

# Clinical Decision Points in the Diagnosis and Treatment of **NON-EOSINOPHILIC ASTHMA**

Final Outcomes Summary: Online Enduring Program  
Data from 9/21/20 – 9/21/21  
GlaxoSmithKline MED-RES-32414



**National Jewish  
Health**<sup>®</sup>

**Breathing Science is Life.**<sup>®</sup>



# Program Overview

Final Outcomes Summary Data from 9/21/20 -9/21/21



The goal of this online educational activity is to improve clinicians' knowledge and competence within the educational gaps of diagnosis, pathophysiology and treatment of non-eosinophilic asthma.

This chapterized online activity is designed to optimize learner retention through microlearning strategies; three chapters offer learners privileged insights into the experiences of leading experts in easily accessible and organized segments. Each chapter aligns with clinical decision points that are outlined in a corresponding infographic resource designed to support learners in converting information into practice.

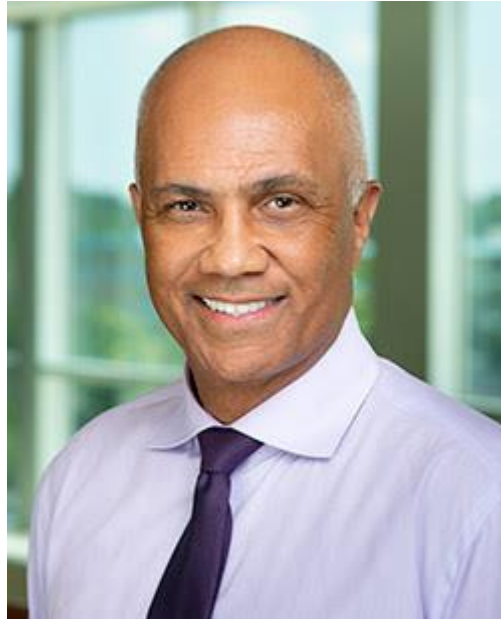
## Learning Objectives

1. Describe the clinical features and burdens of non-eosinophilic asthma (NEA) and apply an evidence-based, stepwise diagnostic approach to assess and phenotype patients with difficult-to-treat asthma.
2. Compare and contrast the pathophysiology of NEA with that of eosinophilic asthma (EA); identify the targets of current and investigational therapies for NEA.
3. Apply an evidence-based, stepwise approach to the pharmacologic and nonpharmacologic management of NEA



# Faculty Members

Final Outcomes Summary Data from 9/21/20 -9/21/21



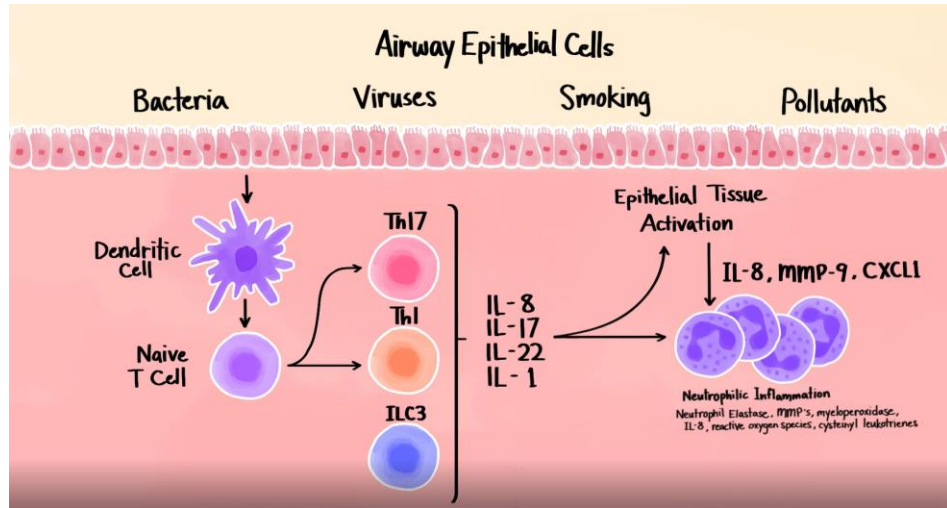
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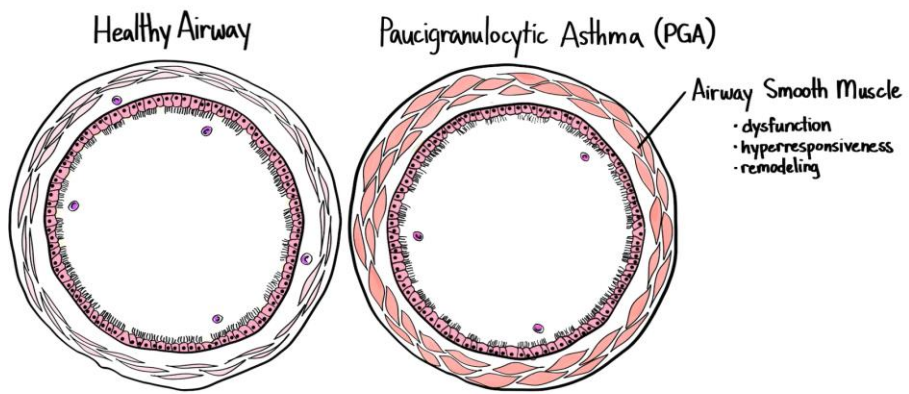
# Program Features

Final Outcomes Summary Data from 9/21/20 -9/21/21



**Infographic Clinical Reference Aid**

**Patient Perspective Video**



**Whiteboard animation clips**



### Clinical Decision Points in the Diagnosis and Treatment of NON-EOSINOPHILIC ASTHMA

**DOES THE PATIENT HAVE ASTHMA?**

- Confirm variable airflow limitation: review/repeat pulmonary function tests with bronchodilator
- Consider methacholine or exercise challenge tests if spirometry inconclusive and clinical response to treatment is absent or limited
- Exclude other conditions (eg, airway tumor, foreign body, COPD, bronchiectasis, induced laryngeal obstruction, tracheobronchomalacia, CF, aspiration)

**EVALUATE COMORBIDITIES AND COMPLICATING FACTORS**

**Diagnose and manage comorbidities**

- Rhinovirus nasal polyps
- Gastroesophageal reflux
- Obstructive sleep apnea
- Inhalable laryngeal obstruction
- Allergic bronchopulmonary aspergillosis
- Eosinophilic granulomatosis with polyangiitis
- Obesity
- Psychological factors (personality, depression, anxiety)
- Drug side effects (asthma, NSAIDs, beta-blockers, ACE inhibitors)
- Aspiration
- Dysbiosis

**Address environmental factors**

- Allergen exposures (indoor, outdoor, pets)
- Occupational exposures
- Respiratory infections (eg, viruses)
- Second-hand cigarette smoke
- Traffic-related pollution
- Respiratory irritants

**Asthma education and health maintenance**

- eating healthy
- vaccination
- smoking cessation
- exercise

**Evaluate Adherence and Optimize Inhaler Technique**

- Use shared-decision making approach to select treatment
- Choose best device for patient and individualize education
- Assess barriers to proper medication use
- Assess knowledge and attitudes about medication
- Educate patient about strategies to reduce side effects
- Check and correct inhaler technique at each visit

**IS ASTHMA UNCONTROLLED, DESPITE STEPPING UP TO A HIGH-DOSE ICS+LABA?**

Asthma is uncontrolled when any 1 of the 4 criteria below is present:

- Poor symptom control: AEC2  $\geq 15$ , ACF  $\leq 20$ , or per GINA/NAEP guidelines
- Systemic corticosteroids:  $\geq 2$  bursts for asthma exacerbations in the past year
- Hospitalizations:  $\geq 1$  hospitalization for asthma in the past year
- Pulmonary Function: FEV1  $< 80\%$  predicted when not taking short- or long-acting bronchodilators

Consider safety and potential effects of long-term oral corticosteroids (OCS)

**CONSIDER ADDING A NON-BIOLOGIC THERAPY**

- Topiramate
- Leukotriene modifier
- Theophylline
- Macrolide antibiotic
- Oral corticosteroid (short course)

**IS ASTHMA STILL UNCONTROLLED, DESPITE TREATMENT WITH HIGH-DOSE ICS+LABA AND A NON-BIOLOGIC ADD-ON THERAPY?**

Close follow-up. Reduce treatment intensity after at least 3-6 months of stable, good control

**DETERMINE INFLAMMATORY PHENOTYPE/ ENDOTYPE FOR PERSONALIZED TREATMENT SELECTION**

- Start with non-invasive testing (allergy testing, IgE level, blood eosinophil count and FeNO level)
- If poor response to therapy continues, consider induced sputum differential for eosinophil and neutrophil counts and/or bronchoscopy with endobronchial biopsy and BAL

Type 2 (T2)	Non-Type 2
IL-4, IL-5, IL-13 or IgE mediated inflammation with high eosinophils or FeNO <sup>a</sup> <sup>a</sup> Fractional nitric oxide concentration in exhaled breath.	Neutrophilic airway inflammation or Paucigranulocytic (non-inflammatory)
<b>Biomarkers</b> • Blood eosinophils $> 150 \mu L$ • FeNO $> 20$ ppb • Sputum or BAL eosinophils $\geq 2\%$ • Elevated IgE	<b>Biomarkers</b> • No T2 biomarkers • Blood eosinophils $< 150 \mu L$ AND • FeNO $< 20$ ppb AND • Sputum or BAL eosinophils $< 2\%$ • Sputum or BAL neutrophils $> 40-60\%$ OR • Sputum or BAL neutrophils also $< 40-60\%$ + paucigranulocytic
<b>Associated Phenotypes</b> • Early age onset • History of allergies • Chronic Rhinosinusitis/Nasal Polyps	<b>Associated Phenotypes</b> • Obesity • Smoking History • Infections • Lack of response to corticosteroids
<b>Non-Pharmacologic Treatment</b> • Weight loss • Bariatric surgery • Bronchial Thermoplasty • Secretion clearance • Pulmonary rehabilitation • Non-eosinophilic comorbidities	

Non-eosinophilic inflammation and poorly controlled asthma	POTENTIAL MECHANISMS:	POTENTIAL PHARMACOLOGIC TREATMENTS:
<b>Neutrophilic inflammation</b> • Sputum or BAL neutrophils $\geq 40-60\%$	• CXCR2 antagonists • IL-17 blockers • IL-18 blockers	• ICS/2 LABA agonists • LABA inhibitors • Smoking cessation • Avoidance from exposure to occupational agents
<b>Associated inflammation</b> • High Th17/Th1 ratio • Th2/Th17 low • Mast cell activation/other	<b>Biological agents</b> • IL-17 blockers • TNF blockers • Protein kinase inhibitors • P13-kinase inhibitors	
<b>Corticosteroid insensitivity</b>	• Small molecule drugs • PDE inhibitors • Protein kinase inhibitors • P13-kinase inhibitors	<b>'Off-label' licensed drugs</b> • Macrolides • Statins • Low-dose theophylline • PPAR $\alpha$ agonists
<b>Non-inflammatory pathways</b> • Airway hyperreactivity/remodeling	<b>Other</b> • Vitamin D3	• Long-acting bronchodilator • Bronchial Thermoplasty

**National Jewish Health**  
Breathing Science is Life.

References:  
1. Global Initiative for Asthma (GINA) Global Strategy for Asthma Management and Prevention. 2019. www.ginasthma.org  
2. US National Heart, Lung, and Blood Institute (NHLBI) National Asthma Education and Prevention Program Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. 2007. www.nhlbi.nih.gov/docs/public/asthma/guide3.pdf  
3. Chung KF, et al. International Eosinophilic Allergy Definition, Evaluation and Treatment of severe asthma. Eur Respir J. 2014;45(2):342-71  
4. Hsu, et al. Severe and difficult to treat asthma in adults. Int J Allergy Asthma Immunol. 2017;27(10):66-76  
5. Wenzel SE. Getting control of uncontrolled asthma. Am J Med. 2014;127(11):1548-50  
6. Blouquet L, et al. Case pathways for the selection of a biologic in severe asthma. Eur Respir J. 2017;50(6)  
7. Chagnac BE, et al. Asthma Severity: Practical recommendations for a stepped step-up in asthma therapy for poorly controlled asthma. Ann Allergy Asthma Immunol. 2017;118(2):139-142.



# Online Enduring Activity

Final Outcomes Summary Data from 9/21/20 -9/21/21



**Medscape** Wednesday, January 20, 2021

FOR YOU **BETA** NEWS & PERSPECTIVE DRUGS & DISEASES **CME & EDUCATION** ACADEMY CONSULT VIDEO

## CME Clinical Decision Points in the Diagnosis and Treatment of Non-eosinophilic Asthma

Authors: Ronald Balkissoon, MD, MSc, DIH, FRCPC (Activity Co-chair); Eileen Wang, MD, MPH (Activity Co-chair) [Faculty and Disclosures](#)

CME Released: 9/21/2020 Valid for credit through: 9/21/2021

This CME activity was developed to be distributed on Medscape.org. The program is a chapterized multimedia online enduring activity with video lecture, patient perspective videos, clinical decision points infographic reference aid, and narrated whiteboard animations led by expert faculty (1 Allergist and 1 Pulmonologist) considered key opinion leaders in asthma.

This educational activity is supported by an educational grant from **GlaxoSmithKline**



CME Information

Download Slides

Activity Transcript

PDF Downloads

Resource



**IN THIS PRESENTATION**

- Awareness and Diagnosis of Non-eosinophilic Asthma 20:01
- Pathophysiology of Non-eosinophilic Asthma 10:40
- Step-wise Approach to Treatment Selection for Non-eosinophilic Asthma 17:25

Launched on Medscape: September 21, 2020

<https://www.medscape.org/viewarticle/937239>

Platform	Learner Definition	Completer Definition	Certificate Earner Definition
Medscape	Progressed past front-matter (unique)	Completed post-test	Completed post-test and evaluation*
	<b>MD/DO Learner Guarantees</b>	<b>MD/DO Completer Guarantees</b>	<b>MD/DO Certificate Guarantees</b>
	1,000	100	N/A
	<b>Learner Actuals</b>	<b>Completer Actuals</b>	<b>Certificate Actuals</b>
	<b>2,823 total</b> <b>2,154 MD/DO</b>	<b>1,256 total</b> <b>795 MD/DO</b>	<b>954 total*</b> <b>611 MD/DO</b>

**Surpassed physician learner guarantees by 1,154 and completer guarantees by 695!**

\*Note: Total evaluation respondents (N=1019) is higher than certificate earners (N=954), as some individuals completed the evaluation but not the post-test, thus not earning a certificate.



# Program Summary Dashboard

## Clinical Decision Points in the Diagnosis and Treatment of Non-eosinophilic Asthma

Program Faculty: Ron Balkissoon, MD, MSc, DIH, FRCPC; Eileen Wang, MD, MPH

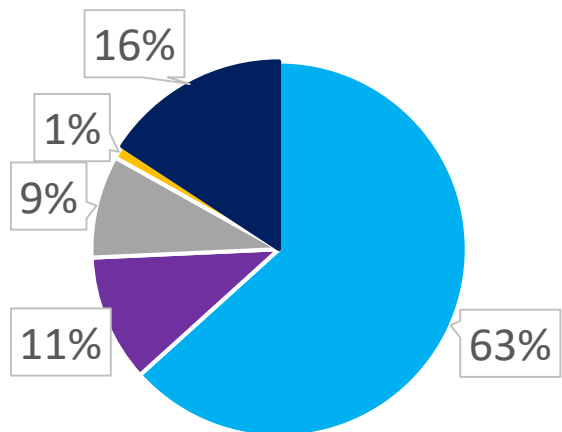
Online: Medscape: 9/21/2020 – 9/21/2021

Final Outcomes Summary Data



### Online Program Participation

2,823 Learners | 1,256 Completers | 954 Certs



Specialty	Total
Family/Internal/General	356
Pulmonary Medicine	215
Allergy & Clinical Immunology	85
Emergency	37
Psychiatry	33
Pediatrics	35
Surgery	25
Cardiology	22
Anesthesiology	19
Otolaryngology	19
Other	410
<b>Total Completers</b>	<b>1,256</b>

### Learning Objectives

#### Learning Objectives

1. Describe the clinical features and burdens of non-eosinophilic asthma (NEA) and apply an evidence-based, stepwise diagnostic approach to assess and phenotype patients with difficult-to-treat asthma.
2. Compare and contrast the pathophysiology of NEA with that of eosinophilic asthma (EA); identify the targets of current and investigational therapies for NEA.
3. Apply an evidence-based, stepwise approach to the pharmacologic and non-pharmacologic management of NEA

### Satisfaction

N=1019

Evaluation respondents in the online activity reported:

The activity was "good" or "excellent" at meeting the learning objectives

95%

The activity was clinically relevant

96%

The activity was free of commercial bias

96%

83% of completers are Physicians and advanced practice providers

52% of completers are Allergy, Pulmonary & Primary Care

# Program Summary Dashboard

## Clinical Decision Points in the Diagnosis and Treatment of Non-eosinophilic Asthma

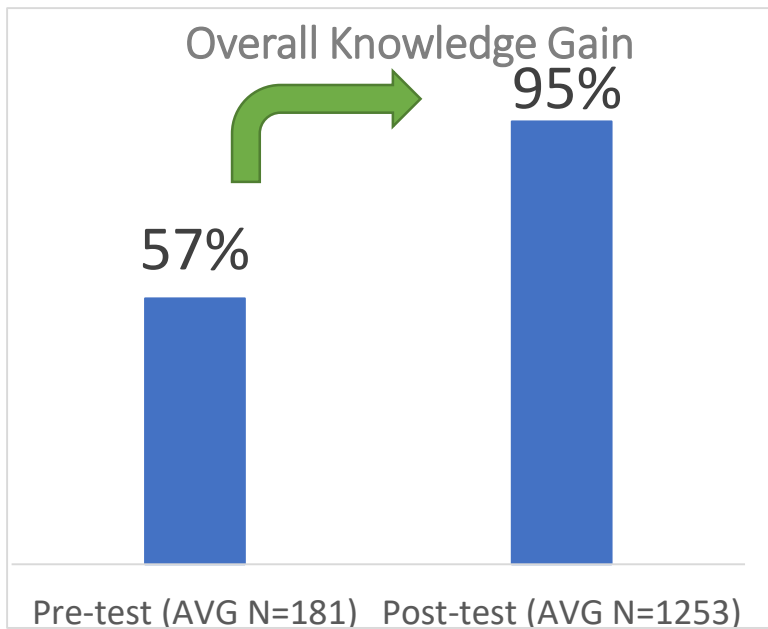
Program Faculty: Ron Balkissoon, MD, MSc, DIH, FRCPC; Eileen Wang, MD, MPH

Online: Medscape: 9/21/2020 – 9/21/2021

Final Outcomes Summary Data



### Knowledge



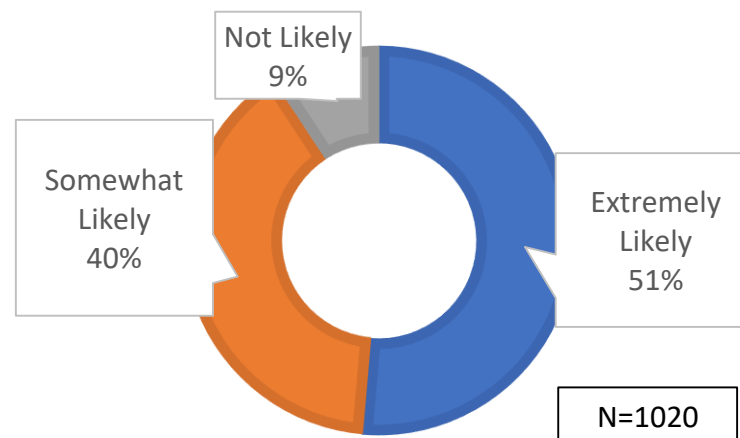
**67%** relative gain in knowledge

**38%** absolute gain in knowledge

### Competence

Evaluation respondents were asked how likely they are to make changes in their practice as a result of what they learned in the activity:

#### ONLINE PROGRAM



**95%** of evaluation respondents reported the activity reinforced and/or improved their current skills

### Top 3 Practice Changes

Evaluation respondents in the online activity reported specific intended practice changes as a result of what they learned:

- ✓ Consider new treatment options
- ✓ More thorough diagnostic workup
- ✓ Evaluation for phenotypes and endotypes

**95%** of evaluation respondents reported the activity improved their ability to treat or manage their patients

# Program Summary Dashboard

## Clinical Decision Points in the Diagnosis and Treatment of Non-eosinophilic Asthma

Program Faculty: Ron Balkissoon, MD, MSc, DIH, FRCPC; Eileen Wang, MD, MPH

Online: Medscape: 9/21/2020 – 9/21/2021

Final Outcomes Summary Data



### Patient Impact

### Educational Needs

**1019**

evaluation  
respondents  
in the online  
activity

Who treat  
**7365 patients**  
with non-eosinophilic  
asthma weekly

Potential to  
impact  
**382,980**  
patient visits  
annually

✓ *Learners were asked if the activity addressed strategies for overcoming barriers to patient care*

**36%** of evaluation respondents are encountering barriers to optimal patient care in practice that were not addressed in the activity (N=1019)

✓ *Learners were asked what topics they need additional education on*

**12%** of evaluation respondents reported a need for more education on current and emerging treatment options (N=121)

### Program Insights

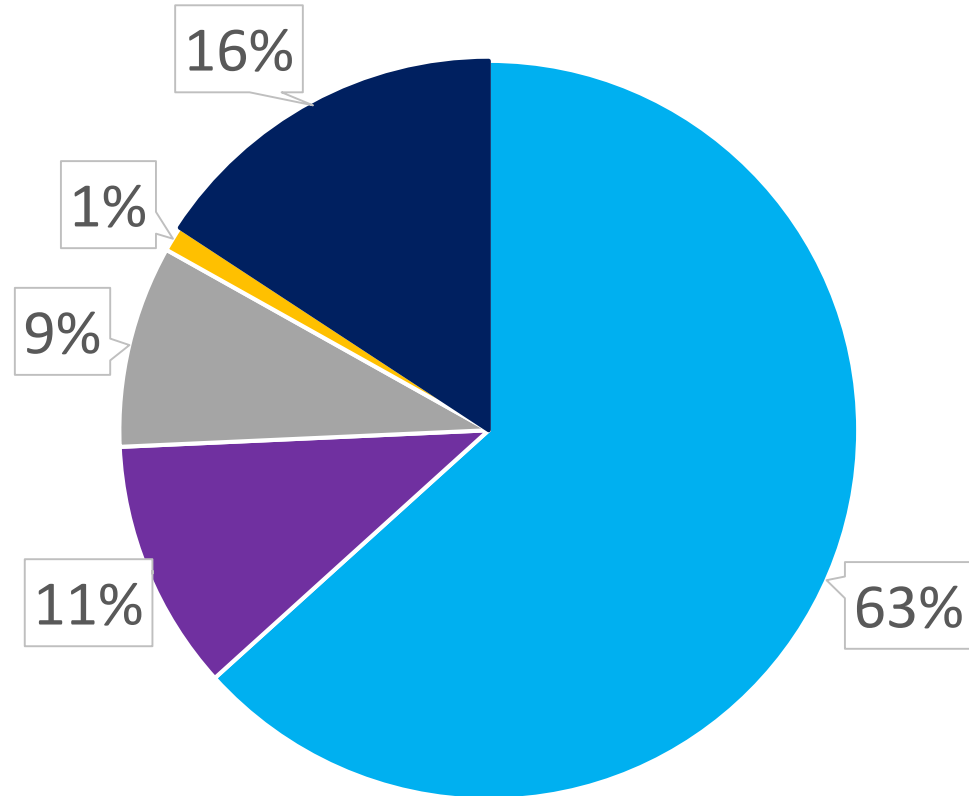
- Further education is needed on pharmacologic and non-pharmacologic treatment options for patients with non-eosinophilic asthma, including special populations such as pregnant and pediatric patients
- Learners are requesting more patient cases to illustrate clinical decision making in management of non-eosinophilic asthma
- Future education may be needed to address barriers encountered in practice, such as communication, patient education, and compliance with treatment plans

**\*Defining the Patient Impact:** Learners were asked through a multiple choice question to identify the number of patients they treat per week with the condition of non-eosinophilic asthma and related disease. Five choices were provided ranging from 'More than 20' to 'None'. Totals were calculated based on conservative estimates within each category.



# Level 1 Outcomes: Participation by Degree

Final Outcomes Summary Data from 9/21/20 -9/21/21



**83%**  
of completers  
were physicians and  
advanced practice  
providers

Degree	Total Completers
MD/DO	795
PA	138
APN	111
PharmD	14
Other	198
<b>TOTAL</b>	<b>1256</b>

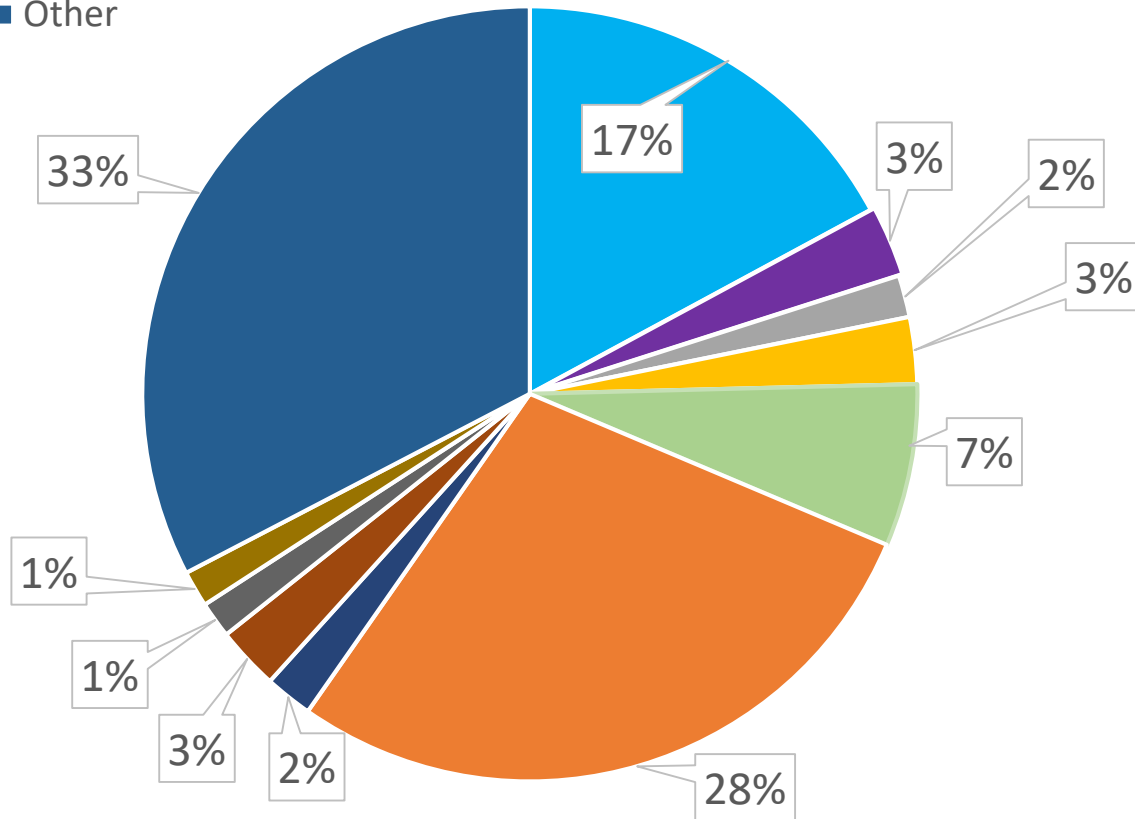
■ MD/DO ■ PA ■ APN ■ PharmD ■ Other

# Level 1 Outcomes: Participation by Specialty



Final Outcomes Summary Data from 9/21/20 -9/21/21

- Pulmonary
- Emergency
- Cardiology
- Pediatrics
- Allergy & Clinical Immunology
- Family/Internal/Adult
- Surgery
- Psychiatry
- Anesthesiology
- Otolaryngology
- Other



Specialty	Total Completers
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<b>Total</b>	<b>1256</b>

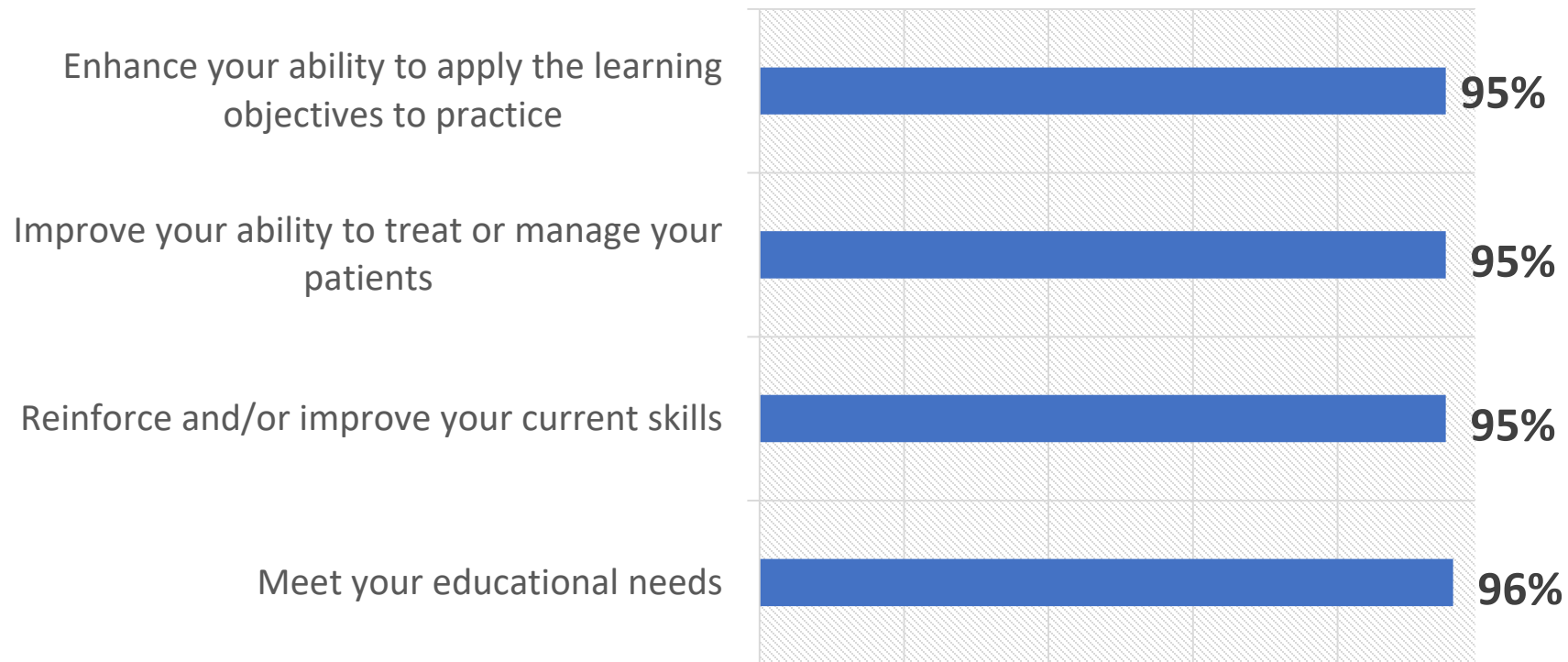
Other includes:  
dermatology, infectious disease, palliative care, ob/gyn, ophthalmology, rheumatology, and more

# Level 2 Outcomes: Satisfaction

Final Outcomes Summary Data from 9/21/20 -9/21/21



## *Analysis of participants' responses related to educational needs* *How well did the activity:*



N = 1019

■ Excellent to Good

Learners reported high levels of satisfaction related to the ability of the activity to impact practical applications

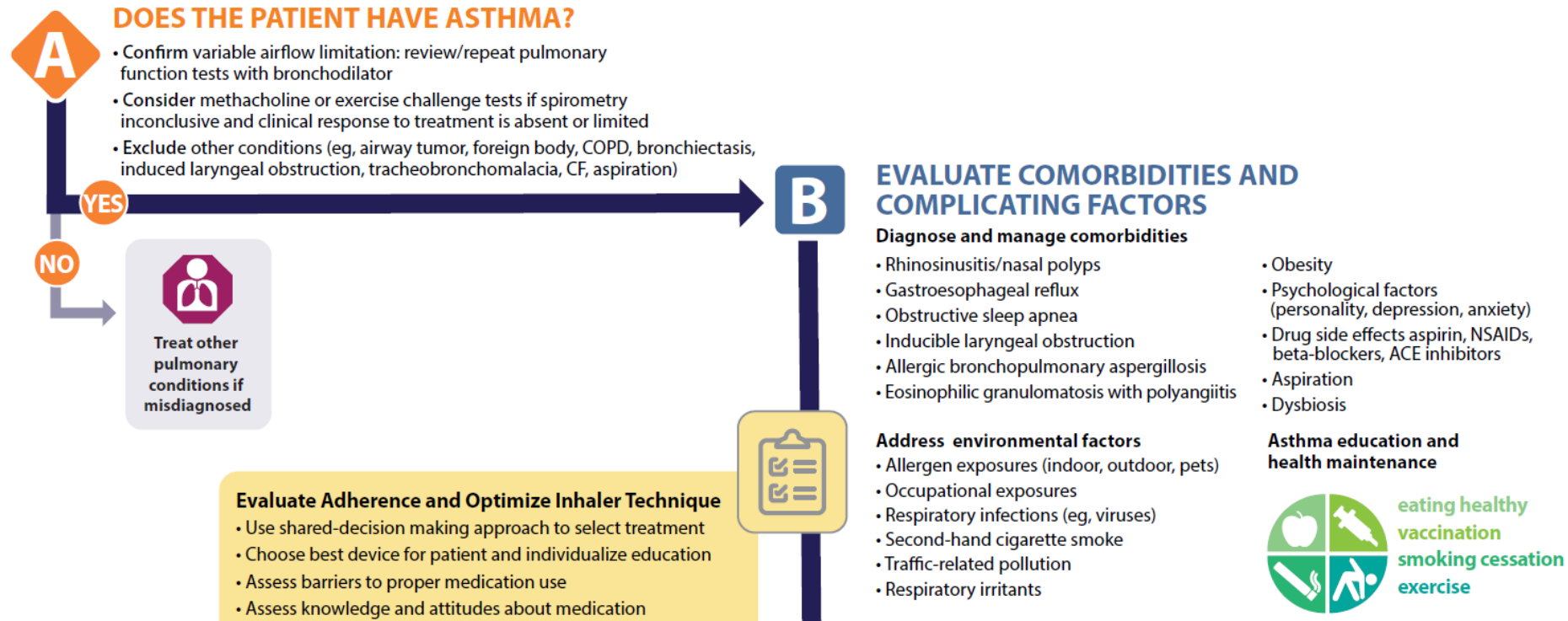


# Level 2 Outcomes: Satisfaction

Final Outcomes Summary Data from 9/21/20 -9/21/21



## Clinical Decision Points in the Diagnosis and Treatment of NON-EOSINOPHILIC ASTHMA



93% of  
evaluation  
respondents  
reported that  
they are  
likely to use  
the  
infographic  
in practice.  
[N=1019]

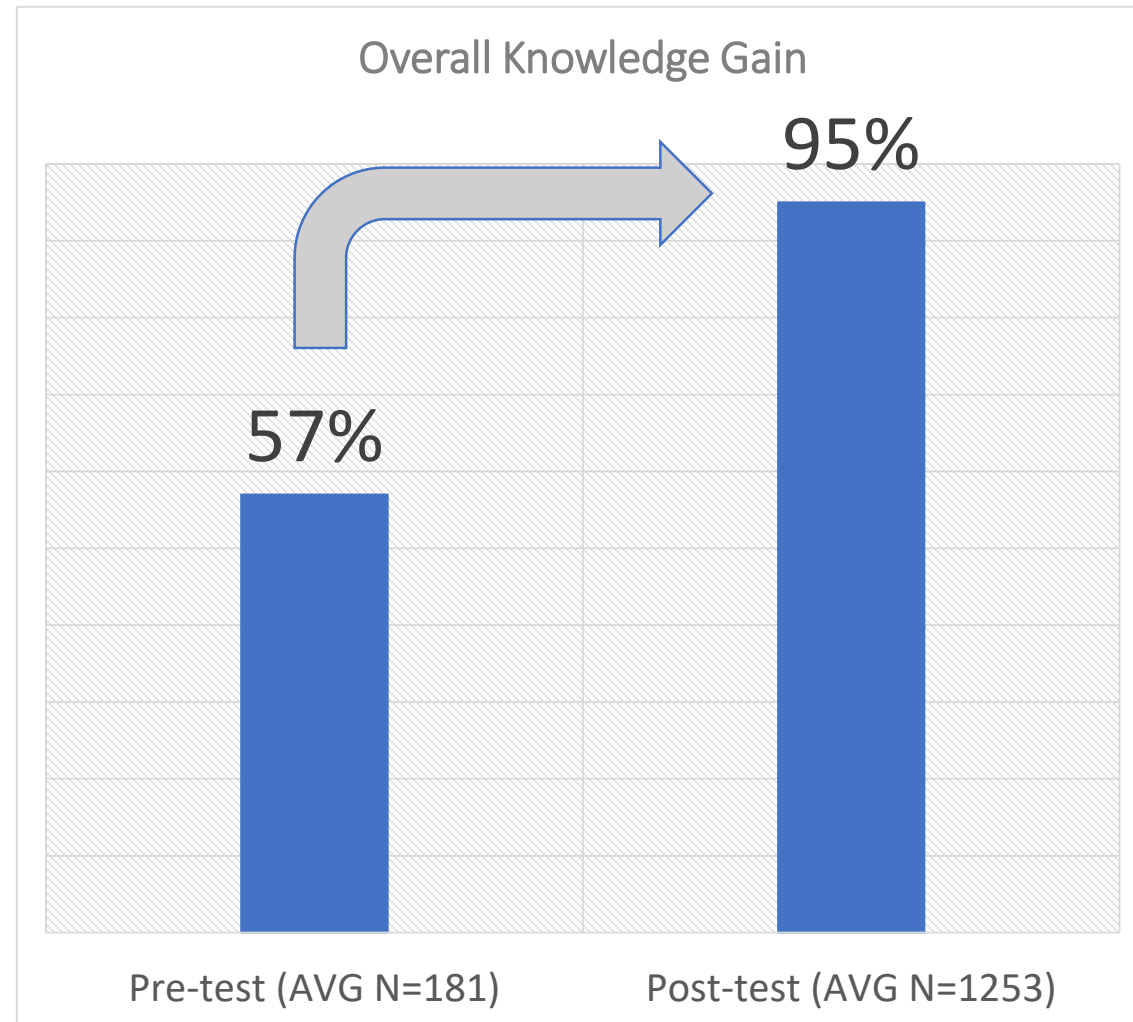
# Level 3 Outcomes: Overall Knowledge

Final Outcomes Summary Data from 9/21/20 -9/21/21



**67% Relative  
Knowledge Gain**

**38% Absolute  
Knowledge Gain**



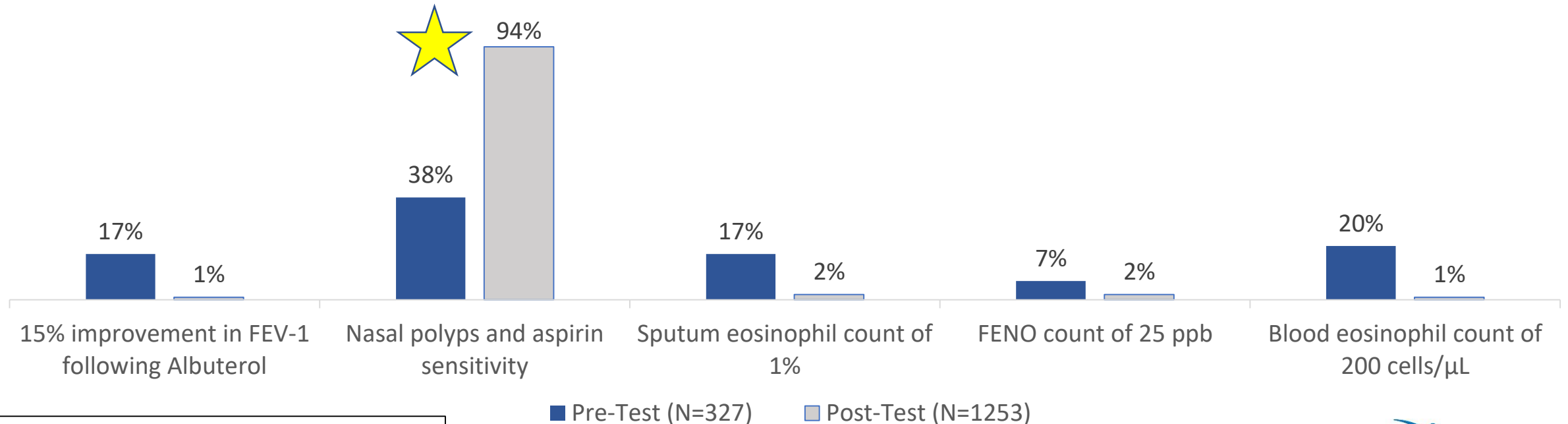
# Level 3 Outcomes: Knowledge (Question 1)



Final Outcomes Summary Data from 9/21/20 -9/21/21

**Learning Objective:** *Describe the clinical features and burdens of non-eosinophilic asthma (NEA) and apply an evidence-based, stepwise diagnostic approach to assess and phenotype patients.*

**Question 1:** A 55-year-old female presents to you with a 5-year history of difficult to control asthma. She currently is on high dose inhaled corticosteroids and long acting beta agonist and her asthma remains poorly controlled. Her last prednisone burst was 6 months ago for 2 weeks duration. Which feature is not consistent with T2 low asthma?



**Relative Knowledge Gain: 147%**  
**Absolute Knowledge Gain: 56%**



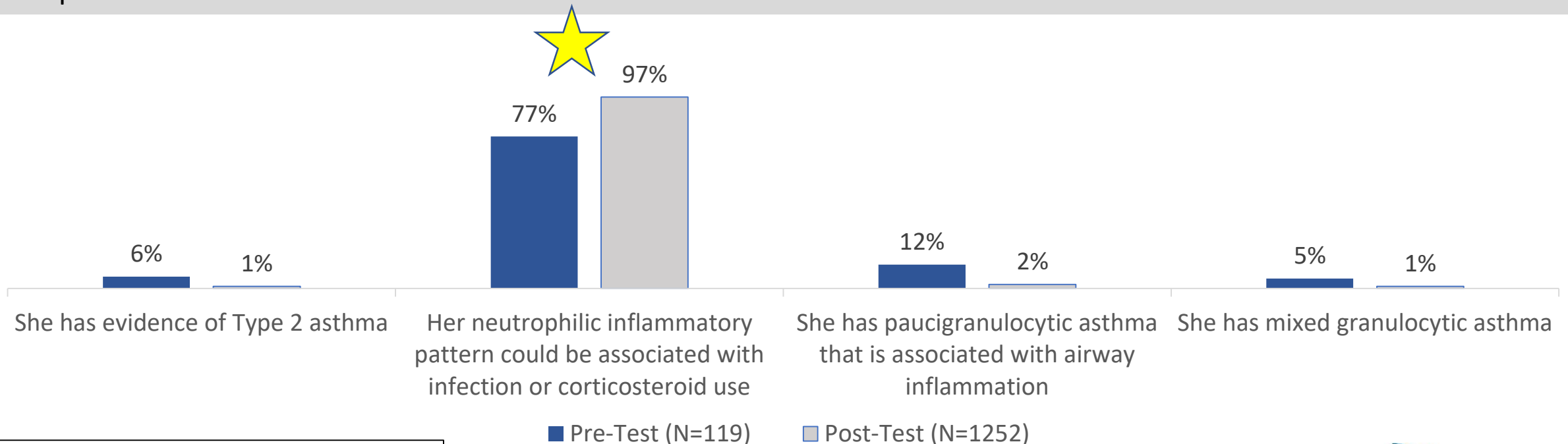
# Level 3 Outcomes: Knowledge (Question 2)



Final Outcomes Summary Data from 9/21/20 -9/21/21

**Learning Objective:** Compare and contrast the pathophysiology of NEA with that of eosinophilic asthma (EA); identify the targets of current and investigational therapies for NEA.

**Question 2:** Ms. Jones is a 56 year-old never smoker with 10-year history of severe persistent asthma, uncontrolled with 2-3 exacerbations per year. She undergoes further evaluation with bronchoscopy. BAL cell count show 0% eosinophils and 80% neutrophils. Which statement is correct?



**Relative Knowledge Gain: 26%**  
**Absolute Knowledge Gain: 20%**

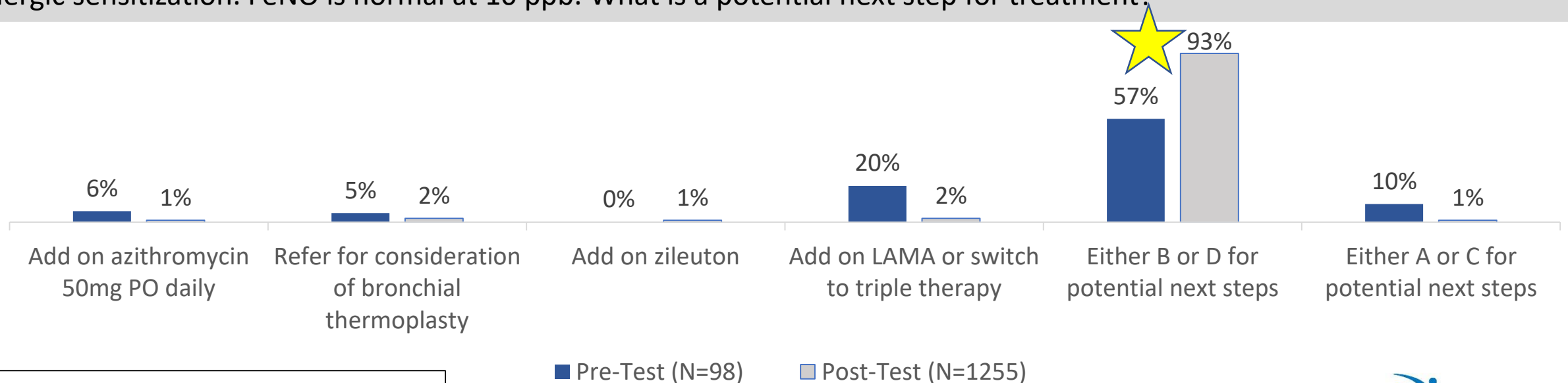
# Level 3 Outcomes: Knowledge (Question 3)



Final Outcomes Summary Data from 9/21/20 -9/21/21

**Learning Objective:** *Apply an evidence-based, step-wise approach to the pharmacologic and nonpharmacologic management of NEA.*

**Question 3:** Mr. Smith is a 72-year-old man with long-standing severe persistent asthma and 15 pack year smoking history. He is very poorly controlled on high dose ICS/LABA and montelukast therapy with nearly 6 severe exacerbations in the last 12 months. He has evidence of significant bronchodilator reversibility that does not reverse completely. He had positive hyperresponsiveness to methacholine. He has no evidence of peripheral eosinophilia, sputum eosinophilia, neutrophilia, or allergic sensitization. FeNO is normal at 10 ppb. What is a potential next step for treatment?



**Relative Knowledge Gain:** 63%  
**Absolute Knowledge Gain:** 36%

# Level 4 Outcomes: Competence

Final Outcomes Summary Data from 9/21/20 -9/21/21



An analysis of open-ended comments demonstrates the following practice changes learners intend to make:

91%

N=1020

Evaluation respondents intend to make changes to practice as a result of the activity

Consider biologics, bronchial thermoplasty, and other treatment options

[N=50]

More thorough diagnostic workup, including evaluation for endotypes and phenotypes

[N=33]

Apply new knowledge of non-eosinophilic asthma to improve patient care and education

[N=31]

Apply guidelines to more effectively manage non-eosinophilic asthma

[N=22]

Refer to a specialist when needed

[N=6]



# Program Evaluation Results

Final Outcomes Summary Data from 9/21/20 -9/21/21



**N=147**

**96%**

- Material presented in an objective manner and free of commercial bias

**96%**

- Content presented was evidence-based and clinically relevant

**N=1019**

# Program Evaluation Results

Final Outcomes Summary Data from 9/21/20 -9/21/21



## Barriers Encountered in Practice

- Access to care
- Better treatment
- Cost of therapy
- Insurance
- Knowledge barrier
- Lack of time
- Lack of training
- Patient adherence
- Patient knowledge
- Communication with patients

64%

N=1019

Evaluation respondents indicated the activity addressed strategies for overcoming barriers to optimal patient care

*“One barrier to care is patient reluctance to continue care when their condition hasn't improved with previous assessment or treatment. This presentation addressed how to overcome this barrier.”*

*– Online enduring program learner –*

# Program Evaluation Results

Final Outcomes Summary Data from 9/21/20 -9/21/21



## What topics would you like more information about in future educational activities?

Biologic treatments in T2 asthma	More detail about co-morbidities
Biologic choice and comparisons	Pathophysiology of asthmatic conditions
Bronchial thermoplasty long term studies	Patient compliance
Newer therapies	Pediatric asthma
Hypereosinophilic syndromes	Role of Chronic infection in non T2 Asthma
Other eosinophilic syndromes	Use of other medications for asthma
Eosinophilic asthma breakthroughs	Asthma exacerbation and COVID treatment

# Accreditation

Final Outcomes Summary Data from 9/21/20 -9/21/21



NJH is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians. The NJH Office of Professional Education produced and accredited this program and adhered to the updated ACCME guidelines.

NJH designates this enduring material for a maximum of 0.75 *AMA PRA Category 1 Credit(s)*<sup>™</sup>.

