

Helping kids with asthma breathe easier

Childhood Asthma Management for Care Managers

MICHIGAN CSHCS ANNUAL TRAINING

TOBY C. LEWIS, MD, MPH

UNIVERSITY OF MICHIGAN PEDIATRIC PULMONARY

MAY 11, 2021



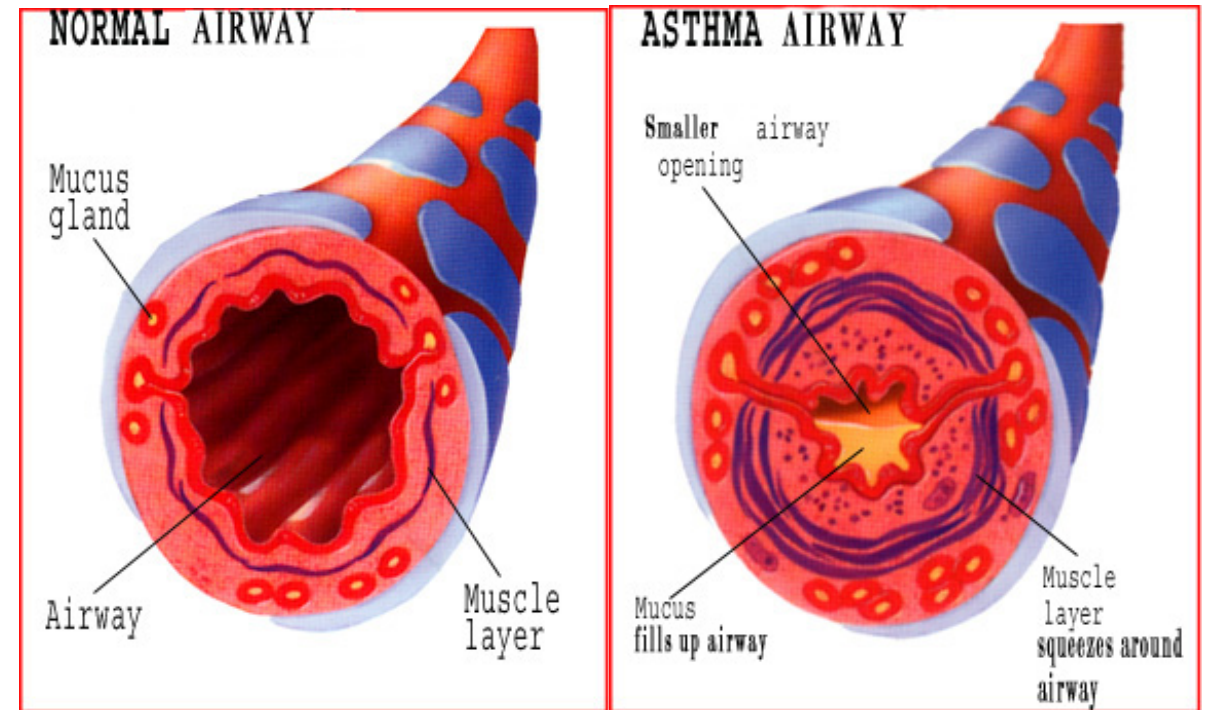
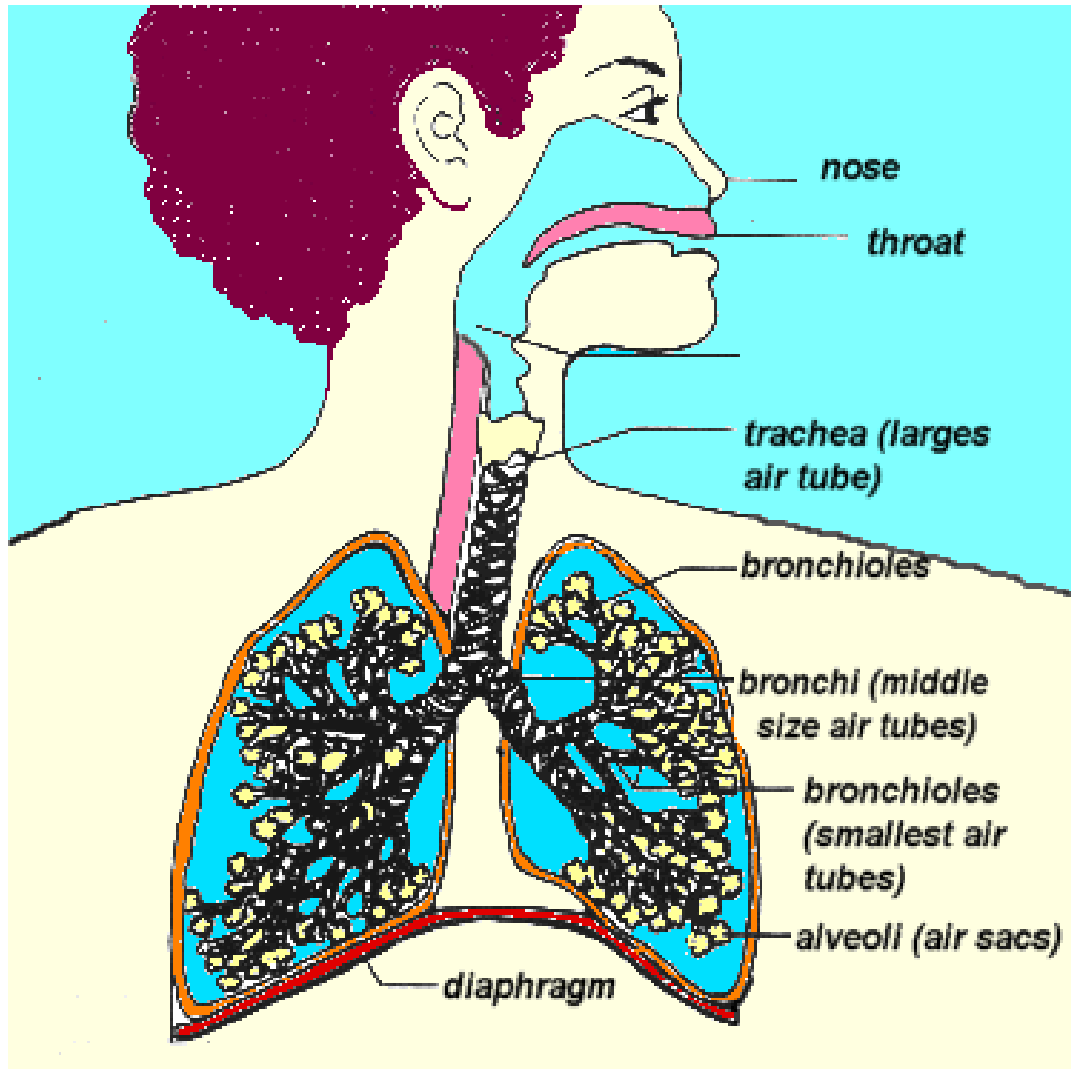
Objectives

1. To acquire a foundational understanding of asthma physiology
2. To improve knowledge about the role of social determinants of health in morbidity on asthma control and self-management, particularly in Michigan
3. To introduce the fundamental concepts of asthma care
4. To provide an brief overview of recent updates to asthma care guidelines from
 - A. NAEPP (2020)
 - B. GINA
5. To explore areas in which case managers can support patients, families, and clinicians

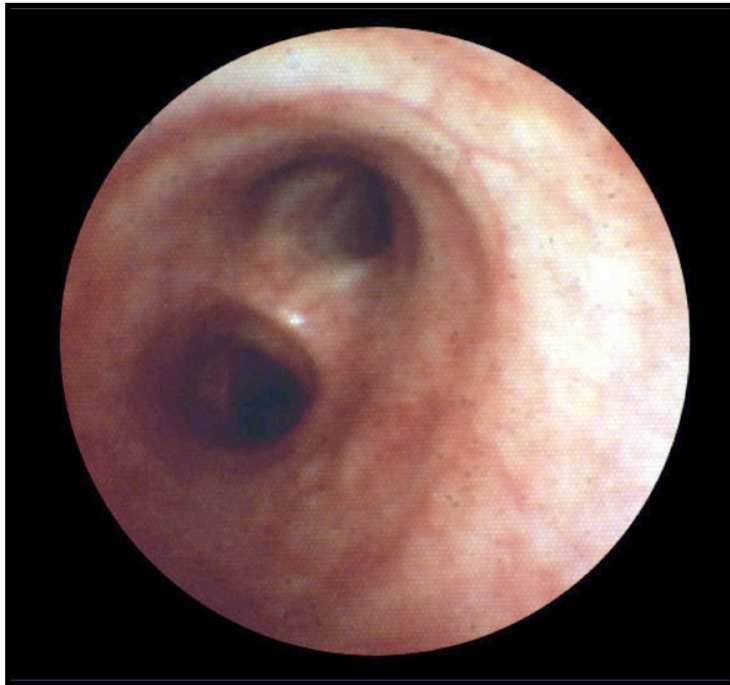
Asthma Background Basics



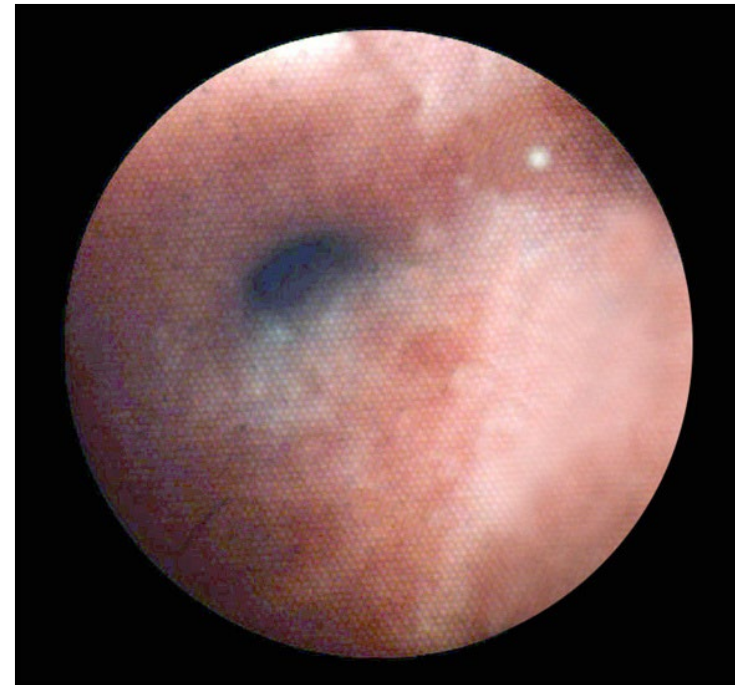
Respiratory Anatomy



This is your Airway...with Asthma

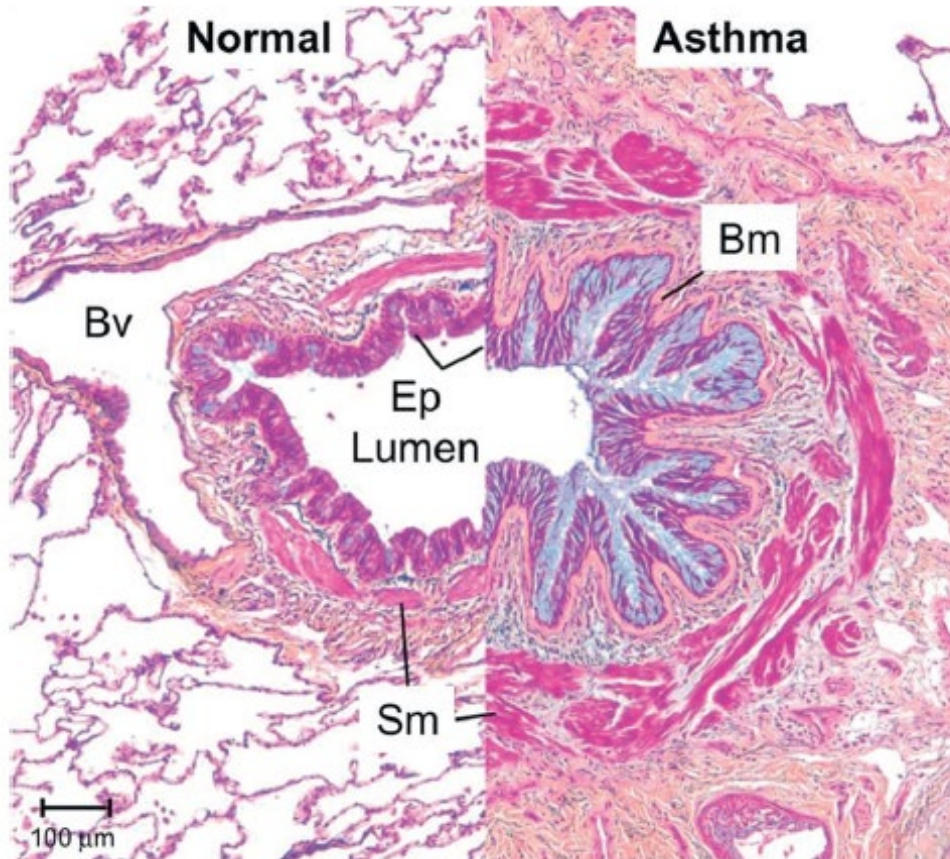


Before



10 Minutes After
Allergen Challenge

Airway pathology in asthma



Asthma is a chronic inflammatory condition

Untreated, it leads to structural changes in the airway lining, airway wall, and airway smooth muscle.

Symptoms of Asthma (mild to moderate)



Wheezing

Coughing

Chest tightness

Throat tightness

Waking up at night

Breathless with exercise before peers

Indications of a Severe Attack



Breathless at rest

Hunched forward

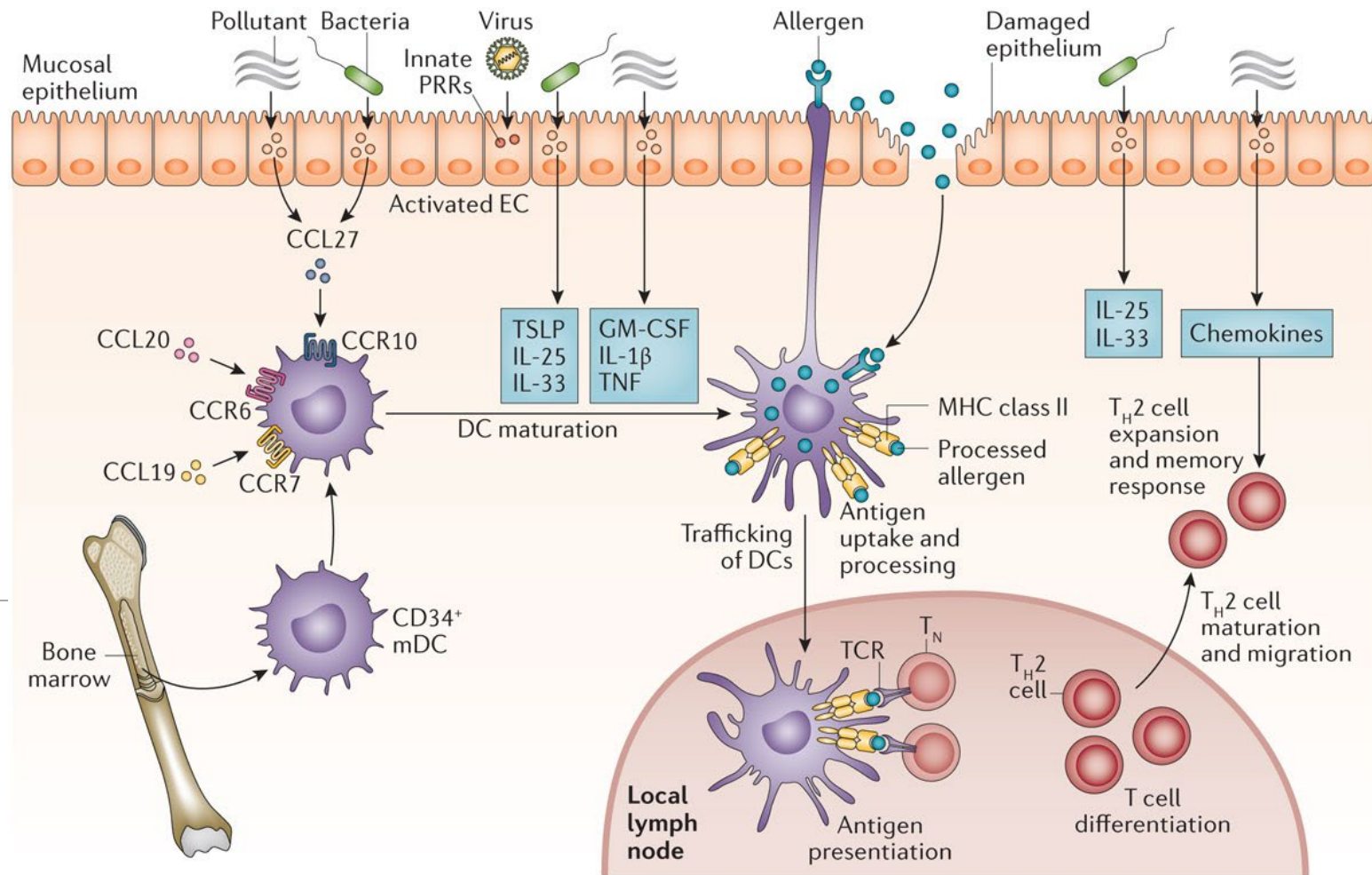
Talking in words rather than sentences

Agitated

Asthma Triggers

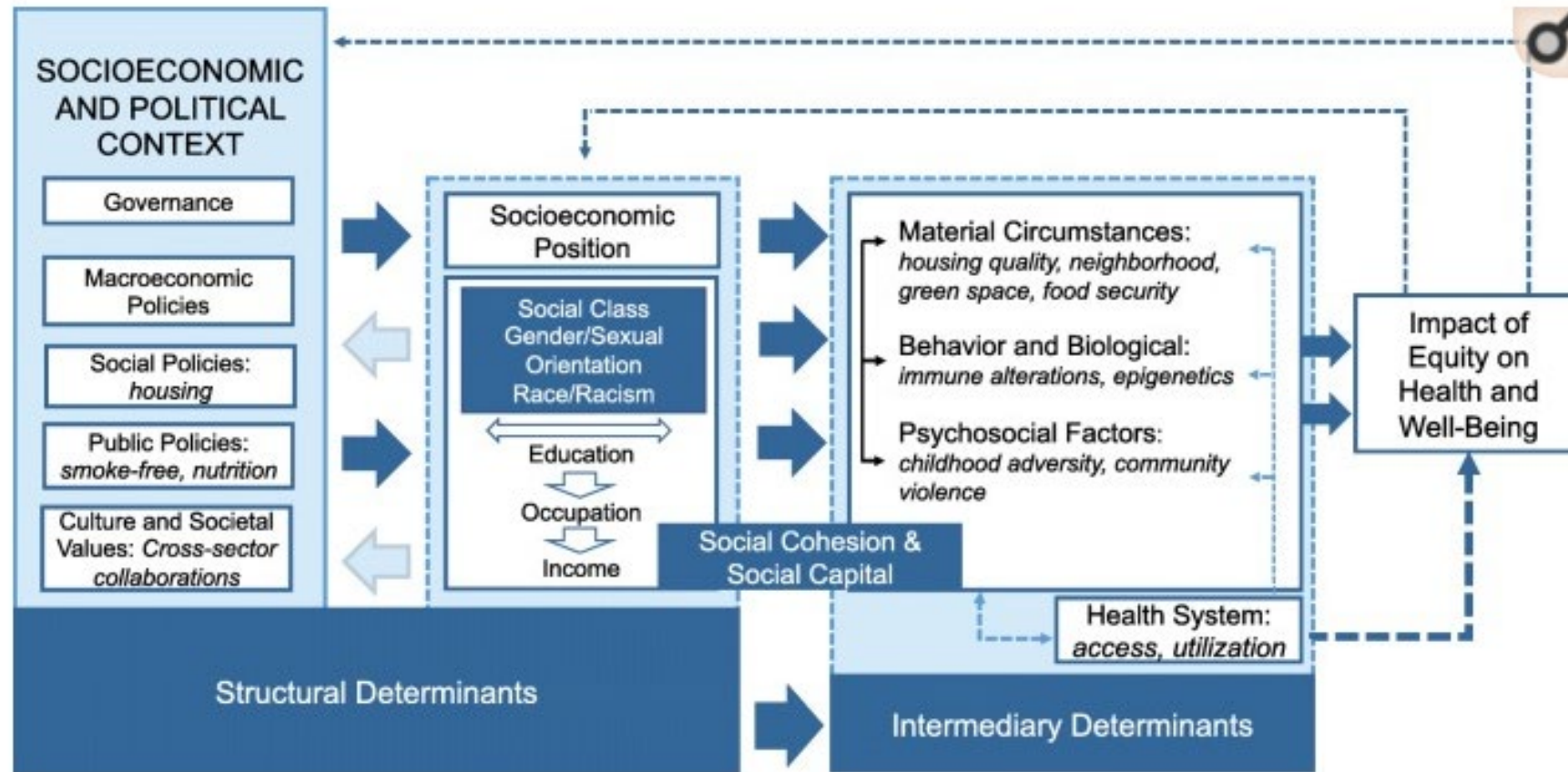


Immune responses in asthma – it's complicated!



Nature Reviews | Disease Primers

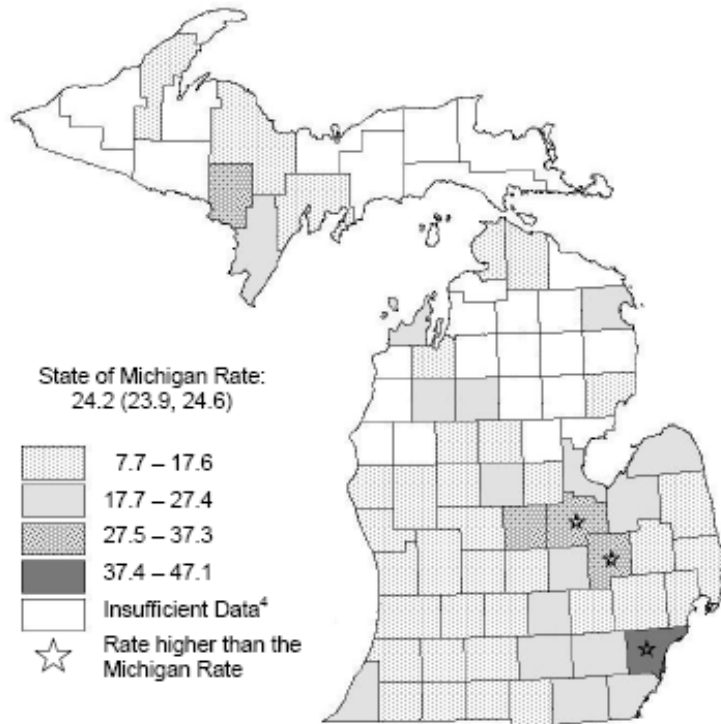
Social Determinants of Health and Asthma



The level at which structural and social determinants affect asthma and contribute to poor asthma outcomes. Adapted from the WHO's Conceptual Framework for the Social Determinants of Health [15]

Disparity in Asthma Hospitalization by Geography, Income, and Race/Ethnicity

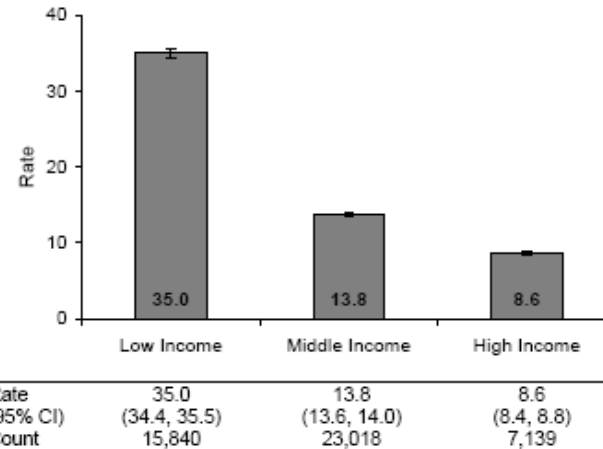
Figure 4.15: Rates^{1,2} (per 10,000) of Hospitalization due to Asthma³ for Children < 18 Years of Age by County of Residence, Michigan, 1999-2001



¹Rates are age adjusted to the 2000 US standard population by the direct standardization method. Hospitalization records with missing age are excluded.
²Population estimates are taken from the Michigan population estimates for 1999.
³Asthma hospitalization defined as a primary discharge diagnosis of asthma, ICD-9-CM=493.XX.
⁴Insufficient data to compute a stable rate. (Number of events ≤ 20 or Population < 5000).

Data Source: Michigan Inpatient Database, Bureau of Epidemiology, MDCH

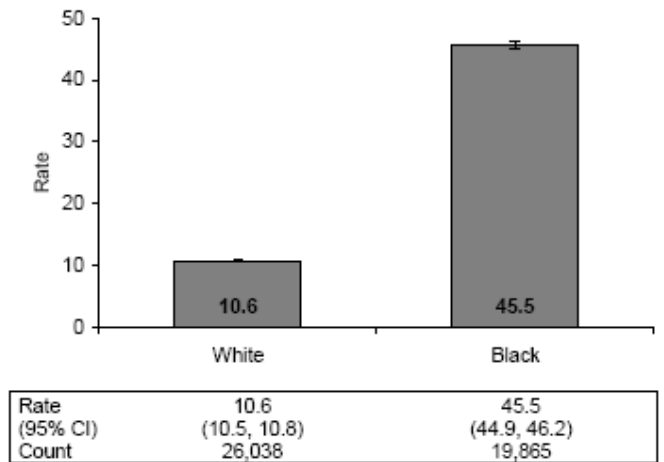
Figure 4.8: Rates^{1,2} (per 10,000) of Hospitalization due to Asthma³ by Income⁴, Michigan, All Ages, 1999-2001



¹Rates are age adjusted to the 2000 US standard population by the direct standardization method. Hospitalization records with missing age are excluded.
²Population is taken from the US Census 2000.
³Asthma hospitalization defined as a primary discharge diagnosis of asthma, ICD-9-CM=493.XX.
⁴High income=top 20% of Michigan's zip code areas, as determined by median household income from Census 2000; Low income=bottom 20% of Michigan's zip code areas, as determined by median household income from Census 2000; All others are considered middle income.

Data Source: Michigan Inpatient Database, Bureau of Epidemiology, MDCH

Figure 4.5: Rates^{1,2} (per 10,000) of Hospitalization due to Asthma³ by Race⁴, Michigan, All Ages, 1999-2001

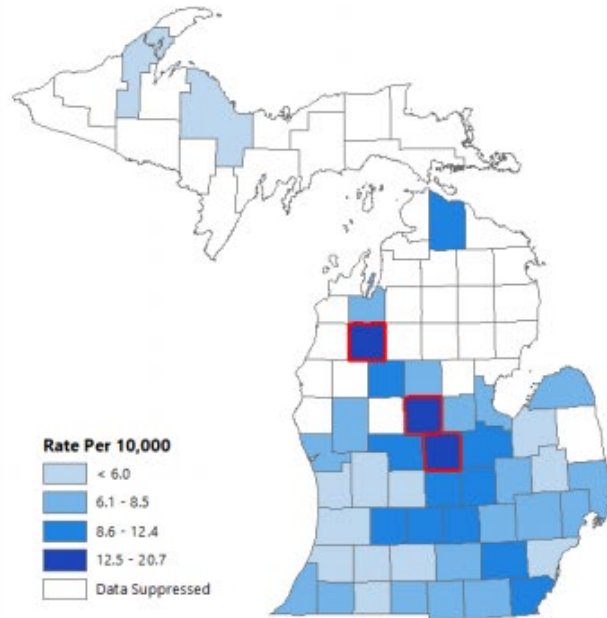


¹Rates are age adjusted to the 2000 US standard population by the direct standardization method. Hospitalization records with missing age are excluded.
²Population estimates are taken from the Michigan population estimates for 1999.
³Asthma hospitalization defined as a primary discharge diagnosis of asthma, ICD-9-CM=493.XX.
⁴For records that are missing data for race, race was assigned based on the 1990 census population.

Data Source: Michigan Inpatient Database, Bureau of Epidemiology, MDCH

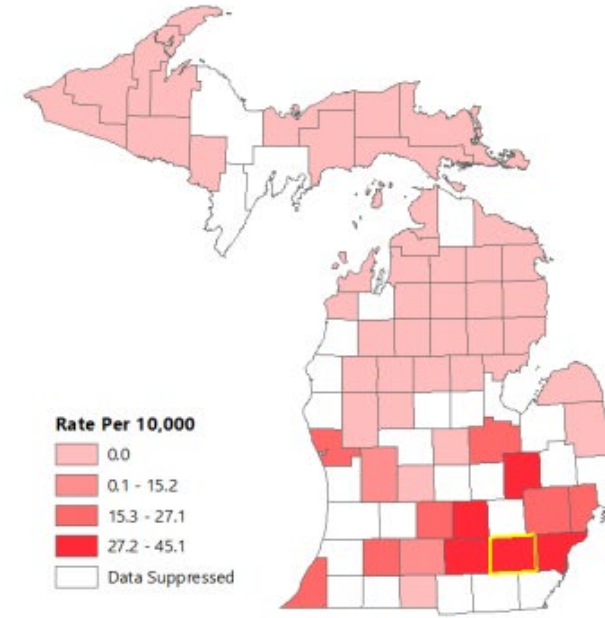
Child Asthma Hospitalizations by Race

White



Age-Adjusted Rates ^{a,b} (per 10,000) of Asthma Hospitalizations Among Children by Race (Aged <18) ^{c,d}					
County ^d	White	Black	County ^d	White	Black
Alcona	-	0.0	Lake	-	0.0
Alger	-	0.0	Lapeer	5.6	-
Allegan	4.5	-	Leelanau	-	0.0
Alpena	-	0.0	Lenawee	6.7	-
Antrim	-	0.0	Livingston	8.0	-
Arenac	-	0.0	Luce	-	0.0
Baraga	-	0.0	Mackinac	-	0.0
Barry	8.8	-	Macomb	6.7	23.5
Bay	8.5	-	Manistee	-	-
Benzie	-	0.0	Marquette	5.4	-
Berrien	6.3	22.4	Mason	-	-
Branch	7.6	0.0	Mecosta	-	0.0
Calhoun	5.2	9.2	Menominee	-	-
Cass	6.6	-	Midland	7.8	-
Charlevoix	-	0.0	Missaukee	-	0.0
Cheboygan	11.0	-	Monroe	9.0	-
Chippewa	-	0.0	Montcalm	10.3	-
Clare	7.7	0.0	Montmorency	-	0.0
Clinton	9.3	-	Muskegon	7.0	25.6
Crawford	-	0.0	Newaygo	7.8	0.0
Delta	-	-	Oakland	6.2	22.8
Dickinson	-	0.0	Oceana	-	-
Eaton	12.0	18.5	Ogemaw	-	0.0
Emmet	-	0.0	Ontonagon	-	0.0
Genesee	7.8	30.7	Osceola	9.0	0.0
Gladwin	-	0.0	Oscoda	-	0.0
Gogebic	-	0.0	Otsego	-	0.0
Grand Traverse	7.3	-	Ottawa	3.7	-
Gratiot	16.6 *	0.0	Presque Isle	-	0.0
Hillsdale	6.4	-	Roscommon	-	0.0
Houghton	5.7	0.0	Saginaw	8.7	27.0
Huron	6.7	0.0	St Clair	7.4	-
Ingham	12.4	29.3	St Joseph	3.1	-
Ionia	5.0	0.0	Sanilac	-	0.0
Iosco	-	0.0	Schoolcraft	-	0.0
Iron	-	0.0	Shiawassee	8.7	-
Isabella	18.5 *	-	Tuscola	4.2	-
Jackson	8.2	31.3	Van Buren	4.8	-
Kalamazoo	4.7	20.6	Washtenaw	11.4	45.1 *
Kalkaska	-	0.0	Wayne	5.8	31.9
Kent	6.0	15.2	Wexford	20.6 *	0.0
Keweenaw	-	0.0	State of Michigan	6.9	27.1

Black



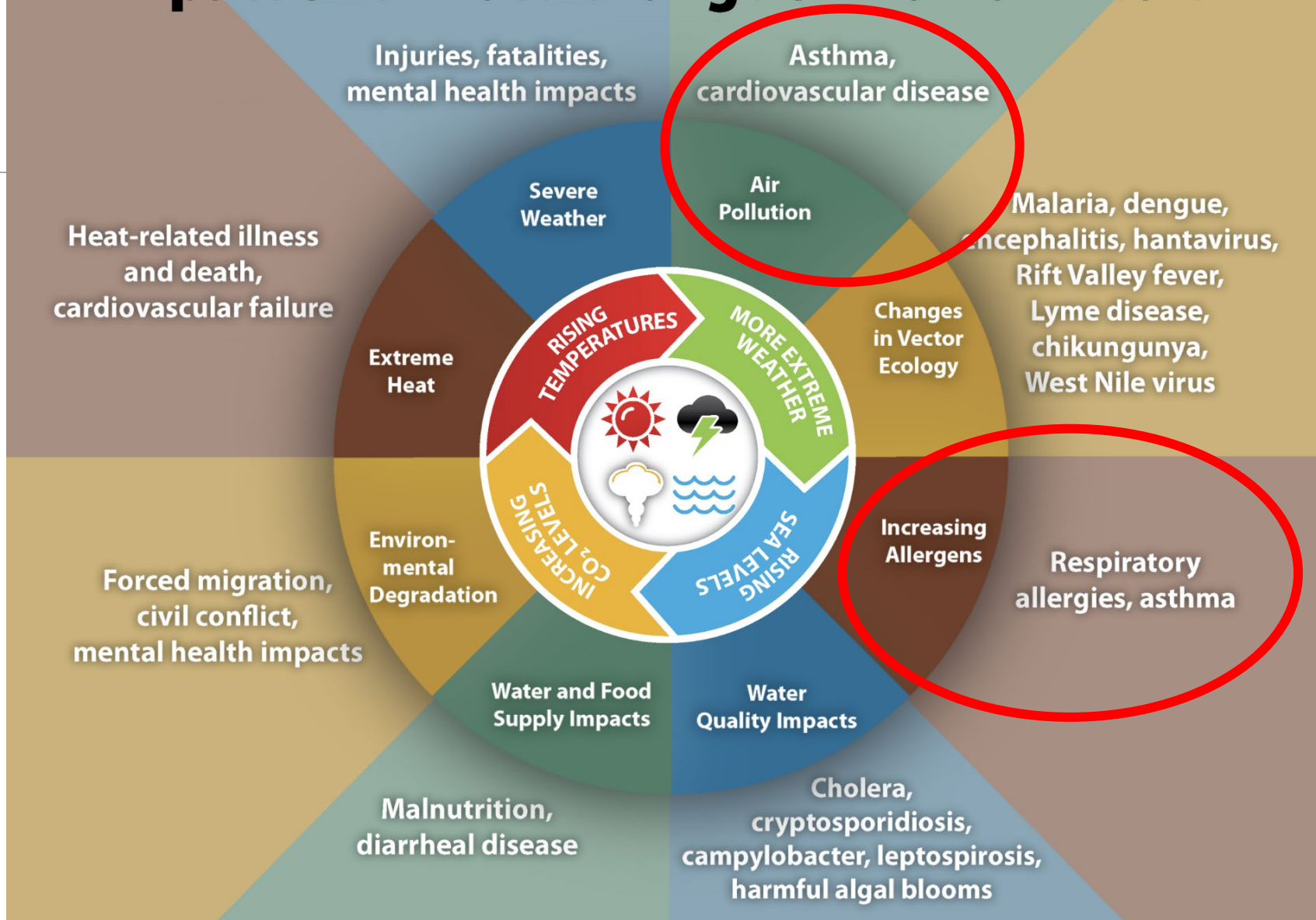
Data Notes:

^a Hospitalization data taken from the 2010-2014 Michigan Inpatient Database. ^b Rates are age-adjusted to the 2000 US Standard Population. ^c County rate suppressed if hospitalization count < 20.

^d Counties defined as outliers (see page 2) are outlined in red on the map of White individuals, outlined in yellow on the map of Black individuals, and indicated by an asterisk in the table.

Michigan Asthma Atlas
Feb 2019
MDHHS
Getasthmahelp.org

Impact of Climate Change on Human Health



Environmental Racism and Environmental Justice



Susan Melkisethian | <https://www.flickr.com/photos/susanmelkisethian/15291290076/in/album-72157647472373158/>

First National People of Color Environmental Leadership Summit, Oct 24-27, 1991, Washington, DC; Rev Benjamin F. Chavis Jr.

E.R.: Uneven and intentional distribution of environmental hazards by race/ethnicity

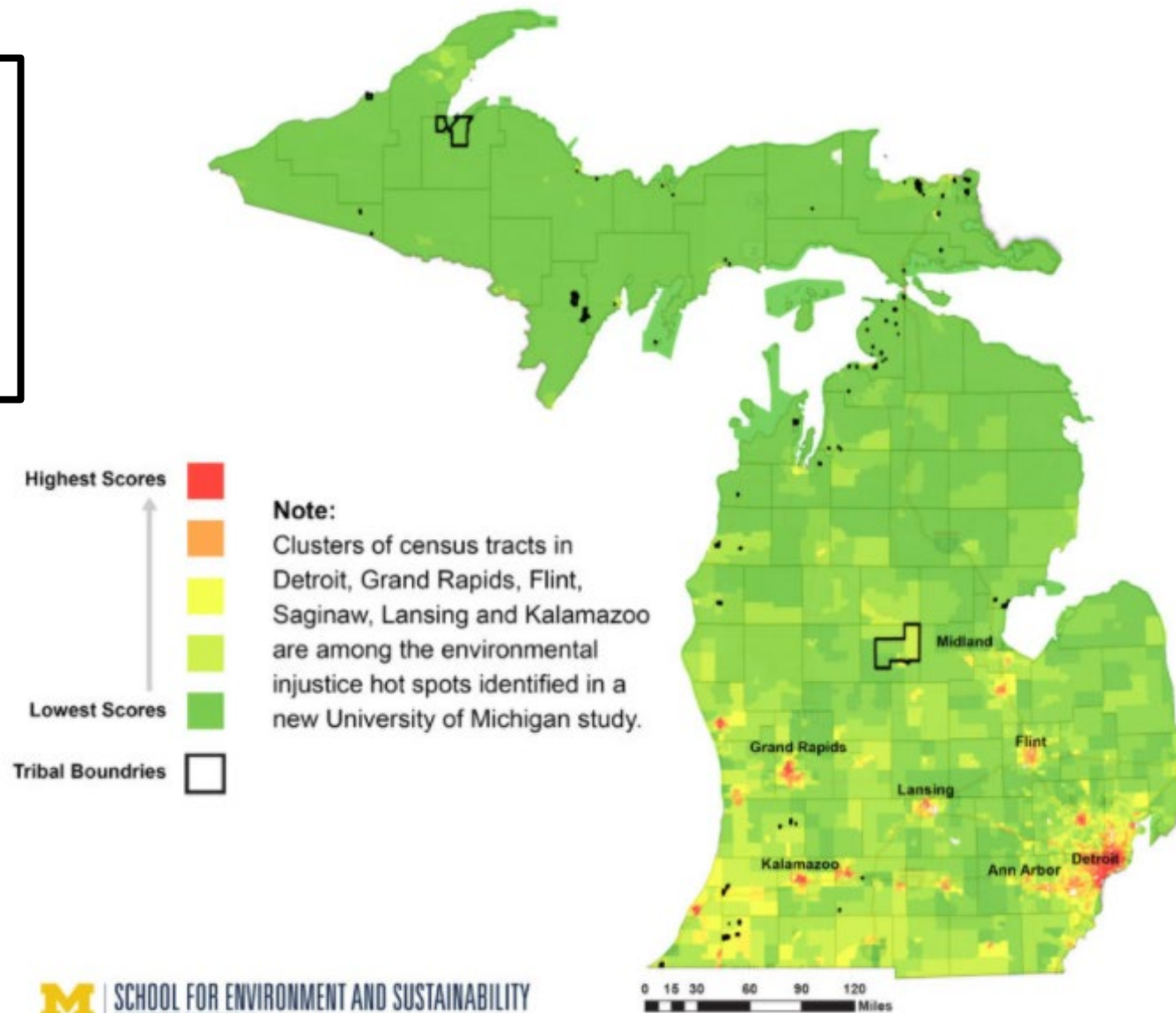
E.J.: All people are entitled to the fair treatment with respect to the development, implementation, enforcement of regulations, programs, and policies as it relates to the environment, health, employment, and housing.

Transparency, Accountability, Partnership

Published 17 principles of Environmental Justice https://www.ucc.org/what-we-do/justice-local-church-ministries/justice/faithful-action-ministries/environmental-justice/principles_of_environmental_justice/

Heat Map of Michigan Census Tracts Ranked by Environmental Justice Scores

EJSCREEN: US EPA's Environmental Justice Screening and Mapping Tool



Asthma Management Fundamentals



Fundamental Concepts in Asthma Care

Asthma Severity – Intermittent vs Persistent; Impairment and Risk

Asthma Control

Step-wise approach to medications (step-up and step-down)

Therapies –Controllers vs. Quick Relief

Trigger Avoidance and other non-pharma approaches

Chronic disease self-management strategies

Quick-Relief Medications

Used in acute asthma episodes for quick relief of symptoms

They are short-acting bronchodilators and will relax airway muscle spasm

Start acting quickly - but also wear off quickly

Don't do anything for inflammation

Most common: Albuterol (Proventil, Ventolin, ProAir) – Family: SABA: short-acting beta-agonist)

Controller Medications

Purpose: Long-term control of asthma

- Prevent asthma attacks
- Get an asthma attack under control

Most controllers work to reduce airway inflammation

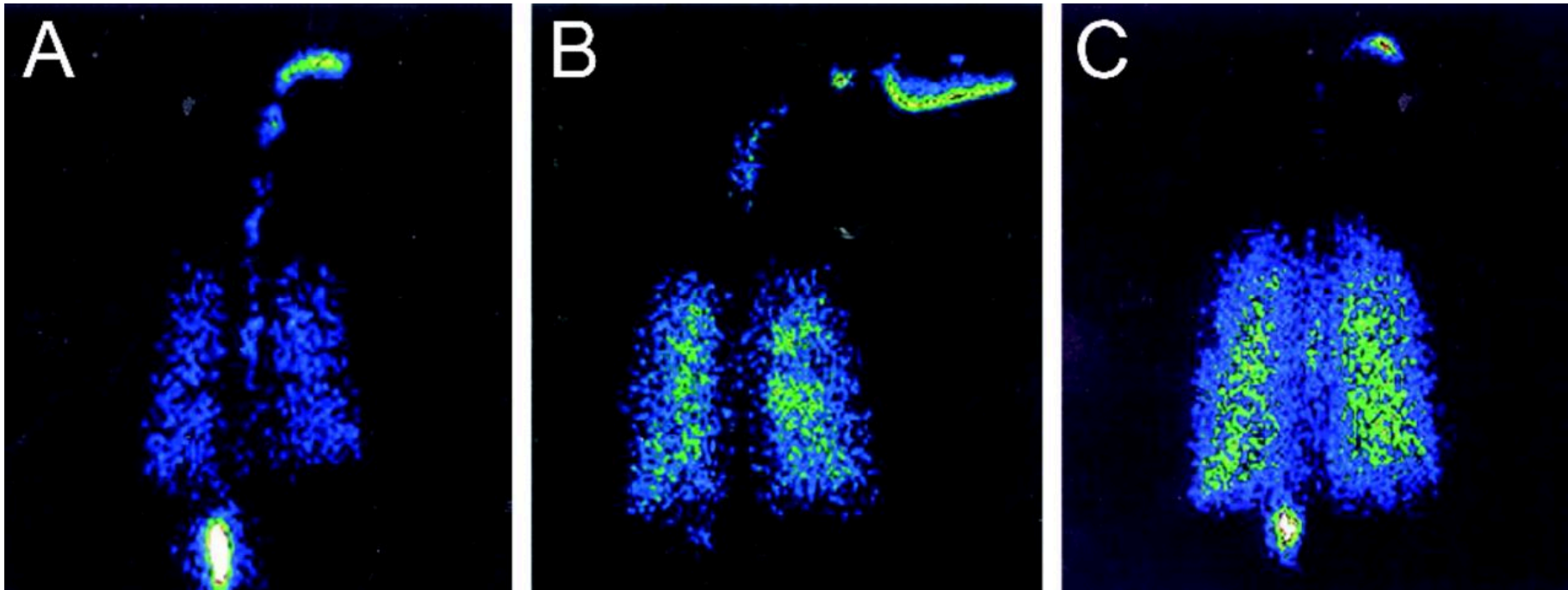
Slower acting - the benefits are not seen immediately, but they last longer

Most common is an inhaled corticosteroid (ICS) or oral corticosteroid (OC)

Also includes long-acting beta agonist (LABA), long acting muscarinic antagonist (LAMA), and leukotriene receptor antagonists (LTRA)

Can come in combination inhalers (e.g.: ICS-LABA)

Importance of good inhalation technique



Aerosol deposition with a pressurized metered-dose inhaler without a spacer (A), and with a spacer (B), compared to the soft mist inhaler (C) using radio scintigraphy.

Lots of non-pharmacological interventions!

Education and reinforcement

- Asthma action plan
- Inhalation technique
- Recognizing “zones”
- Distinguishing controllers from quick relievers

Problem-solving barriers to care and adherence

- Financial
- Transportation
- Language, Literacy, Health Literacy
- Cultural beliefs – home remedies
- Mistrust

Reducing environmental exposures

Address Comorbidities (obesity, GERD, allergies, sleep apnea, anxiety, depression, chronic and acute stress)

Note: Hovering your mouse over a field will show the instructions for that field.

Asthma Action Plan
Adults (18 years old and up)

Name: _____ Birth Date: _____ Today's Date: _____
Doctor: _____ Phone: _____
Specialist: _____ Phone: _____

GO! (GREEN Zone) Use these controller medicines every day

You have **ALL** of these:

- ✓ Breathing is easy
- ✓ No cough or wheeze
- ✓ Sleep well at night
- ✓ Able to exercise
- ✓ Peak flow is 80% of personal best (= _____)

Personal best = _____

▶ If asthma with exercise: _____

WATCH OUT! (YELLOW Zone) Keep using Green Zone medicines and ADD this quick-relief medicine

You have **ANY** of these:

- ✓ First sign of a cold
- ✓ Cough or wheeze
- ✓ Tight chest
- ✓ Wake at night
- ✓ Peak flow is 60% to 80% of personal best (_____ to _____)

First: _____
Next: ▶ If **not** breathing better after 2 treatments, 20 minutes apart, **GO TO RED ZONE**.
▶ If breathing better, take treatments every 4 to 6 hours as needed for up to 2 days.
Call the doctor: ▶ If at any time, quick-relief medicine does not last for 4 hours, OR
▶ If quick-relief medicine is needed more than 2 times a week.

DANGER! (RED Zone) Use these emergency medicines AND get medical help NOW!

You have **ANY** of these:

- ✓ Medicine not helping
- ✓ Breathing hard, fast
- ✓ Nose opens wide
- ✓ Can't walk or talk well
- ✓ Ribs suck in
- ✓ Peak flow less than 60% of personal best (< _____)

First: _____
Next: ▶ Wait 15 minutes to see if the treatment(s) have helped.
▶ If **not** breathing better, **GO TO THE EMERGENCY DEPARTMENT OR CALL 9-1-1**.
▶ If breathing better, keep taking treatments every 4 to 6 hours and **CALL THE DOCTOR FOR AN APPOINTMENT TODAY!**
▶ Make an appointment with your doctor within 2 days of an ER visit or hospitalization.

My asthma triggers (Items that can make my asthma worse). Avoid these triggers; pre-treat if needed.

<input type="checkbox"/> Cigarette smoke	<input type="checkbox"/> Wood smoke	<input type="checkbox"/> Reflux/GERD
<input type="checkbox"/> Colds/flu	<input type="checkbox"/> Dust, dust mites, carpeting	<input type="checkbox"/> Strong odors, perfumes, cleaners
<input type="checkbox"/> Exercise	<input type="checkbox"/> Changes in weather, temperature	<input type="checkbox"/> Foods: _____
<input type="checkbox"/> Mold/mildew	<input type="checkbox"/> Cockroaches	<input type="checkbox"/> Other: _____
<input type="checkbox"/> Animal dander, rodents	<input type="checkbox"/> Flowers, grass, trees, weeds, pollen	
<input type="checkbox"/> Ozone alert days	<input type="checkbox"/> Stress/emotions	

▶ Seasonal triggers for asthma: ☐ Fall ☐ Winter ☐ Spring ☐ Summer

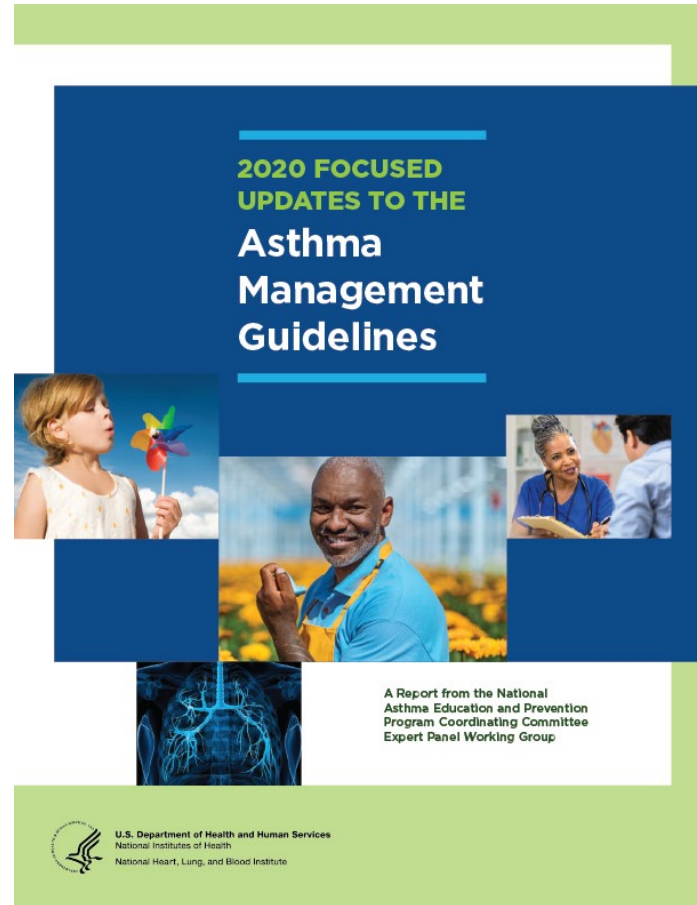
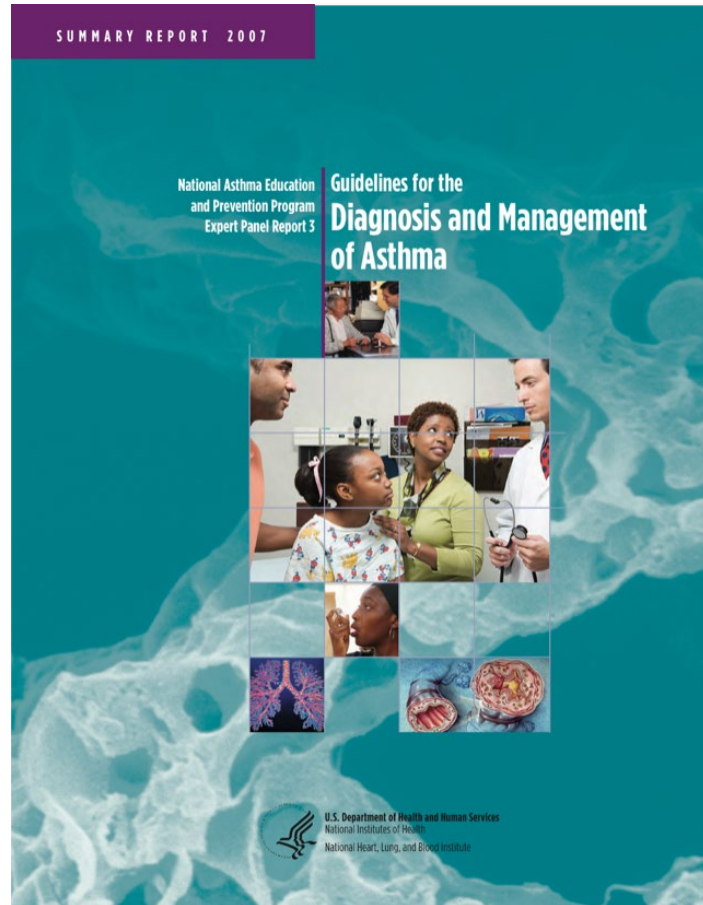
This Action Plan was developed in partnership with the patient by: _____ Date: _____

Doctor/Provider (sign): _____ Date: _____

Adapted from the original design by the Pediatric Asthma Coalition of New Jersey rev. 07/2017



NAEPP Guidelines (EPR)- Focused Updates - 2020



EPR-3 (2007):

<https://www.ncbi.nlm.nih.gov/books/NBK7232/>.

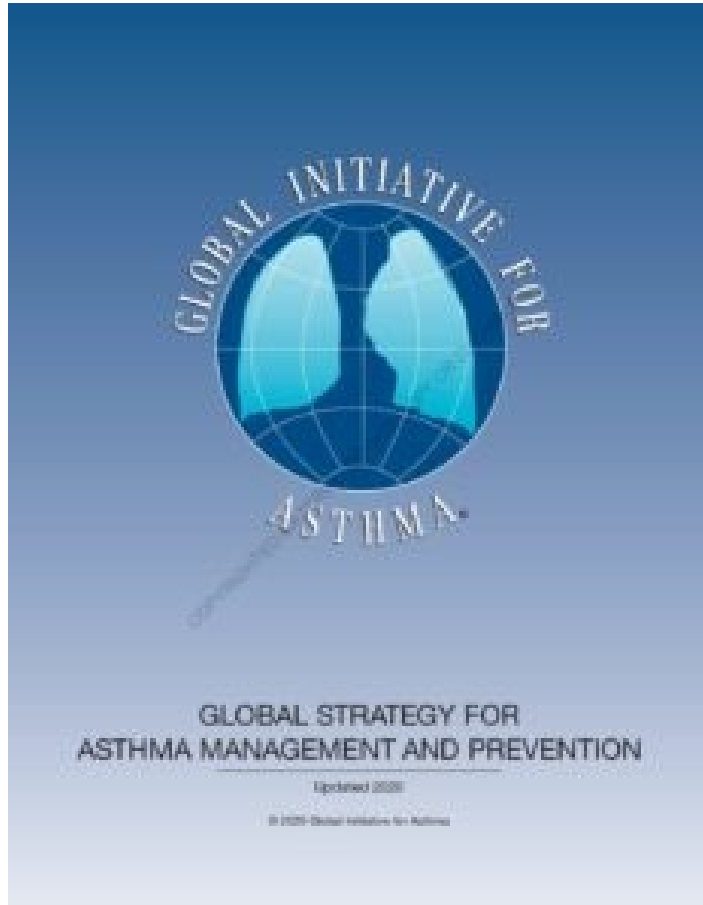
2020 Updates:

Based on studies published through October 2018.

J Allergy Clin Immunol 2020;146:1217–1270.

NIH Publication No. 20-HL-8142
December 2020

Global Initiative for Asthma (GINA)



- Updated annually.
- The global standard for countries that do not establish their own – especially low-resource settings
- Includes some drugs not available in the US
- Available: www.ginasthma.org

New Emphasis/Concepts

* Adjust treatment options based on specific patient groups and preferences*

For intermittent asthma

- Introduction of intermittent ICS *in some circumstances* (NAEPP);
- No more SABA only (GINA)

For mild-moderate persistent asthma:

- Inclusion of SMART therapy (Single Maintenance And Reliever Therapy: ICS-formoterol) *in some circumstances*
- Less emphasis on LTRA, particularly montelukast
- Introduction of long-acting muscarinic antagonist (LAMA) *in some circumstances*
- Statement about immunotherapy for allergic asthma

For severe asthma:

- Introduction of biologics

SMART

Single inhaler for both daily use (control) AND intermittent use (quick relief)

Must contain formoterol due to pharmacokinetics (not salmeterol)

Advantages:







- Easier for some patients – only one inhaler!
- Generally steroid-sparing (use more steroids during flares, but less routinely)
- Generally similar control (slightly worse at daily symptoms; similar in oral steroids, hospitalizations)

Challenges:

- Different education than “traditional” therapy
- Changes the way we think about Rx fills: Need more than 1 inhaler per month; need extra inhaler(s) for school
- * SMART may not work as well for those with poor perception of symptoms

Sobieraj DM, Weeda ER, Nguyen E, et al. Association of inhaled corticosteroids and long-acting β -agonists as controller and quick relief therapy with exacerbations and symptom control in persistent asthma: a systematic review and meta-analysis. *JAMA*. 2018;319(14):1485–1496.

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

		Management of Persistent Asthma in Individuals Ages 0–4 Years					
		Intermittent Asthma					
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 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

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**▲	

Quick Relief: Yellow and Red Zone

SABA:

- Use as needed for symptoms
- “Intensity of treatment depends on severity of symptoms: up to 3 treatments at 20-minute intervals as needed”

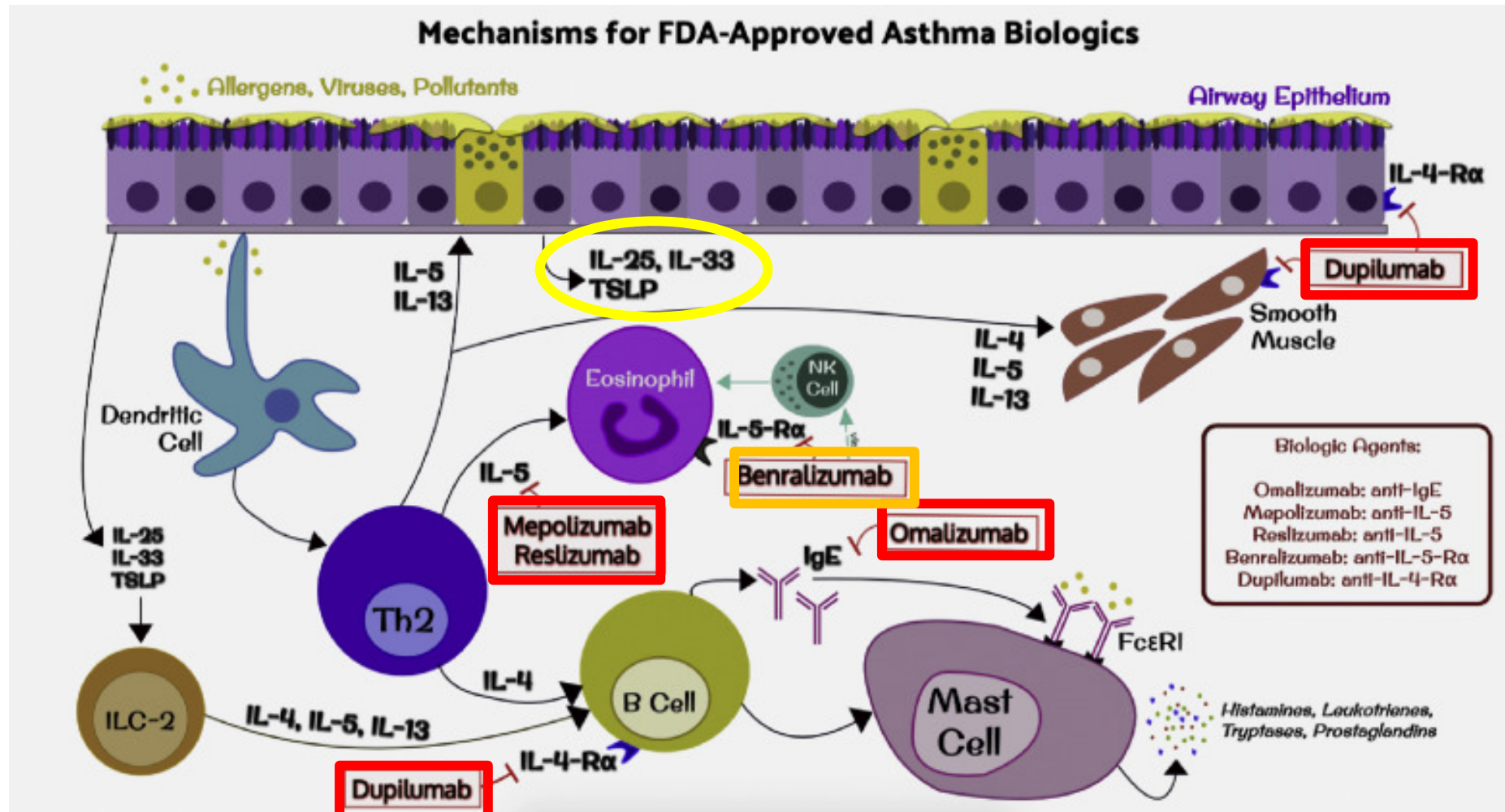
ICS-formoterol

- Use 1-2 puffs as needed up to a maximum total daily maintenance and rescue dose of 8 puffs (36 mcg) for 5-11 year olds [2 puffs 4x/day]
- Up to 12 total daily puffs (54 mcg) for 12+ [2 puffs 6/day]

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)**

A new class of medications: biologics



A silver, rounded rectangular badge with a black border and a gradient shadow. Inside, the word "NEW" is written in a bold, orange, sans-serif font.

Key Updates – NAEPP 2020

A silver, rounded rectangular badge with a black border and a gradient shadow. Inside, the word "NEW" is written in a bold, orange, sans-serif font.

Kids < 4 years:

- Intermittent use of ICS +SABA for recurrent viral-associated wheeze
- De-emphasis of montelukast

Kids 5-11 years:

- SMART therapy (Single Maintenance And Reliever Therapy: ICS-formoterol)
- Step 3 & 4 (but NOT 1, 2, ... 5, 6)

Teens, and Adults (12+ years):

- SMART therapy in Step Step 3 & 4
- Long-acting muscarinic (LAMA) – recommended in Step 5; alternate Step 3 & 4
- Biologics for Step 5 & 6

A reminder – the key change in GINA 2019



EDITORIAL
GINA 2019

GINA 2019: a fundamental change in asthma management

Treatment of asthma with short-acting bronchodilators alone is no longer recommended for adults and adolescents

Helen K. Reddel¹, J. Mark FitzGerald², Eric D. Bateman³,
Leonard B. Bacharier⁴, Allan Becker⁵, Guy Brusselle⁶, Roland Buhl⁷,
Alvaro A. Cruz⁸, Louise Fleming⁹, Hiromasa Inoue¹⁰, Fanny Wai-san Ko¹¹,
Jerry A. Krishnan¹², Mark L. Levy¹³, Jiangtao Lin¹⁴, Søren E. Pedersen¹⁵,
Aziz Sheikh¹⁶, Arzu Yorgancioglu¹⁷ and Louis-Philippe Boulet¹⁸



@ERSpublications

GINA no longer recommends treating adults/adolescents with asthma with short-acting bronchodilators alone. Instead, they should receive symptom-driven (in mild asthma) or a daily corticosteroid-containing inhaler, to reduce risk of severe exacerbations. <http://bit.ly/310LLzE>

Cite this article as: Reddel HK, FitzGerald JM, Bateman ED, *et al.* GINA 2019: a fundamental change in asthma management. *Eur Respir J* 2019; 53: 1901046 [<https://doi.org/10.1183/13993003.01046-2019>].

When guidelines differ...

National Asthma Education and Prevention Program 2020 Guideline Update: Where Do We Go from Here?

— [Jerry A. Krishnan](#)^{1*}, — [Michelle M. Cloutier](#)², and — [Michael Schatz](#)³

American Journal of Respiratory and Critical Care Medicine Volume 203 Number 2 | January 15 2021, p 164-167

Table 1. Preferred Controller and Reliever Pharmacotherapy Recommendations for Individuals ≥12 Years with Asthma in the NAEPP 2020 Guideline Update and GINA 2020 Report

	NAEPP 2020 Guideline Update	GINA 2020 Report
Step 1	Step 1 therapy not reviewed as part of NAEPP 2020 guideline update	As-needed low-dose ICS-formoterol
Step 2*	Conditional recommendation:	Daily low-dose ICS and as-needed SABA
	Daily low-dose ICS and as-needed SABA	or
	or	As-needed low-dose ICS-formoterol
Step 3	As-needed concomitant low-dose ICS and SABA	
	Strong recommendation:	Daily low-dose ICS-LABA and as-needed SABA
	Daily low-dose ICS-formoterol (maintenance and reliever therapy) [‡]	or
Step 4		Daily low-dose ICS-formoterol (maintenance and reliever therapy)
	Strong recommendation:	Daily medium-dose ICS-LABA and as-needed SABA
	Daily medium-dose ICS-formoterol (maintenance and reliever therapy)	or
Step 5		Daily medium-dose ICS-formoterol (maintenance and reliever therapy)
	Conditional recommendation:	Daily high-dose ICS-LABA
	Daily medium- to high-dose ICS-LABA + LAMA and as-needed SABA	and
Step 6		Refer for phenotypic assessment and add-on therapy (e.g., tiotropium, anti-IgE, anti-IL5/5R, and anti-IL4R)
	Step 6 therapy not reviewed as part of NAEPP 2020 guideline update	Not applicable in GINA

A Quick Break



CASE 1:



An 15 year old boy has refilled his albuterol inhaler monthly for the last 6 months.

What questions do you want to know to help you understand why his asthma has been so poorly controlled, and how you might help?

Some possibilities:

Does he have a primary care provider?

Has he seen the PCP recently?

Has he been prescribed an asthma controller?

Does he know how much to take and when?

Does he know how to take it? (technique)

Does he have the medications?

Does he have/use a spacer?

Does he need to use a mask?

Is he taking her controller regularly? If not, what are the barriers?

Do we know what is triggering his attacks?

Is the family doing anything focused on preventing attacks?

Were medicines available when the attacks started?

You get more info:

Yes, he has a PCP, who has prescribed a bunch of meds in the last couple of years

But he's not sure which is which

He takes "the blue one" because it helps him feel better fast

His brother uses the other ones, because he has asthma too

"What's a spacer?"

"What's an action plan?"

"I don't take any medicines at school – I don't want my friends to see"



What could you
recommend or help
with?

CASE 2:



An 8 year old girl has been in the Emergency Department with an asthma attack 3 times in the last 2 months

You ask the same types of questions as Case 1...

You learn some things about her social/environmental history:

The window in the bathroom is stuck shut and mold is growing along the sill.



Grandpa recently moved in with the family when Grandma died and he's a smoker.



They don't have air conditioning, so in the summer they open their windows. Down the street there's an abandoned house and an empty lot.



This is how she travels to school



This is the location of her school



Montgomery Blair High School in Silver Spring, Maryland — hemmed in by three roads, including Washington's Beltway — is one of thousands of public schools near significant traffic. Google Earth; USC Center for Health Journalism, Jamie Hopkins, February 17, 2017

This is the park where she plays



Playground in William C. Sterling State Park with billowing smokestack in the background.
Detroit Metro Times; By Eliza Perez-Ollin, Mon, Mar 26, 2018 at 9:41 am

So, what can we do about these things?

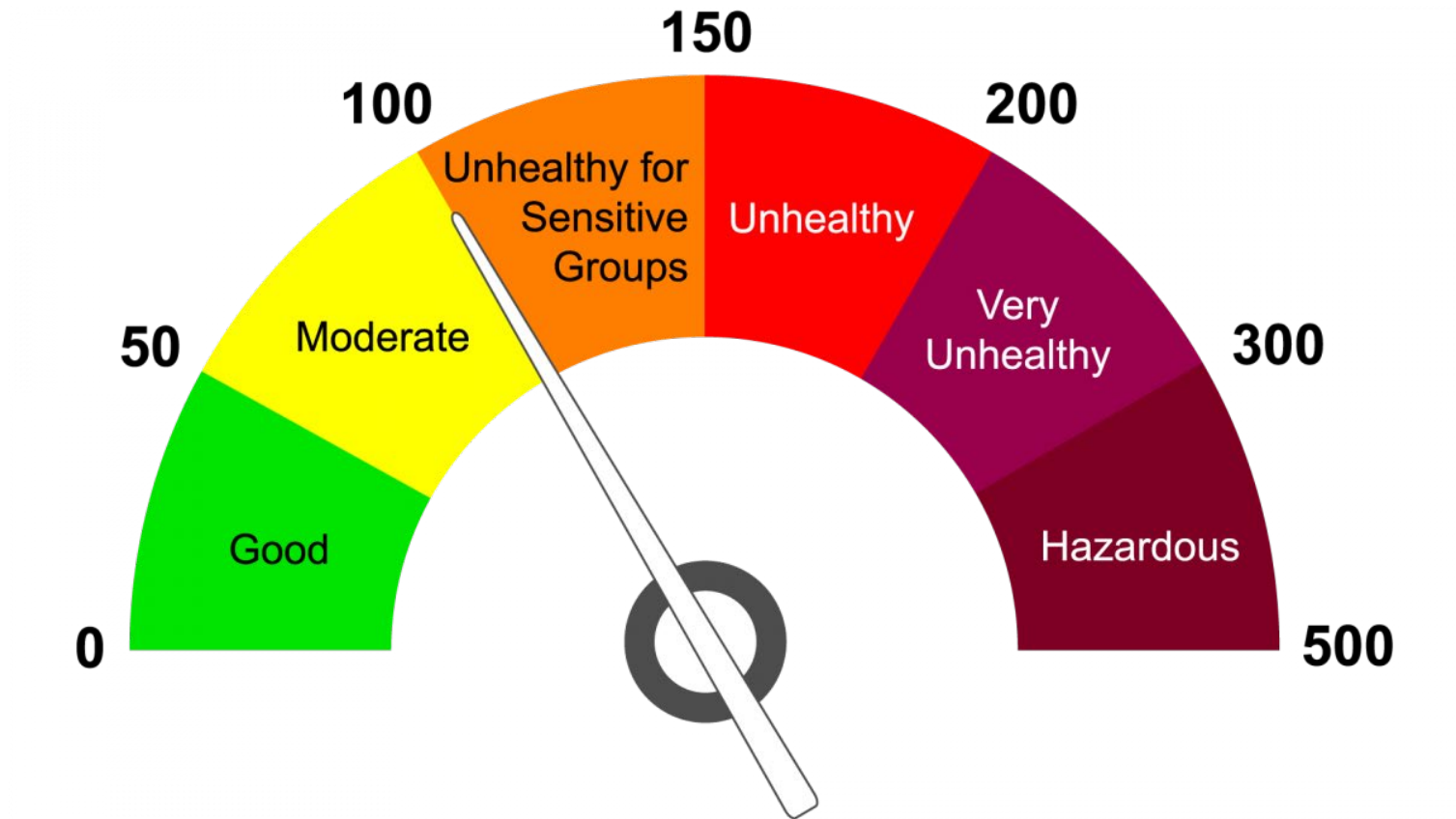
Indoor air

Outdoor allergens

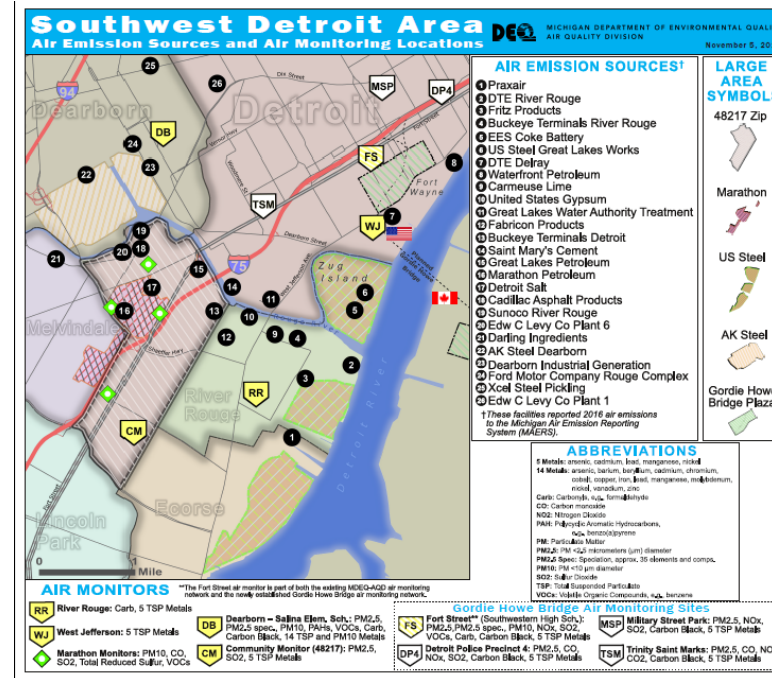
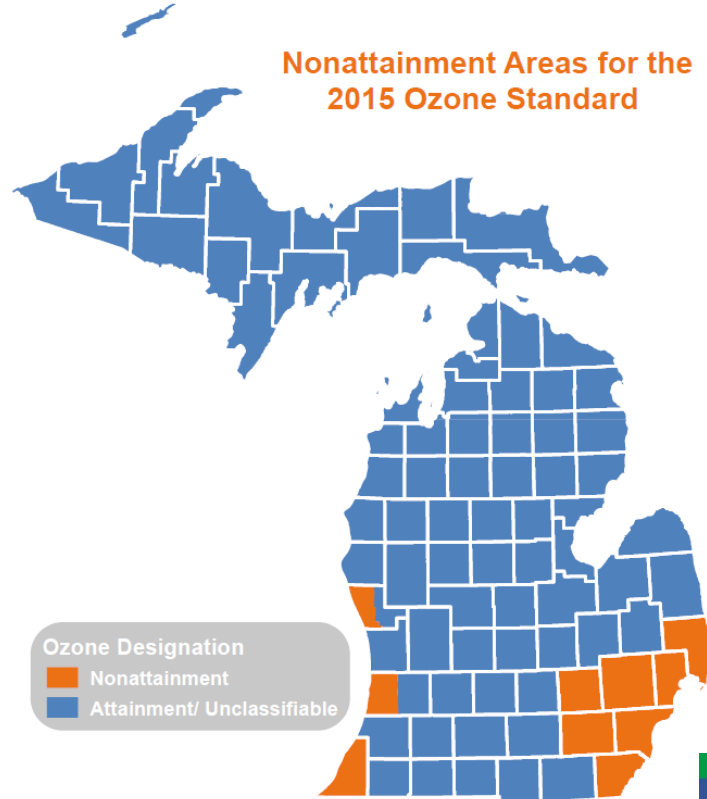
Transportation

Outdoor pollution

Air Quality Index



Engaging with civic leaders on air quality and climate



Climate and Health
Adaptation Planning Guide
For Michigan Communities



*I HAVE ASTHMA BUT
ASTHMA DOESN'T HAVE*



Picture from the Asthma Information Outreach Project, www.asthma-nyc.org