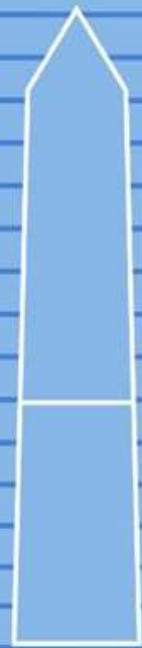
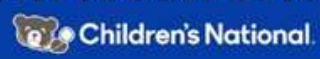


Future ^{OF} Pediatrics

Pediatric Health Network



SMART Tips to Breathe Easy

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Pediatric Pulmonologist



Single Maintenance and Reliever Therapy (SMART)

Appropriate Candidates:

- Age \geq 4 years
- moderate to severe persistent asthma, taking low-dose or medium-dose ICS
- Individuals with a severe exacerbation in the prior year
- Uncontrolled on ICS-LABA + PRN SABA

Recommended formulations of ICS-formoterol: Symbicort, Breyna

- Budesonide-formoterol
- Formoterol-mometasone*
- 1-2 puffs ICS-formoterol once or twice daily + 1-2 puffs PRN

SMART: Ages 5-11 years

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
Preferred	PRN SABA	Daily low-dose ICS and PRN SABA	Daily and PRN combination low-dose ICS-formoterol [▲]	Daily and PRN combination medium-dose ICS-formoterol [▲]	Daily high-dose ICS-LABA and PRN SABA	Daily high-dose ICS-LABA + oral systemic corticosteroid and PRN SABA
Alternative		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: Conditionally recommend the use of subcutaneous immunotherapy as an adjunct treatment to standard pharmacotherapy in individuals ≥ 5 years of age whose asthma is controlled at the initiation, build up, and maintenance phases of immunotherapy [▲]			Consider Omalizumab ^{**▲}	



Symbicort 80-4.5mcg

- Low dose ICS-formoterol
- 1 puff daily + 1 puff PRN (daily max: 8 puffs)



Symbicort 80-4.5mcg

- Medium dose ICS-formoterol
- 1 puffs BID + 1 puff PRN (daily max: 8 puffs)

SMART: Ages >12

AGES 12+ YEARS: STEPWISE APPROACH FOR MANAGEMENT OF ASTHMA

	Intermittent Asthma	Management of Persistent Asthma In Individuals Ages 12+ Years				
Treatment	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6 [■]
Preferred	PRN SABA	Daily low-dose ICS and PRN SABA or PRN concomitant ICS and SABA ▲	Daily and PRN combination low-dose ICS-formoterol ▲	Daily and PRN combination medium-dose ICS-formoterol ▲	Daily medium-high dose ICS-LABA + LAMA and PRN SABA ▲	Daily high-dose ICS-LABA + oral systemic corticosteroids + PRN SABA
Alternative		Daily LTRA* and PRN SABA or Cromolyn,* or Nedocromil,* or Zileuton,* or Theophylline,* and PRN SABA	Daily medium-dose ICS and PRN SABA or Daily low-dose ICS-LABA, or daily low-dose ICS + LAMA, ▲ or daily low-dose ICS + LTRA,* and PRN SABA or Daily low-dose ICS + Theophylline* or Zileuton,* and PRN SABA	Daily medium-dose ICS-LABA or daily medium-dose ICS + LAMA, and PRN SABA ▲ or Daily medium-dose ICS + LTRA,* or daily medium-dose ICS + Theophylline,* or daily medium-dose ICS + Zileuton,* and PRN SABA	Daily medium-high dose ICS-LABA or daily high-dose ICS + LTRA,* and PRN SABA	
		Steps 2-4: Conditionally recommend the use of subcutaneous immunotherapy as an adjunct treatment to standard pharmacotherapy in individuals ≥ 5 years of age whose asthma is controlled at the initiation, build up, and maintenance phases of immunotherapy ▲			Consider adding Asthma Biologics (e.g., anti-IgE, anti-IL5, anti-IL5R, anti-IL4/IL13)**	



Symbicort 160-4.5mcg

- Low dose ICS-formoterol
- 1 puff daily or BID + 1 puff PRN (daily max: 12 puffs)



Symbicort 160-4.5mcg

- Medium dose ICS-formoterol
- 2 puffs BID + 1 puff PRN (daily max: 12 puffs)

Asthma Action Plan: 5-11 year old SMART

Green Zone

- Budesonide-formoterol 80-4.5mcg 1 puff BID (with spacer)
- Exercise: 1 puff budesonide-formoterol 80-4.5mcg 15 minutes before activity (with spacer)

Yellow Zone:

- 1 puff budesonide-formoterol as needed (daily max: 8 puffs)

Red Zone

- 1 puff budesonide-formoterol. If no improvement repeat 1 puff in 1-3 minutes, max: 6 inhalation, while seeking emergency help.
- Alternative: 6 puffs albuterol every 15 minutes, can repeat 3 times while seeking emergency help.

Asthma Action Plan: > 12 year old SMART

Green Zone

- Budesonide-formoterol 160-4.5mcg 2 puff BID (with spacer)
- Exercise: 1 puff budesonide-formoterol 80-4.5mcg 15 minutes before activity (with spacer)

Yellow Zone:

- 1 puff budesonide-formoterol as needed (daily max: 12 puffs)

Red Zone

- 1 puff budesonide-formoterol. If no improvement repeat 1 puff in 1-3 minutes, max: 6 inhalation, while seeking emergency help.
- Alternative: 6 puffs albuterol every 15 minutes, can repeat 3 times while seeking emergency help.

Intermittent ICS: >12 years

Step 2: SABA + ICS used PRN

- 2-4 puffs albuterol followed by 80-250 mcg of beclomethasone (QVAR) q4h PRN

AGES 12+ YEARS: STEPWISE APPROACH FOR MANAGEMENT OF ASTHMA

	Intermittent Asthma	Management of Persistent Asthma in Individuals Ages 12+ Years				
Treatment	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6 [■]
Preferred	PRN SABA	Daily low-dose ICS and PRN SABA or PRN concomitant ICS and SABA ▲	Daily and PRN combination low-dose ICS-formoterol▲	Daily and PRN combination medium-dose ICS-formoterol▲	Daily medium-high dose ICS-LABA + LAMA and PRN SABA ▲	Daily high-dose ICS-LABA + oral systemic corticosteroids + PRN SABA
Alternative		Daily LTRA* and PRN SABA or Cromolyn,* or Nedocromil,* or Zileuton,* or Theophylline,* and PRN SABA	Daily medium-dose ICS and PRN SABA or Daily low-dose ICS-LABA, or daily low-dose ICS + LAMA,▲ or daily low-dose ICS + LTRA,* and PRN SABA or Daily low-dose ICS + Theophylline* or Zileuton,* and PRN SABA	Daily medium-dose ICS-LABA or daily medium-dose ICS + LAMA, and PRN SABA▲ or Daily medium-dose ICS + LTRA,* or daily medium-dose ICS + Theophylline,* or daily medium-dose ICS + Zileuton,* and PRN SABA	Daily medium-high dose ICS-LABA or daily high-dose ICS + LTRA,* and PRN SABA	
		Steps 2-4: Conditionally recommend the use of subcutaneous immunotherapy as an adjunct treatment to standard pharmacotherapy in individuals ≥ 5 years of age whose asthma is controlled at the initiation, build up, and maintenance phases of immunotherapy▲			Consider adding Asthma Biologics (e.g., anti-IgE, anti-IL5, anti-IL5R, anti-IL4/IL13)**	

Intermittent ICS: 0-4 years

AGES 0-4 YEARS: STEPWISE APPROACH FOR MANAGEMENT OF ASTHMA

	Intermittent Asthma	Management of Persistent Asthma in Individuals Ages 0-4 Years				
Treatment	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6
Preferred	PRN SABA and At the start of RTI: Add short course daily ICS▲	Daily low-dose ICS and PRN SABA	Daily low-dose ICS-LABA and PRN SABA▲ or Daily low-dose ICS + montelukast,* or daily medium-dose ICS, and PRN SABA	Daily medium-dose ICS-LABA and PRN SABA	Daily high-dose ICS-LABA and PRN SABA	Daily high-dose ICS-LABA + oral systemic corticosteroid and PRN SABA
Alternative		Daily montelukast* or Cromolyn,* and PRN SABA		Daily medium-dose ICS + montelukast* and PRN SABA	Daily high-dose ICS + montelukast* and PRN SABA	Daily high-dose ICS + montelukast* + oral systemic corticosteroid and PRN SABA

For children age 4 years only, see Step 3 and Step 4 on Management of Persistent Asthma in Individuals Ages 5-11 Years diagram.

Step 1
(recurrent wheezing)

- 7-10 day course of daily ICS + PRN SABA

Step 3

- Daily low dose ICS-LABA +PRN SABA

Life after Flovent

- **Ages 0-8 years – HFA/MDI with spacer**
 - Fluticasone (44mcg, 110mcg, 220mcg)
 - Mometasone/Asmanex (50mcg, 100mcg, 200mcg)
- **Ages >8 years – breath actuated inhalers**
 - Beclomethasone/QVAR Redihaler (40mcg, 80mcg)
 - Budesonide/Pulmicort Flexhaler (90mcg, 180mcg)
 - Mometasone/Asmanex Twisthaler (110mcg, 220mcg)
 - Fluticasone/Arnuity Ellipta (50mcg, 100mcg, 200mcg)



Applying for Prior Authorization: Age ≤ 5



The formulary alternative [*insert Qvar Redihaler, Arnuity Ellipta*] are dry powder inhalers (DPI).



Due to patients age, DPIs are not acceptable due to lung delivery efficiency.



Use of a DPI is counter to the recommendations of the Global Initiative for Asthma Guidelines (2023), which state “for children 5 years and younger, a pressurized metered-dose inhaler with a valved spacer chamber is the preferred delivery system.

Applying for Prior Authorization: Age ≤ 12

DPIs do not have child-friendly design characteristics

Limited drug delivery

Lower lung volumes + reduced flow \rightarrow variable effectiveness

Significant risk of under-dosing patients



(Lexmond et al, 2014)

Pulmonary Clinic Sites

Montgomery County

- General Pulmonary
- Severe Asthma
- Sickle Cell
- Sleep Disorders

Dr. Rosenberg

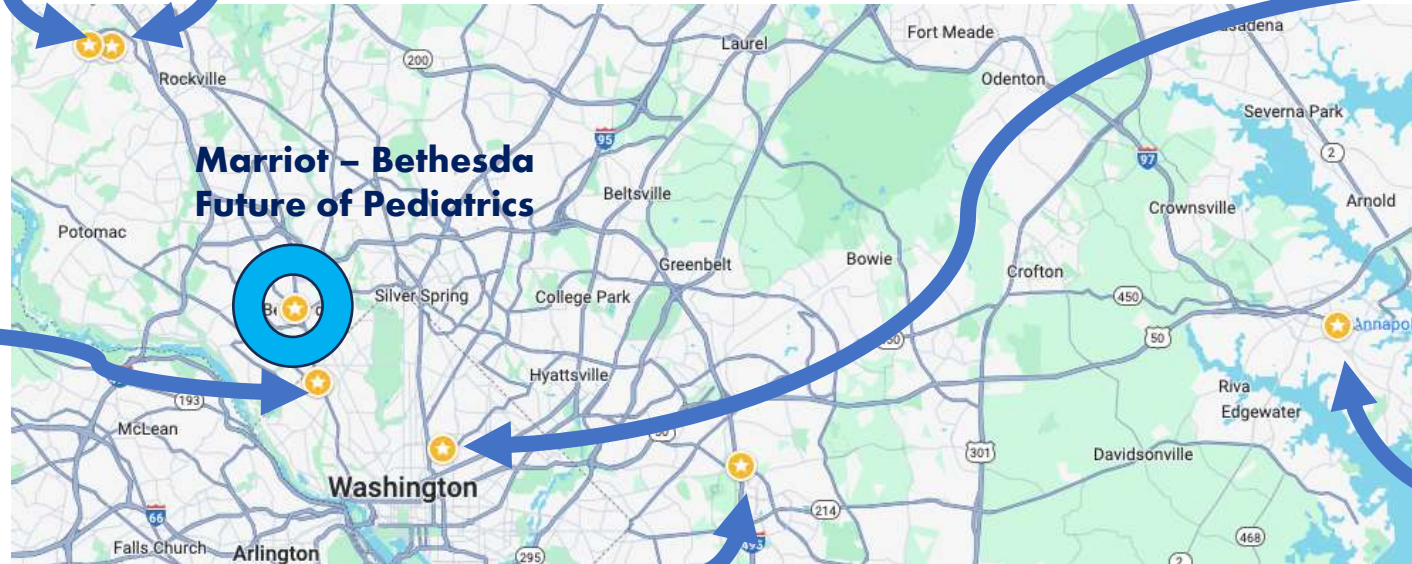
- General Pulmonary
- Apnea Monitors

Main Campus, D.C.

- General pulmonary
- Cystic fibrosis
- Sickle cell
- Severe asthma
- BPD
- Neuromuscular
- Sleep Disorders
- Aerodigestive

Friendship Heights

- Aerodigestive



**Marriot - Bethesda
Future of Pediatrics**

Prince George's County

- General Pulmonary
- Sleep Disorders
- Sickle Cell
- Severe asthma

Annapolis

- General pulmonary

Referring to Pulmonary

Common Referrals

- Uncontrolled asthma
- Chronic cough
- Recurrent wheezing
- Recurrent pneumonia
- Exercise induced dyspnea
- Dyspnea/chest pain
- Recurrent croup
- Snoring/OSA
- BPD/CLD of prematurity
- Pulmonary function testing

Urgent Referrals

- Abnormal newborn screen
- Abnormal sweat test
- Infant with tachypnea
- Child with abnormal CXR (CPAM, lobar atelectasis)
- Uncontrolled asthma after starting medications

For urgent referral call **202-476-2128** and ask for an urgent pulmonary visit.

*State reason for urgency, time frame
Anticipate Physician Call-back within 72 hours*

Managing Common Referrals

- Uncontrolled asthma

- Chronic cough

- Recurrent wheezing

- Trial of medication recommended prior to evaluation.
- Consider IMPACT DC Referral for asthma education
- If questions about medication choice can consult by phone through on-call paging system.

- Recurrent pneumonia

Criteria: > 2 bacterial pneumonias in 6 months or 3 in lifetime
Management: Consider ordering sweat test, CBC, Strep pneumo titers, IgGAM

- Exercise induced dyspnea

Management: Trial SABA + spacer, Referral if requiring frequent SABA outside pre-activity

- Recurrent croup

Uncontrolled asthma can be disguised as recurrent croup.
Management: start ICS, if recurs refer to ENT

- Snoring/OSA

Consider simultaneous ENT referral. In some cases, T&A can be considered even without PSG.

- Pulmonary function testing

Ideal candidate is ≥ 6 years old and able to follow instructions

Diseases with Pulmonary Manifestations

- Congenital lung and airway malformations : TEF, CDH
- Complex congenital heart disease
- Neuromuscular disease (DMD, SMA)
- Chest wall abnormalities (pectus excavatum, scoliosis)
- Sickle Cell Disease
- Solid organ or bone marrow transplantation (GVHD, chemotherapy)
- Rheumatologic disorders (Lupus, connective tissue diseases)

Subspecialty Clinics

Cystic Fibrosis Center	Appointments through Central Scheduling All new patients must be seen at main campus
Bronchopulmonary Dysplasia Clinic	Appointments through Central Scheduling E-mail: BPDprogram1@childrensnational.org for urgent questions/referrals
Severe Asthma Clinic	Refer if patient has ≥ 3 ED visits, ≥ 2 hospitalizations, ≥ 1 PICU admission E-mail pulmasthma@childrensnational.org for urgent questions/referrals
Aerodigestive Clinic	Consider for patients needing >2 of the following: SLP, ENT, Pulm, GI E-mail aerodigestive@childrensnational.org for referral If patient is already seeing one of the specialists, reach out to that provider to inquire about AD referral

Helpful Phone Numbers

**Urgent
Referrals:
202-476-2128**

**Sweat Test:
202-476-5355**

- Please order if patient has abnormal NMS
- If abnormal sweat test please call for urgent pulmonary appointment

**Scheduling
Sleep Study:
202-476-5777**

- Scheduling approximately 6 months in advance
- Can be ordered by PCP

**IMPACT DC
202-476-3970**

- Asthma Education
- Spacer Teaching
- Community Resources for Housing Problems

Pediatric **Health** Network



Children's National®