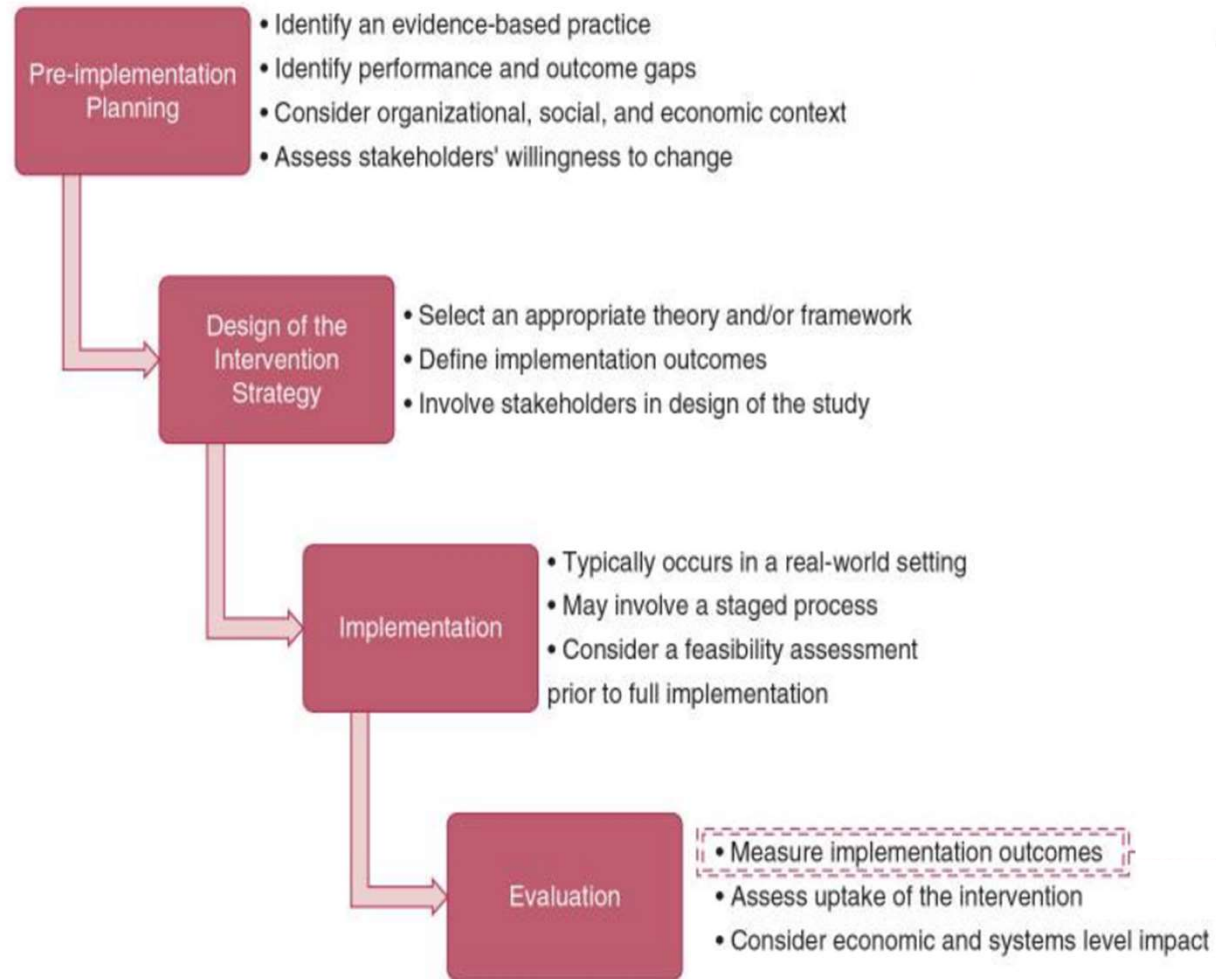
“The study of methods to promote the adoption and integration of evidence-based practices, interventions and policies into routine health care and public health settings.”

Fogarty International Center. *Implementation science information and resources*, <https://www-fic-nih-gov.ezproxy.cmh.edu/ResearchTopics/Pages/ImplementationScience.aspx/>; 2019.

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Ashrafzadah et al 2019

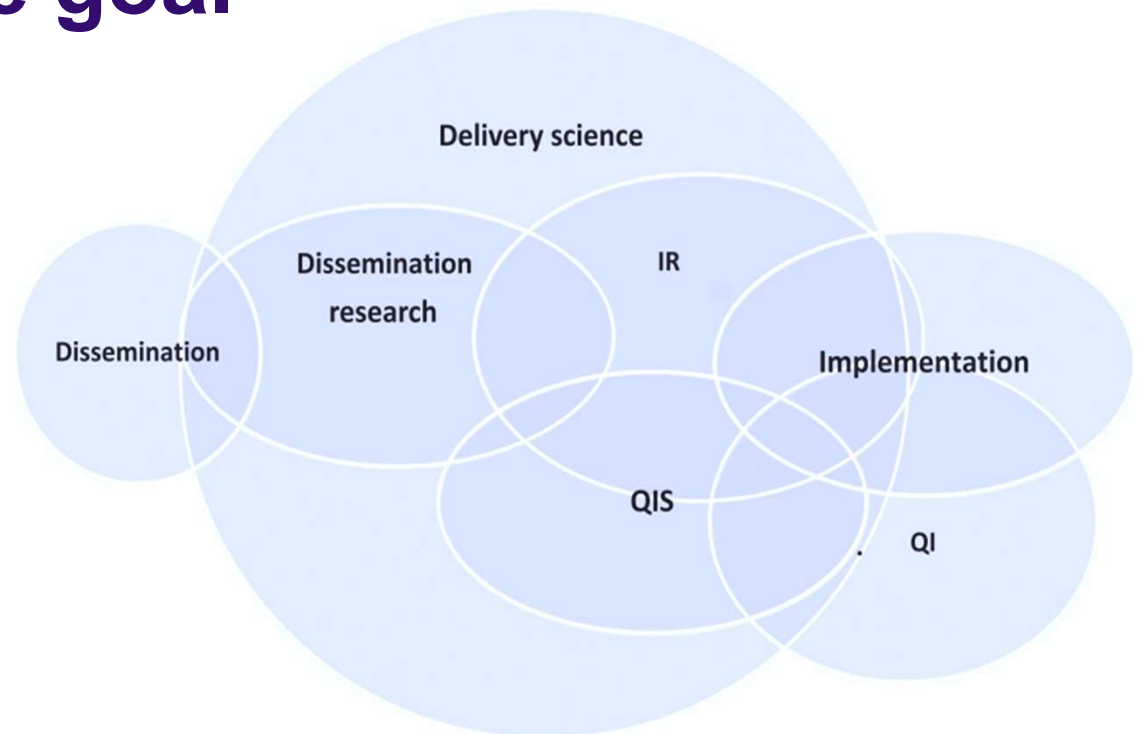


# Implementation and QI: two paths with same goal

- **Implementation:** closes gap between what is known and what is practiced
- **QI:** transforms systems to improve health care quality

Common differences:

- 1) **Starting point**
- 2) scope/scale of goals
- 3) perspective



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Tyler and Glasgow, Hospital Pediatrics 2021

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# Pre-implementation work:

## Stakeholders

- Patients/Families
- Providers
- Hospitals, EDs, UCs
- Schools
- Insurance
- Pharmacies
- Community Asthma Organizations

## Organization & Local contexts

- Emergency Rooms
- Urgent Cares
- Hospital Medicine
- Allergy/Immunology
- Pulmonology
- Primary Care Clinics
- Adolescent Clinics

## Providers

- PCPs
- Hospitalists
- Specialists
- Trainees
- Pharmacists
- RTs

## Economic & Social Environment

- Insurance coverage
- Outreach structures to community providers and schools

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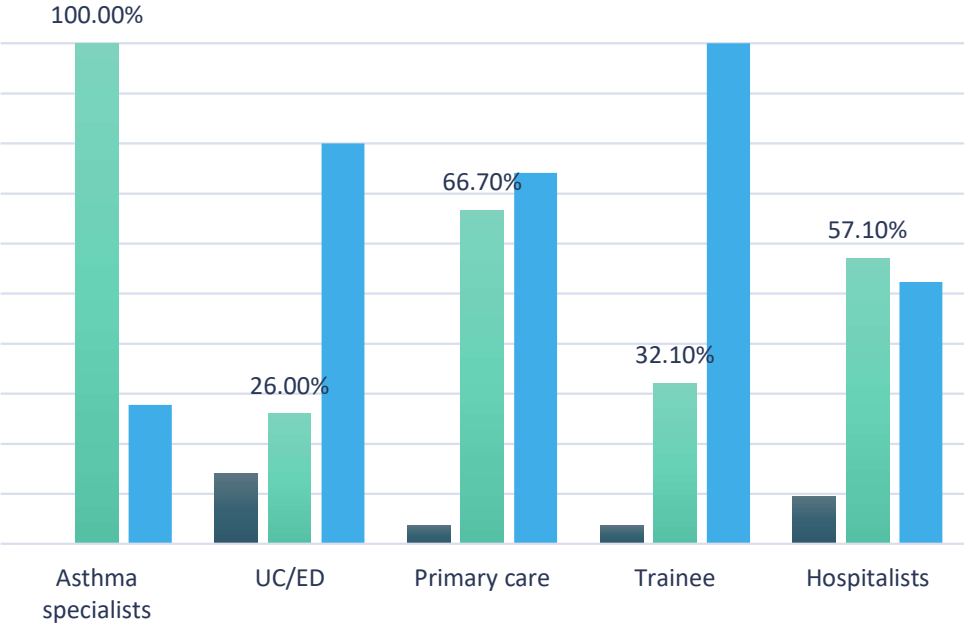


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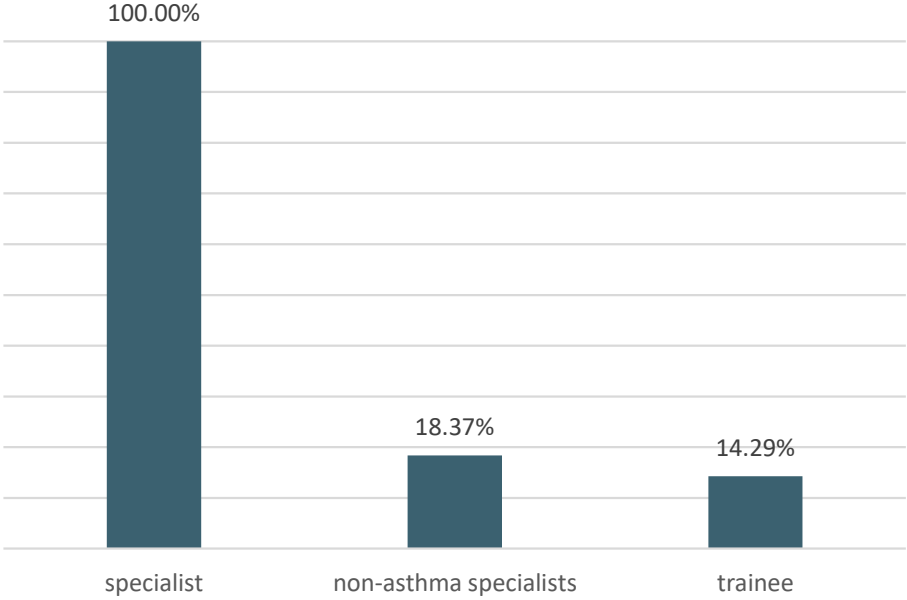


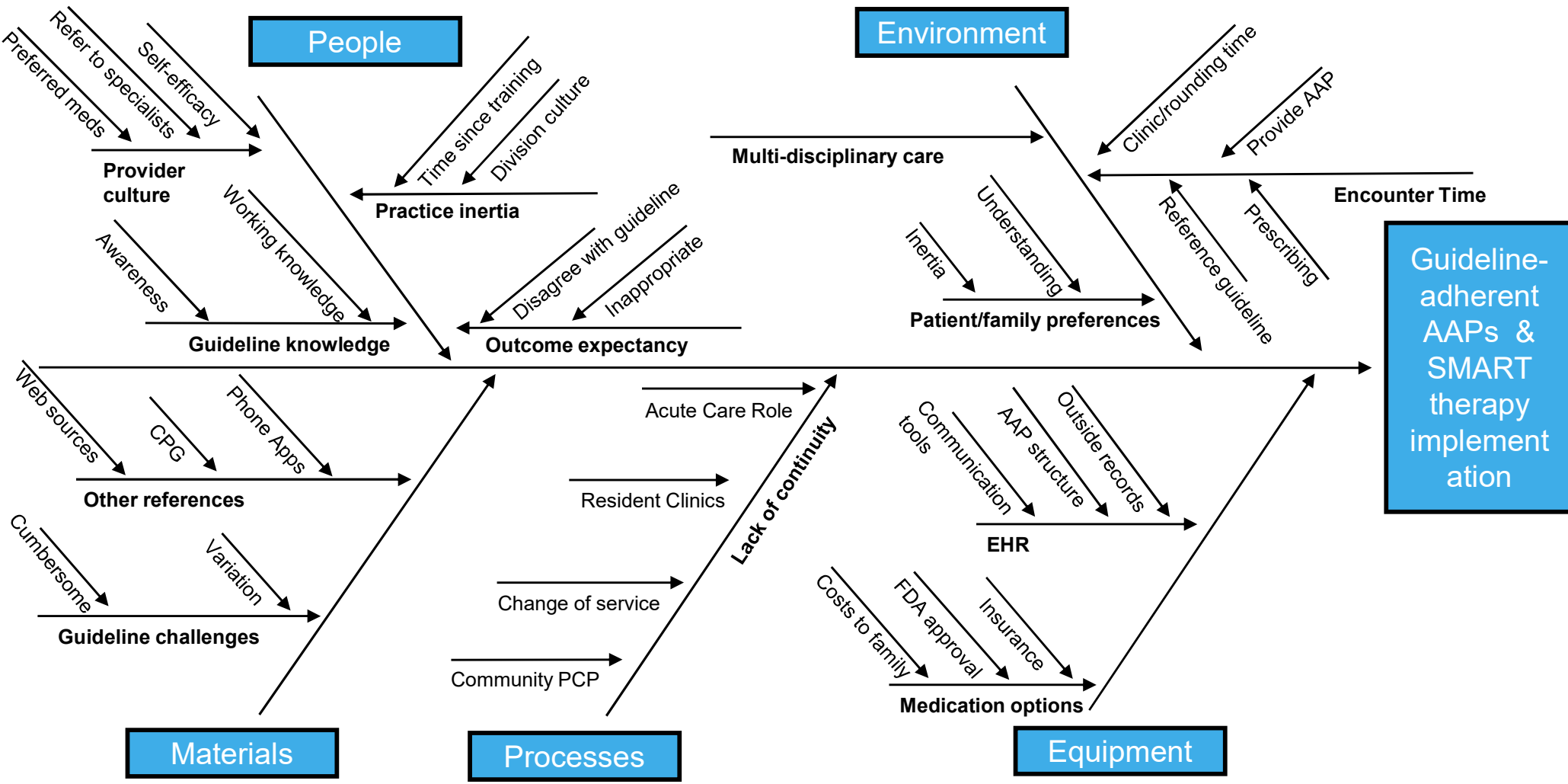
# Identifying performance/outcome gaps:

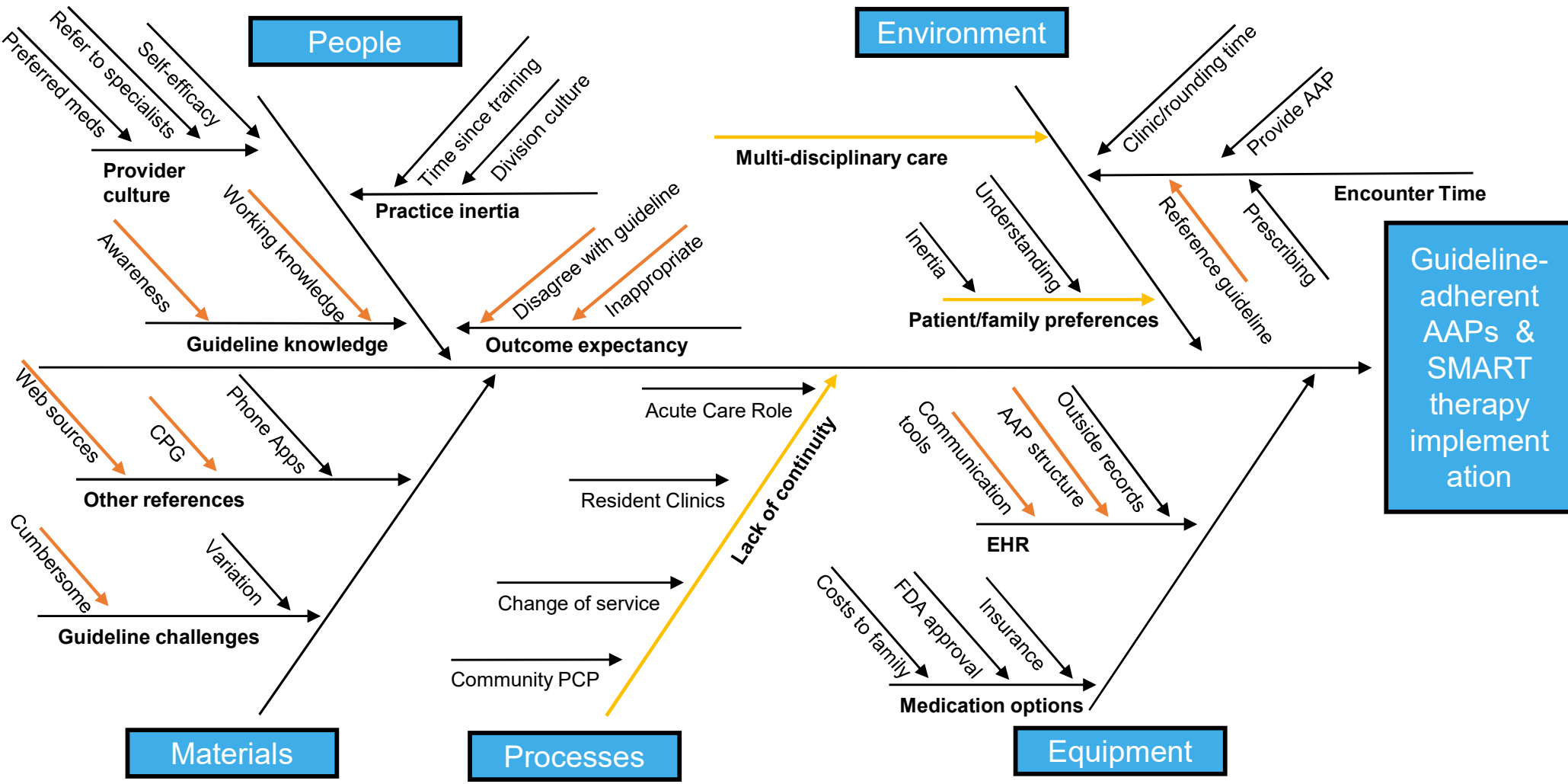
### Asthma Guidelines Used at CMH



### CMH Providers “Regularly prescribing” ICS-LABA, Prior to EPR-4 release







# Common Barriers to Guideline Use



Internal (Provider)



External:

- Guideline related
- Patient Related
- Institutional/Environment
  - Time
  - Team
  - Tools



Equity



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**What are barriers you foresee to implementing SMART or other EPR-4 guidelines in your practice as a hospitalist?**

Free text response from audience

## *Live Content Slide*

*When playing as a slideshow, this slide will display live content*

**Poll: What are barriers you foresee to implementing SMART or other EPR-4 guidelines in your practice as a hospitalist?**

# Physician Level Barriers

## Provider-level barriers

Lack of awareness and familiarity (good working knowledge)

Lack of agreement with guideline conclusion, appropriateness

Lack of self efficacy

The feeling of capable of effective use of guideline)

Lack of outcome expectancy

Don't expect real-world results for their patients

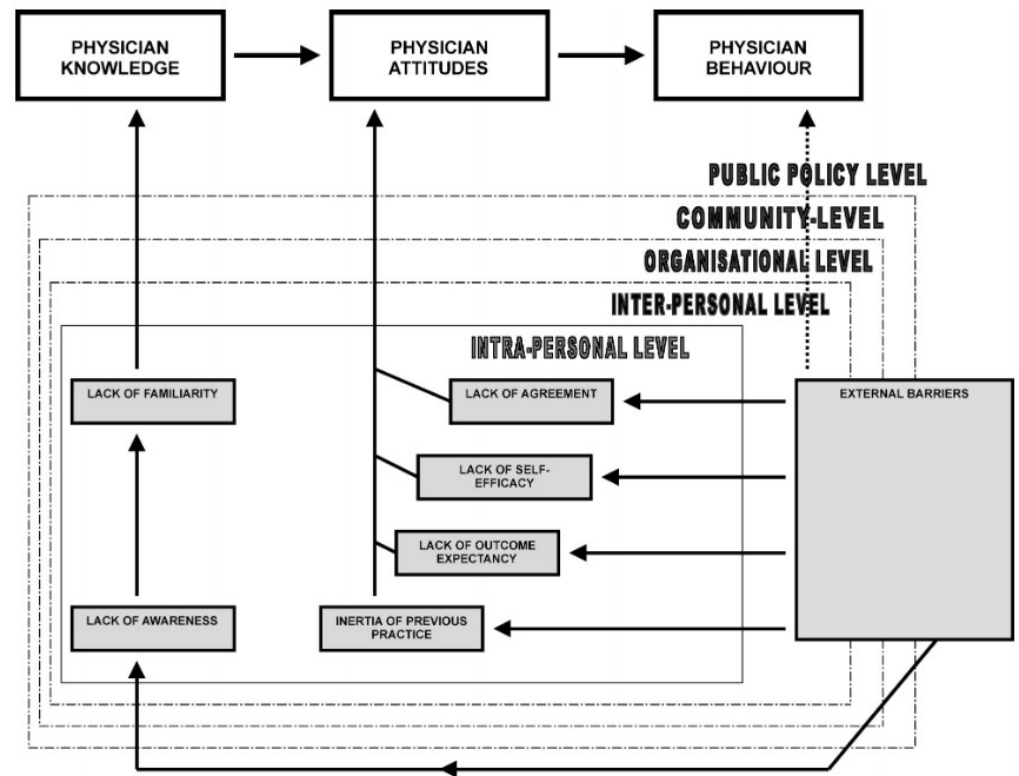
Inertia of previous practice

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Cabana et al. 1999

Cabana and Flores, 2002





# External Barriers

## Guideline related

- No convenient access to guideline
- Cumbersome to reference
- Confusing or at odds with other guidelines

## Patient Related

- Difficult to understand
- Difficult to adhere to
- Inertia to change
- Don't believe benefits > risk

## Institutional

- Time to familiarize, access regularly, counsel families
- RT and nurse lack of familiarity
- Trainee/attending dys-synchronous adoption
- Multi-disciplinary provision of asthma care
- Internal clinical guideline consistency
- Prescribing ease
- EMR tools
- Continuity within system

## Resources/Financial

- Insurance coverage for non-FDA approved ages
- Insurance coverage of increased use
- No alternatives to formoterol

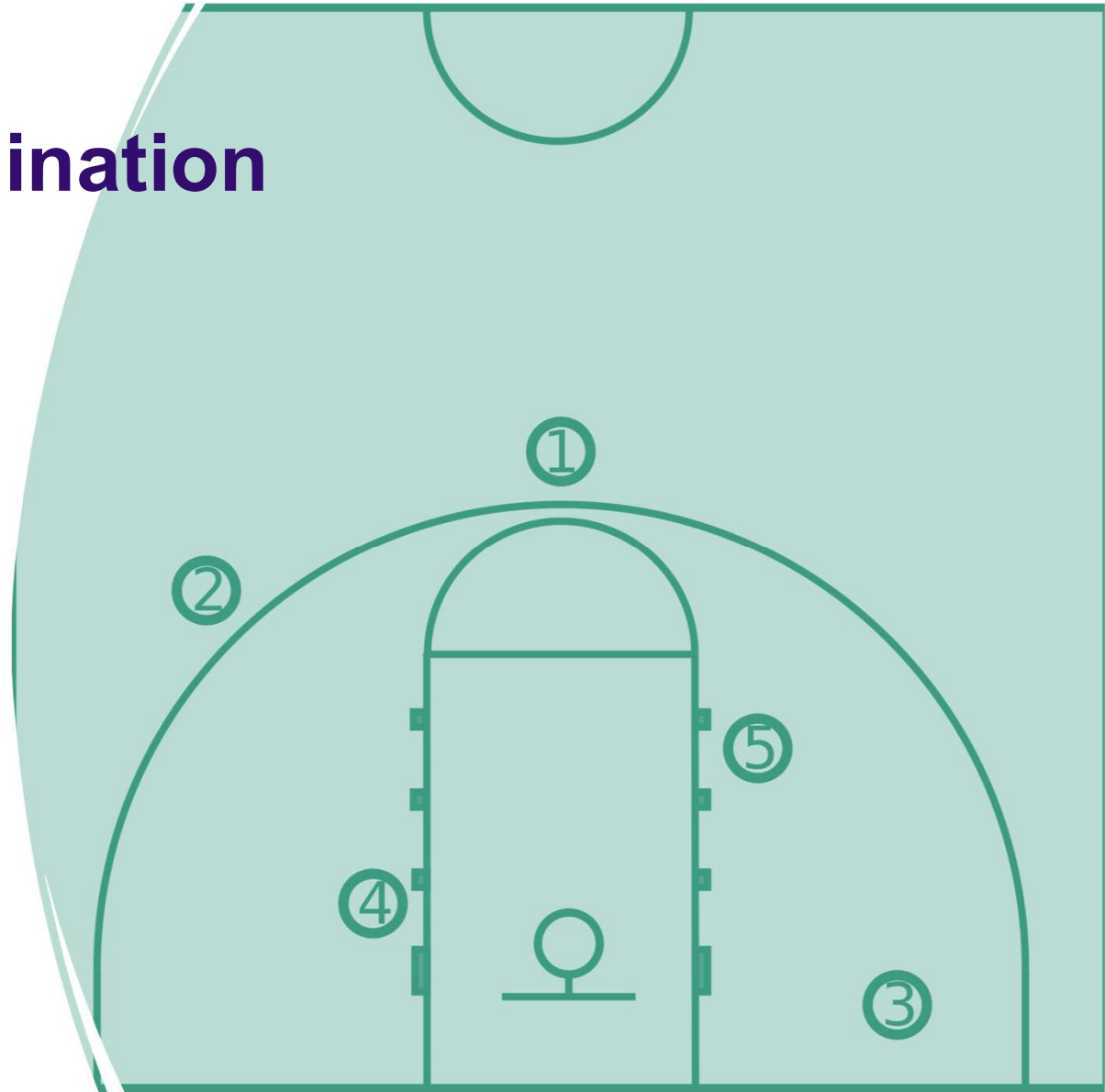
# Equity of the new guidelines

Race/ethnicity group	Pediatric only (6 studies)	Pediatric and adult (3 studies)
Asian	0	3090 (8.1%)
Black	63 (4.2%)	3462 (9.1%)
Hispanic	0	0
American Indian, Alaskan Native, Native Hawaiian, Pacific Islander	0	1160 (3.1%)
White	1057 (71.2%)	28341 (74.7%)
Other/Unknown	364 (24.5%)	1902 (5.0%)
Total	1484	37955

Adah and Jones, unpublished

# Frameworks: Playbook for Dissemination & Implementation

- Selected based on outcomes, context and barriers
- Pragmatic, guided description of domains, factors, resources
- Allows the users to systematically address needs during implementation



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**What resources or tools do you feel are important when implementing practice changes at your hospital?**

## *Live Content Slide*

*When playing as a slideshow, this slide will display live content*

**Poll: What resources or tools do you feel are important when implementing practice changes at your hospital?**

# Clinical pathways



To refer a patient to Connecticut Children's, contact the OneCall team:

📞 1.833.733.7669 | 📍 Our Locations

For Medical Professionals

COVID-19 Resources

Make a Referral +

Resources for Referring Providers +

Physician Relations

Care Network +

Clinical Pathways

Education & Training +

Stay Connected +

Medical Staff Office

Careers

## Asthma (Emergency Department and Inpatient)

### Pathway Background and Objectives

In the United States, asthma affects 7 million children under 18 years. In 2010, 58.3% of children with asthma had at least one asthma attack in the previous twelve months. Nearly 20% of children diagnosed with asthma went to an ED for care in 2009. Asthma is the third-ranking cause of hospitalization for children and one of the leading causes of school absenteeism, approximately 12.8 million school days. Less than half of all children with asthma have an asthma action plan. Clinical pathways for asthma can decrease LOS, costs, and unnecessary antibiotic use without increasing rates of readmissions, leading to higher value care.

The objectives of this pathway are to:

- Standardize management of patients presenting with asthma exacerbation
- Ensure safe transfer of patients from the Emergency Department to Inpatient Unit
- Ensure all patients are discharged with a completed asthma home treatment plan
- Ensure that all eligible patients are started on a daily inhaled corticosteroid

### Algorithm

- [Asthma Emergency Department Pathway Algorithm](#)
- [Asthma Inpatient Pathway Algorithm](#) – Updated February 14, 2022

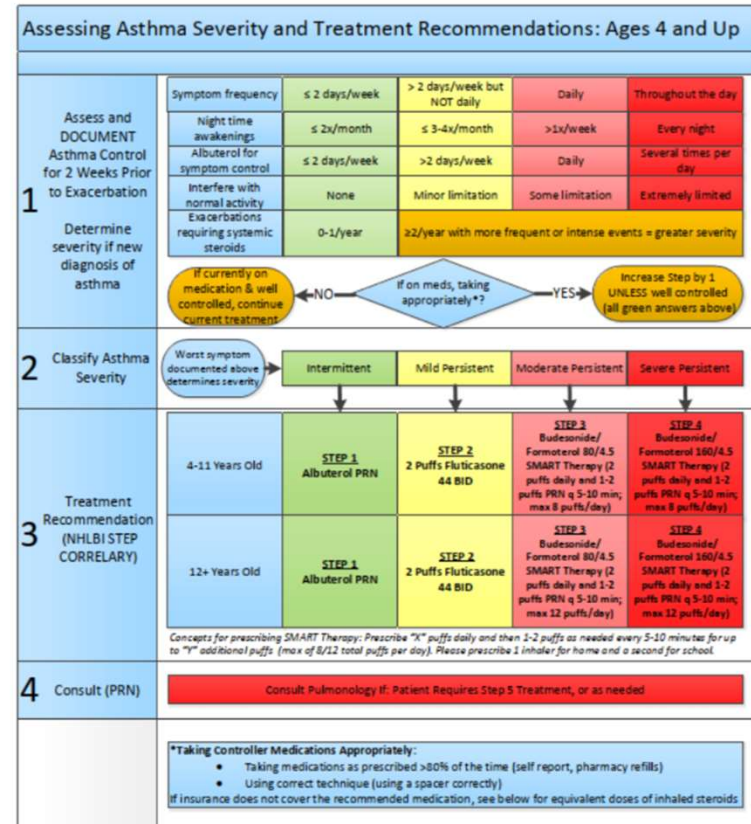
For management of this condition in primary care, [see CLASP/Co-Management guideline](#)

# Clinical pathways

## Appendix A: Assessing Asthma Severity and Treatment Recommendations

- Providers may use this tool in conjunction with the Asthma-Specific H&P to determine appropriate stepwise treatment plan
- Determine asthma control based on standardized questions (which should be documented in the Asthma-Specific H&P)
  - Classify asthma severity
  - Determine appropriate treatment
  - Consult as needed

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# Institutional guides

## Asthma Reference Guide

The goal of this asthma care reference guide is to help clinicians provide quality care to children with asthma across the care continuum at Children's Mercy. This was done by summarizing national (EPR4/GINA) and institutional guidelines, as well as resources available at Children's Mercy.

1. Important Children's Mercy-Specific Asthma Resources
2. Introduction to Asthma
3. Asthma Diagnosis
4. Asthma Presentation
5. Goals of Asthma Therapy and Management
6. Asthma Severity and Asthma Control
7. Asthma Outpatient Management
8. Treating Modifiable Risk Factors
9. Treating Co-Morbid Conditions
10. Asthma Medications
11. Yellow Zone Therapy Options
12. Allergy Immunotherapy and Biologic Therapy
13. Asthma Exacerbations in the Emergency Department or Urgent Care
14. Special Asthma Considerations for Inpatient
15. Asthma Management in the PICU
16. Respiratory Support for Asthma Exacerbation
17. Asthma Education Resources
18. Note about COVID-19 Influenza Vaccines

## 11. Yellow Zone Therapy Options

In the EPR 4, the expert panel specified three critical outcomes (exacerbations, asthma control and quality of life) and one important outcome (rescue medication use for this question) for asthma. There were no differences in asthma control, quality of life, in rescue therapy using the two types of intermittent ICS therapy (ICS paired with albuterol in two studies and yellow zone ICS in one study) compared to daily ICS in three studies in youth ages 12 years and older and adults with a high certainty evidence. There were also no differences in exacerbations between groups in any of the three studies but the strength of the evidence for exacerbations was low.

In individuals ages 4 years and older with mild to moderate persistent asthma who are likely to be adherent to daily ICS treatment, the Expert Panel conditionally recommends against a short-term increase in the ICS dose for increased symptoms or decreased peak flow.







YELLOW ZONE THERAPY	PARTICIPANT AGE	FINDINGS	REFERENCE
Intermittent ICS	Children <6 years of age	High dose ICS reduced viral induced exacerbations by 35%	Kaiser, Sunitha V., et al. "Preventing exacerbations in preschoolers with recurrent wheeze: a meta-analysis." <i>Pediatrics</i> 137.6 (2016).
	School age children and adults	Reduction in oral corticosteroids but low quality evidence	Chong, Jimmy, et al. "Intermittent inhaled corticosteroid therapy versus placebo for persistent asthma in children and adults." <i>Cochrane Database of Systematic Reviews</i> 7 (2015).



# Institutional guides

	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	
Every 3 months or as needed: Patient education, review medication technique, assess environmental control, and manage of comorbidities							
<b>&lt;5 years old</b>	<b>Intermittent Asthma</b>		<b>Persistent Asthma: Daily Medication</b>				
	Preferred Treatment (choose 1)	PRN SABA  <i>EPR4:</i> At start of URI, start 7-10 day course of ICS + PRN SABA	low-dose ICS + PRN SABA	low-dose ICS/LABA + PRN SABA or medium-dose ICS + PRN SABA	Specialist referral  medium-dose ICS/LABA + PRN SABA	Specialist referral  high-dose ICS/LABA + PRN SABA	Specialist referral  high-dose ICS/LABA + oral corticosteroids + PRN SABA
	Alternative Treatment (if alternative treatment fails, use preferred treatment prior to stepping up)	(none)	LTRA + PRN SABA	Consider specialist referral	medium-dose ICS + LTRA + PRN SABA	high-dose ICS + LTRA + PRN SABA	high-dose ICS+LTRA + oral corticosteroids + PRN SABA
	Quick-Relief Medication	If clear benefit is not observed in 4-6 weeks, and medication technique and adherence are satisfactory, consider adjusting therapy or alternate diagnoses. -SABA as needed for symptoms. Intensity of treatment depends on severity of symptoms. -With viral respiratory symptoms: SABA every 4-6 hours up to 24 hours (longer with physician consult). Consider short course of oral systemic corticosteroids if asthma exacerbation is severe or patient has history of severe exacerbations. -Caution: Frequent use of SABA may indicate the need to step up treatment.					
<b>5-11 years of age</b>	<b>Intermittent Asthma</b>		<b>Persistent Asthma: Daily Medication</b>				
	Consult with asthma specialist if step 4 care or higher is required. Consider consultation at step 3.						
	Preferred Treatment	PRN SABA	low-dose ICS + PRN SABA	low-dose ICS/formoterol + PRN ICS/formoterol	medium-dose ICS/formoterol + PRN ICS/formoterol	high-dose ICS/LABA + PRN SABA	high-dose ICS/LABA + oral corticosteroids + PRN SABA
	Alternative Treatment (choose 1) (if alternative treatment fails, use preferred treatment prior to stepping up)	<i>GINA2020:</i> concomitant SABA + low-dose ICS PRN	LTRA + PRN SABA or concomitant SABA + low-dose ICS PRN	low-dose ICS/LABA + PRN SABA or medium-dose ICS + PRN SABA	med-dose ICS/LABA + PRN SABA or med-dose ICS+LTRA + PRN SABA	high-dose ICS+LTRA + PRN SABA	high-dose ICS+LTRA + oral corticosteroids + PRN SABA
Consider subcutaneous allergen immunotherapy (for dust mites, animal dander, pollen) for patients who have persistent, allergic asthma. Consider adding tiotropium, biologics, or LTRA -SABA as needed for symptoms. Intensity of treatment depends on severity of symptoms: up to 3 treatments every 20 minutes as needed. Short course of oral							

# Institutional resources

ICS/LABA: Available Medications						
Name (Brand)	Dosage Forms	Product Image	FDA-Approved Indicated Age	Dosage Strengths (per puff)	AWP COST (\$) <sup>1</sup>	Formulary (Y/N)
Budesonide and formoterol fumarate (Symbicort)	HFA		6+	80 mcg ICS/4.5 mcg LABA 160 mcg ICS/4.5 mcg LABA	382.54 437.26	Y
Fluticasone furoate and vilanterol (Breo)	Eliпта (DPI)		18+	100 mcg ICS/25 mcg LABA 200 mcg ICS/25 mcg LABA	434.17 434.17	N
Fluticasone propionate and salmeterol (AirDuo)	RespiClick (DPI)		12+	55 mcg ICS/14 mcg LABA 113 mcg ICS/14 mcg LABA 232 mcg ICS/14 mcg LABA	384.28 384.28 384.28	N
Fluticasone propionate and salmeterol (Advair)	HFA		12+	45 mcg ICS/21 mcg LABA 115 mcg ICS/21 mcg LABA 230 mcg ICS/21 mcg LABA	317.05 472.72 621.72	Y
	Diskus (DPI)		4+	100 mcg ICS/50 mcg LABA 250 mcg ICS/50 mcg LABA 500 mcg ICS/50 mcg LABA	317.05 393.93 518.10	N
Mometasone furoate and formoterol fumarate (Dulera)	HFA		5+	50 mcg ICS/5 mcg LABA 100 mcg ICS/5 mcg LABA 200 mcg ICS/5 mcg LABA	373.62 373.62 373.62	Y

# Grand rounds/division meetings

- #ThatZoomLife
- Give division updates
- Demonstrate expertise to community groups



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# Asynchronous medical education

## Conversations from the World of Allergy

### Episode 41: 2020 NHLBI Asthma Guidelines: What's New & Different

In this episode intended for allergists and other healthcare professionals, Michelle M. Cloutier, MD, Chair of the Expert Panel Working Group of the National Asthma Education and Prevention Program Coordinating Committee that is coordinated by the National Heart, Lung, and Blood Institute (NHLBI), discusses important aspects of the NHLBI's newly released 2020 asthma guidelines during this in-depth and comprehensive interview. Listen now to learn more about what the guidelines do and do not address, as well as important perspective about how to put these recommendations into practice. (December 3, 2020)



[Click here to listen to the podcast.](#)  
[Read the transcript of the conversation.](#)  
[2020 Focused Updates to the Asthma Management Guidelines: A Report from the National Asthma Education and Prevention Program Coordinating Committee Expert Panel Working Group](#)



#### Apple Podcasts Preview



#### 6.22.21 "Implementing the 2020 Focused Updates Asthma Guidelines : Pediatric Recommendations" Dr. Michelle Cloutier

Connecticut Children's Grand Rounds

Medicine

[Listen on Apple Podcasts](#)

1 hr 2 min

PLAY

List the 5 topics included in the 2020 Focused Updates to the Asthma Guidelines that include recommendations for children. Define shared-decision making and its role in developing treatment options for children with asthma and their caregivers. Develop a plan for implementing SMART (Single Maintenance and Reliever Therapy) in children with asthma.

[More Episodes](#)

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## Special Article

### A Practical Guide to Implementing SMART in Asthma Management

Helen K. Reddel, MB, BS, PhD<sup>a,\*</sup>, Eric D. Bateman, MB, ChB, MD<sup>b,\*</sup>, Michael Schatz, MD, MS<sup>c</sup>, Jerry A. Krishnan, MD, PhD<sup>d</sup>, and Michelle M. Cloutier, MD<sup>e</sup> Sydney, Australia; Cape Town, South Africa; San Diego, Calif; Chicago, Ill; and Farmington, Conn

The Journal of Allergy and Clinical Immunology: In Practice (January 2022)

DOI: 10.1016/j.jaip.2021.10.011



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# Logistics – SMART Asthma Action Plan

Asthma Action Plan  
www.childrensmercy.org/asthma



### GREEN ZONE

I do not have asthma symptoms (cough, wheeze or problems breathing).  
I can play and I can sleep without symptoms.

#### Actions to Take

My SMART inhaler is...

I will take \_\_\_\_\_ puffs with my spacer.

Asthma symptoms starting? I will take my SMART inhaler 2 puffs and go to **YELLOW ZONE**.

Comments:

### YELLOW ZONE

I have used my SMART inhaler for asthma symptoms.  
I have a cold.

#### Actions to Take

Continue SMART inhaler  
**AND**  
I will take 2 puffs of my SMART inhaler when I have asthma symptoms.

If I used my SMART inhaler more than \_\_\_\_\_ in one day I will go to **RED ZONE**.

If I do not have my SMART inhaler at school or with me:

- I can use my quick reliever inhaler instead.
- Albuterol 2 puffs every 4 hours as needed or before exercise.

Make an appointment to see my asthma provider.

Comments:

### RED ZONE

I have used my SMART inhaler more than \_\_\_\_\_ in one day.  
I am finding it hard to breathe.

#### Actions to Take

#### Seek EMERGENCY Care

Call your asthma provider or the Children's Mercy nurse triage line at (816) 234-4444.

**Go to the ER or call 911 if:**

- Pulling at the ribs or neck.
- Lips or fingernails are blue.
- Struggling to breathe.
- You are very concerned about your child's breathing.

Comments:

## Asthma Action Plan

childrensmercy.org/asthma

If listed below: Use Controller every day to prevent asthma symptoms.  
Symbicort (budesonide/formoterol) Inhaler 160/4.5 mcg inhale 2 puffs Once per day

### GREEN ZONE

- Feel great
- No cough or wheeze
- Can play
- Can sleep

USE QUICK RELIEVER AS NEEDED

### QUICK RELIEVER

—Use as needed to stop asthma symptoms: coughing, wheezing or problems breathing. Symbicort (budesonide/formoterol) 160mg-4.5mcg inhale 2 puffs every 4 hours as needed; max 12 puff/day

1. Asthma symptoms NOW: GIVE QUICK RELIEVER
2. If quick reliever does not work fast (in 20 minutes): GIVE QUICK RELIEVER again
3. If quick reliever does not work fast (in 20 minutes): GIVE QUICK RELIEVER again

**RED** STOP SLOW DOWN  
**YELLOW** FEEL GOOD  
**GREEN**

NO Symptoms: Go to **YELLOW ZONE** ← NEXT → YES Symptoms: Go to **RED ZONE**

MY TRIGGERS ARE: Smoke, Other: vaping

### YELLOW ZONE

Start this medicine and use for 2 weeks then return to GREEN ZONE.

Symbicort (budesonide/formoterol) Inhaler 160/4.5 mcg inhale 2 puffs Once per day

- Cough or wheeze starting
- First sign of a cold

CONTINUE GREEN ZONE MEDICINE  
USE QUICK RELIEVER AS NEEDED

### RED ZONE

Start this medicine NOW

Prednisone Tablet 20 mg 60 tablet(s) by mouth take now

NEXT:  
CALL YOUR PROVIDER OR GO TO EMERGENCY ROOM  
CALL 911 FOR BLUE LIPS OR BLUE FINGERNAILS

PCP INFORMATION: PCP: No, PCP,  
Follow-up in 1 weeks with PCP or as directed in hospital discharge instructions No, PCP.

DEC 01/14/14

## Logistics – Insurance Coverage

**Problem:** Insurance companies have not caught up with the current practice guidelines

Insurance typically covers ICS/LABA dosing at the traditional rate of 1-2 puffs BID



Patients use more often with SMART, run out faster

### • Solutions:

- Prescribe SMART ICS/LABA, but just 1 puff BID
- Working with insurance companies/representatives who can enact change

## Logistics - Care Coordination

1. Patients leave the hospital with a new (and possibly very different/less familiar) AAP

2. PCPs, schools and other providers need to be aware of the new plan, the new recommended guidelines, AND buy into this plan for their patient to continue in the future

## Solutions

- Developing standard language for discharge summaries according to SMART AAP that explains the recommendations

## Children's Medication Management

- Educational Outreach to WH-associated PCP clinics:
  - Local educational newsletters
  - Outward Facing Asthma Resource Guide

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# QI and IS tools for implementing SMART



# Resources for choosing a Framework

## Dissemination-implementation.org


Keyword found in 5 Models total.

Search Criteria: Keyword: guideline

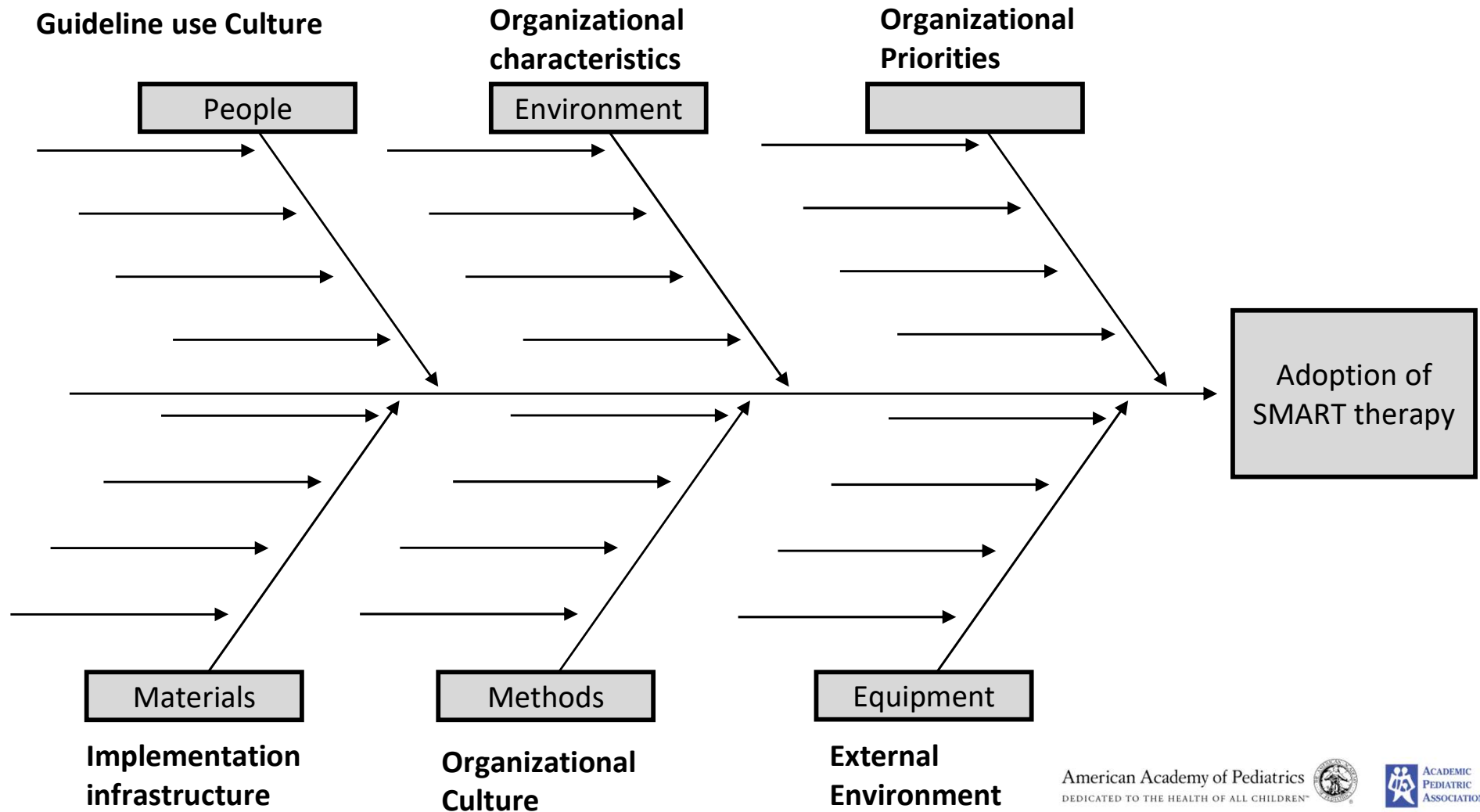
CSV Format  Excel Format

<input type="checkbox"/>	Model	D &/or I	Construct Flexibility	Socio-Ecological Levels	Field of Origin	Times Cited	Rating
<input type="checkbox"/>	Critical Realism & the Arts Research Utilization Model (CRARIUM) <a href="#">Description</a>	D=I	3	Individual Organization	Clinical practice guidelines	56	n/r
<input type="checkbox"/>	Davis' Pathman-PRECEED Model <a href="#">Description</a>	D=I	3	Individual Organization Community	Public Health	132	n/r
<input type="checkbox"/>	Diffusion of Innovation <a href="#">Description</a>	D-Only	1	Individual Organization Community	Agriculture	19700	n/r
<input type="checkbox"/>	Johns Hopkins Nursing Evidence-Based Practice Model and Guidelines <a href="#">Description</a>	D>I	5	Individual Organization	Nursing	94	n/r
<input type="checkbox"/>	Ottawa Model of Research Use <a href="#">Description</a>	D=I	4	Individual Organization Community	Health care	82	n/r

CSV Format  Excel Format

Model Name	RE-AIM 1.0 Framework
D and/or I	D=I
Construct Flexibility	4
Socio-Ecological Levels	Individual Organization Community
Figure	
Field of Origin	Public Health
Practitioner/Researcher	n/a
Constructs	Adoption Implementation Innovation characteristics Maintenance and Sustainability Reach Stakeholders
Website	<a href="http://www.re-aim.org/">http://www.re-aim.org/</a>
Number of Times Cited	1360
Citations	Glasgow RE, Vogt TM, Boles SM. Evaluating the public health impact of health promotion interventions: the RE-AIM framework. Am J Publ Health 1999;89(9):1322-7.
Examples	Aittasalo M, Miilunpalo S, Ståhl T, Kukkonen-Harjula K. From innovation to practice: initiation, implementation and evaluation of a physician-based physical activity promotion programme in Finland. Health Promot Int 2007;22(1):19.

# Cause-Effect Diagram: QI and PRISM framework



# Measuring Outcomes

Quantitative	Qualitative
SMART AAP ordering	Provider satisfaction
SMART education provided by physicians/RTs	Community provider satisfaction with hospital-made change to SMART
ICS/LABA orders within the hospital	Patient and family satisfaction with change to SMART
Provider reported knowledge of guidelines	
OUTCOMES	Balancing Measures
Asthma control scores (within system)	Length of stay/ Visit due to SMART education
Exacerbations	Patient inability to attain medication (insurance coverage)
Patient reported ICS daily use	

# Implementation outcome measures

<i>Implementation Outcomes and Definitions</i>	
<i>Acceptability</i>	Stakeholders' perception that an intervention is acceptable and amenable to implementation
<i>Adoption</i>	Uptake and utilization of a new intervention
* <i>Appropriateness</i>	Degree of perceived suitability ("fit") of an intervention to a specific context or target population
<i>Cost</i>	Cost of the intervention and the implementation strategy (can refer to marginal cost, cost-benefit, or cost effectiveness)
<i>Coverage</i>	Degree to which a target population receives an intervention
<i>Feasibility</i>	Degree to which an intervention can be effectively put into practice
* <i>Fidelity</i>	Degree of consistency between how the intervention was designed and how it was implemented
<i>Penetration</i>	Degree of institutionalization or spread of the intervention
<i>Sustainability</i>	Degree to which an intervention can be maintained in a particular setting

Variation between guideline or Appropriateness for a population

E.g., Are we not implementing down to 4 yo because of patient barriers, or insurance/FDA barriers?

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Ashrafzadah et al 2019

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## **Question:**

What outcome measures do you think could be easily tracked at your institution or could help to evaluate for effective implementation?



# SMART Implementation Resources/Toolkit

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# Final Thoughts

- Pediatric hospitalists can proactively initiate SMART in the hospital setting
- Sustainable implementation of EPR-4 SMART guidelines starts with assessment of:
  - Care gaps
  - Environments
  - Barriers
- Involve all relevant stakeholders early in the process
- Dissemination & Implementation tools should be used to address barriers at many levels
  - Audit for successful sustained use

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# Thank you!

Please reach out with any questions

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# SMART Implementation Resources/Toolkit

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