Individualizing Asthma Care: Addressing Type 2 Inflammation

1,515 Participants

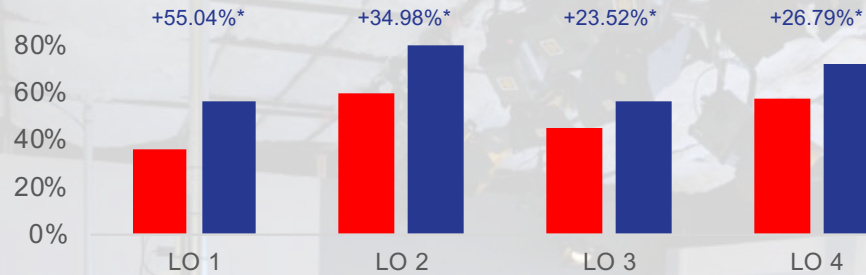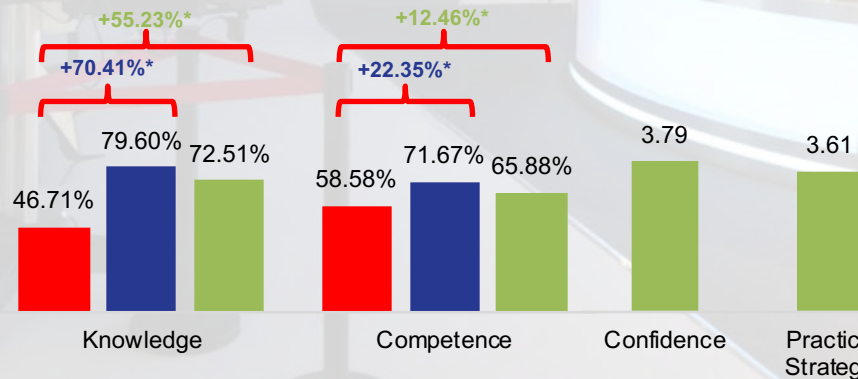**2 Activities**

1,092 certificates issued to date

This education has the potential to impact **551,460** patients with asthma on an annual basis.

9,545–11,666 Patients Weekly

2019 Conversations Activity	Date	Participants
Conversations In Primary Care 2019 Episode 2	3/2/19	792
Conversations In Primary Care 2019 Episode 3	3/30/19	723
Live Guarantee:1000	**Total**	**1,515**

Enduring Symposium Webcast

Individualizing Asthma Care: Addressing Type 2 Inflammation

Speaker

Nicola Alexander Hanania, MD, MS
Associate Professor
Director, Airways Clinical Research Center
Member, Vice Chair of Research GroupDepartment of Medicine
Baylor College of Medicine
Director, Asthma and COPD Clinic
Ben Taub Hospital
Houston, TX

Cost: Free

Start Date: 05/15/2019

Expiration Date: 05/14/2020

Target Audience: Primary Care Providers

Format: Webcast

Estimated Time To Complete CME Activity: 1.0 hour

Credit(s):
1.0 *AMA PRA Category 1 Credit*™
1.0 AANP Contact hour which includes 0.50 pharmacology hours

Hardware/Software Requirements: Any web browser

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Learning Gains Across Objectives

+55.04%* +34.98%* +23.52%* +26.79%*

(bar chart: LO 1, LO 2, LO 3, LO 4; y-axis 0%–80%)

- ❖ **LO 1:** Describe the newer concepts in the pathophysiology of asthma and type 2 inflammation and the implications of targeted biologic therapies
- ❖ **LO 2:** Implement tools for clinical assessment of asthma control and risk factors for poor asthma outcomes
- ❖ **LO 3:** Individualize treatment of moderate-to-severe asthma
- ❖ **LO 4:** Discuss the impact of comorbid conditions on asthma control and the evidence approach to their treatment

Learning Domain Analysis

+55.23%*
+70.41%*
+12.46%*
+22.35%*

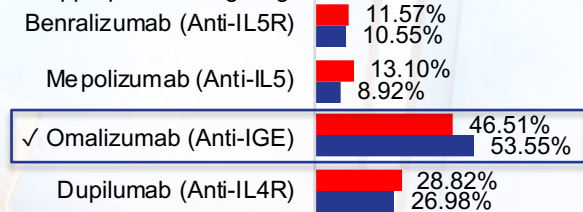| Knowledge	Competence	Confidence	Practice Strategy
46.71% / 79.60% / 72.51%	58.58% / 71.67% / 65.88%	3.79	3.61

- ❖ Learners demonstrated strong, significant improvements from Pre- to Post-Test in Knowledge and Competence.
- ❖ Scores on Knowledge questions were high at Post-Test (> 89%) for two of the three Knowledge items; the third addressed biomarkers that indicate type 2 airway inflammation
- ❖ In Confidence and practice strategy, which were measured at follow-up only, moderate scores were observed

Persistent Learning Gaps/Needs

Treatment selection for patients with uncontrolled asthma, comorbid GERD, and a negative Allergy evaluation
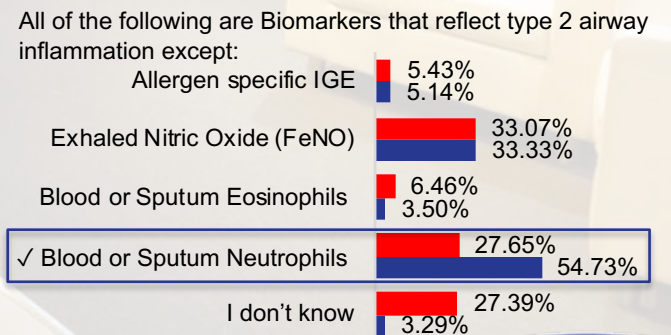On a Competence item presenting the case of a patient with severe, uncontrolled asthma, low IgE levels, and comorbid GERD, learners struggled at Post-Test to correctly identify the inappropriate biologic agent among the answer choices:

A 41-year-old man presents with severe, uncontrolled asthma. He also has a history of GERD. Current medications include high-dose ICS/LABA, tiotropium, and lansoprazole. His blood work-up shows serum IgE level 15 IU/mL, blood eosinophil count 450 cells/mcL, and Allergen specific IgE (RAST) negative for common aeroallergens. Based on these findings, which of the following is NOT an appropriate biologic agent:

Benralizumab (Anti-IL5R) — 11.57% / 10.55%
Mepolizumab (Anti-IL5) — 13.10% / 8.92%
✓ Omalizumab (Anti-IGE) — 46.51% / 53.55%
Dupilumab (Anti-IL4R) — 28.82% / 26.98%

Biomarkers reflecting type 2 airway inflammation
On a Knowledge item on biomarkers indicating type 2 airway inflammation, low scores were measured at Post-Test learners struggled at Post-Test to correctly identify which biomarker does not reflect airway inflammation:

All of the following are Biomarkers that reflect type 2 airway inflammation except:

Allergen specific IGE — 5.43% / 5.14%
Exhaled Nitric Oxide (FeNO) — 33.07% / 33.33%
Blood or Sputum Eosinophils — 6.46% / 3.50%
✓ Blood or Sputum Neutrophils — 27.65% / 54.73%
I don't know — 27.39% / 3.29%

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Curriculum Patient Impact

In the evaluation, learners (N = 757) were asked to report how many patients with asthma they see in any clinical setting per week by selecting a range. The resulting distribution of learner responses was then extrapolated to reflect the total number of learners who have attended the onsite and online meetings.

The findings reveal that this education has the potential to impact

551,460

patients with asthma on an annual basis.

9,545–11,666 patients with asthma on a weekly basis

9,545–11,666

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2019 Commercial Support

- Actelion Pharmaceuticals US, Inc.
- Amgen, Inc.
- Avanir Pharmaceuticals, Inc.
- Intercept Pharmaceuticals, Inc.
- Lilly USA, LLC

- Lundbeck
- Sanofi Genzyme and Regeneron Pharmaceuticals
- Sanofi US and Regeneron Pharmaceuticals
- Shire
- Takeda Pharmaceuticals U.S.A., Inc.

Overview

Learning Objectives

❖ Describe the newer concepts in the pathophysiology of asthma and type 2 inflammation and the implications of targeted biologic therapies

❖ Implement tools for clinical assessment of asthma control and risk factors for poor asthma outcomes

❖ Individualize treatment of moderate-to-severe asthma

❖ Discuss the impact of comorbid conditions on asthma control and the evidence approach to their treatment

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Curriculum Overview

Two Live Virtual CME Symposia

Enduring CME Symposium Webcast

https://www.naceonline.com/courses/individualizing-asthma-care-addressing-type-2-inflammation

**Individualizing Asthma Care: Addressing Type 2 Inflammation**

Speaker

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Hardware/Software Requirements: Any web browser

Clinical Highlights eMonograph

eMonograph, containing key teaching points from the CME activity, was distributed 1 week after the meeting to all attendees.

CONVERSATIONS IN PRIMARY CARE
NACE
Live Virtual Conferences
2019 Clinical Highlights
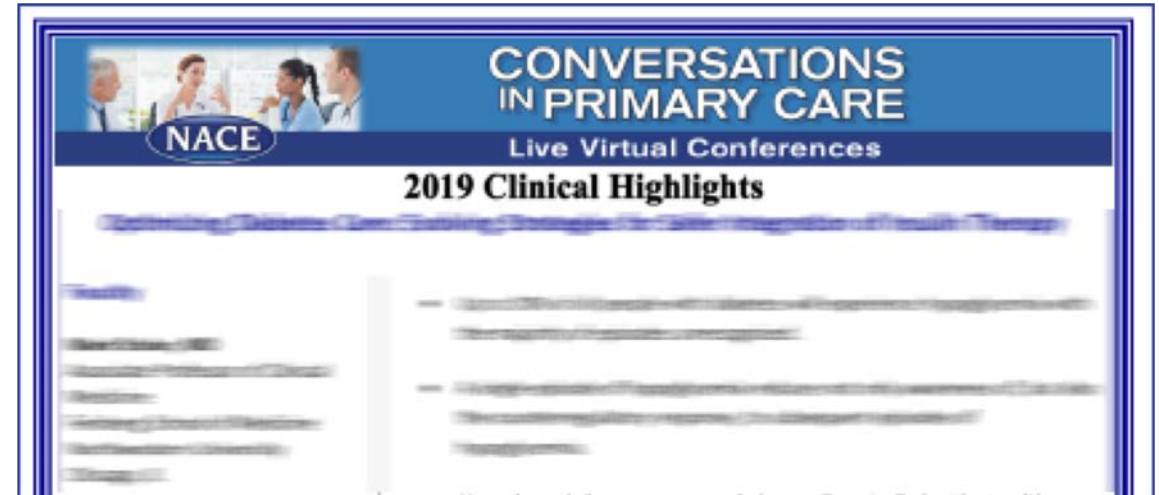
Outcomes Methodology

Learning outcomes were measured using matched Pre-Test and Post-Test scores for Knowledge, Performance, Confidence, and practice strategy and across all of the curriculum's Learning Objectives.

Outcomes Metric	Definition	Application
Percentage change	This is how the score changes resulting from the education are measured. The change is analyzed as a relative percentage difference by taking into account the magnitude of the Pre-Test average.	Differences between Pre-Test, Post-Test, and PCA score averages
P value (p)	This is the measure of the statistical significance of a difference in scores. It is calculated using dependent or independent samples t-tests to assess the difference between scores, taking into account sample size and score dispersion. Differences are considered significant for when $p \leq .05$.	Significance of differences between Pre-Test, Post-Test, and PCA scores and among cohorts
Effect size (d)	This is a measure of the strength/magnitude of the change in scores (irrespective of sample size). It is calculated using Cohen's d formula, with the most common ranges of d from 0-1: d < .2 is a small effect, d=.2-.8 is a medium effect, and d > .8 is a large effect.	Differences between Pre-Test and Post-Test score averages
Power	This is the probability (from 0 to 1) that the "null hypothesis" (no change) will be appropriately rejected. It is the probability of detecting a difference (not seeing a false negative) when there is an effect that is dependent on the significance (p), effect size (d), and sample size (N).	Differences between Pre-Test and Post-Test score averages
Percentage non-overlap	This is the percentage of data points at the end of an intervention that surpass the highest scores prior to the intervention. In this report, it will reflect the percentage of learners at Post-Test who exceed the highest Pre-Test scores.	Differences between Pre-Test and Post-Test score averages

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Participation

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Level 1: Demographics and Patient Reach

Specialty

67.98% Primary Care
15.45% Other
5.06% Cardiology
3.09% Neurology/Psychiatry
2.25% Hospitalist

Under 2%	
Emergency Medicine/Critical Care	1.97%
Endocrinology	1.69%
Pulmonology	1.12%
Gastroenterology	1.12%
Rheumatology	0.28%
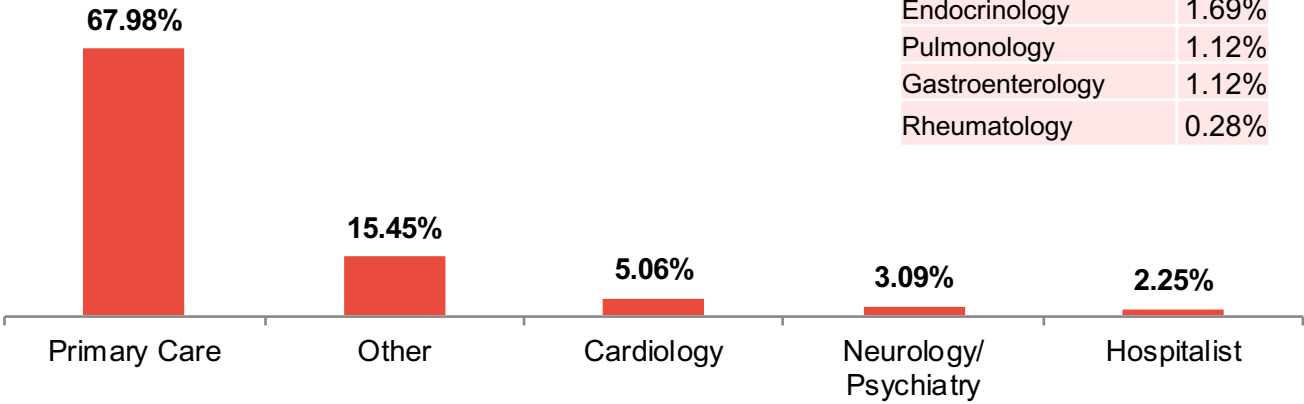
Patient Care Focus: 94%

Patients with asthma seen each week, in any clinical setting:

None
1–5
6–10
11–15
16–20
21–25
>25

0% 10% 20% 30% 40%
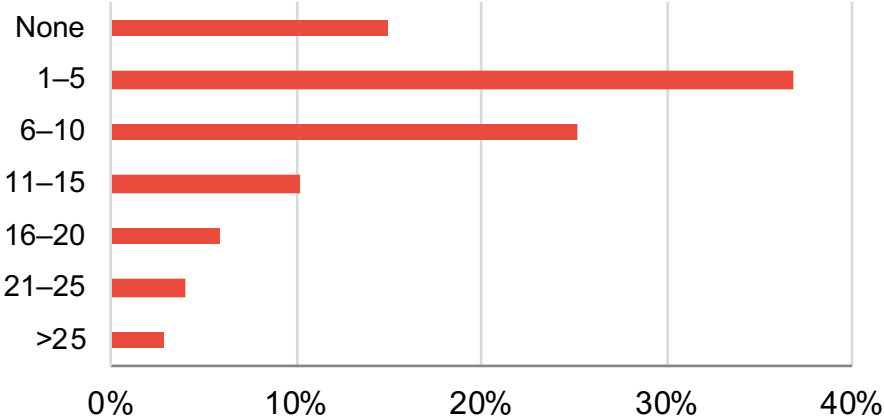
Average number of patients with asthma seen each week per clinician: 7

Profession

69.57% NP
15.32% MD
7.66% PA
4.35% RN
1.66% DO
1.45% Other

Years in Practice

36.23% <5
17.16% 5-10
19.07% 11-20
27.54% >20

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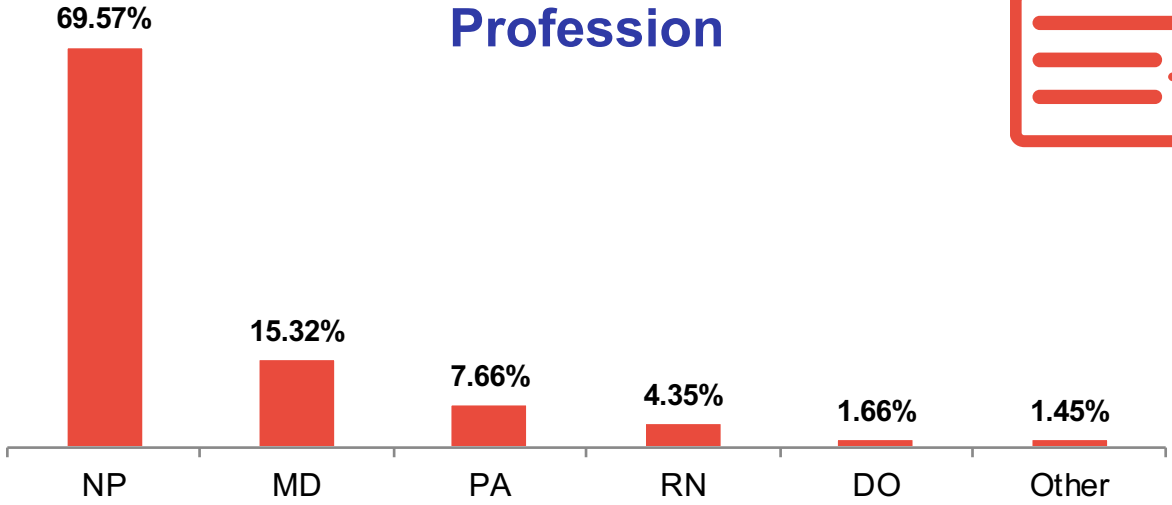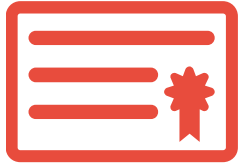
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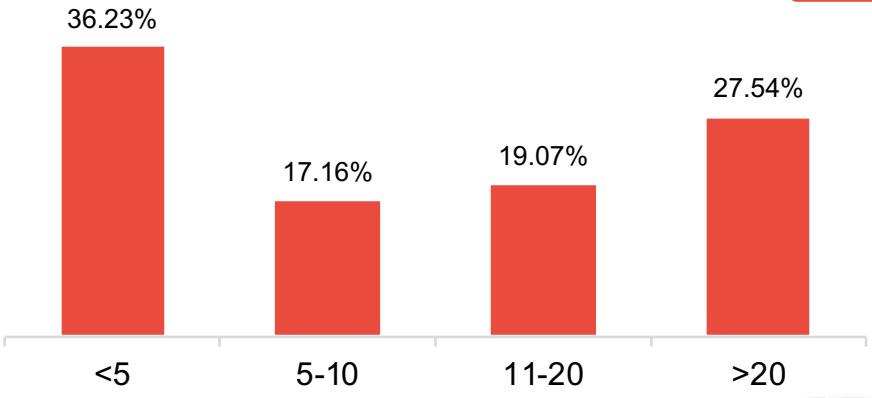
Level 2-5:
Outcomes Metrics

Learning Objective Analysis

N = 336 – 429

Describe the newer concepts in the pathophysiology of asthma and type 2 inflammation and the implications of targeted biologic therapies
- Pre-Test: 36.79% (40.58%)
- Post-Test: 57.04% (41.79%)
- +55.04%*

Implement tools for clinical assessment of asthma control and risk factors for poor asthma outcomes
- Pre-Test: 59.75% (33.68%)
- Post-Test: 80.65% (28.13%)
- +34.98%*

Individualize treatment of moderate-to-severe asthma
- Pre-Test: 45.54% (49.80%)
- Post-Test: 56.25% (49.61%)
- +23.52%*

Discuss the impact of comorbid conditions on asthma control and the evidence approach to their treatment
- Pre-Test: 57.52% (39.18%)
- Post-Test: 72.93% (36.02%)
- +26.79%*

❖ Learners demonstrated substantial and significant improvements on all four curriculum Learning Objectives

❖ A high Post-Test average (81%) was achieved on the learning objective addressing implementation of tools for clinical assessment of asthma control and risk factors for poor asthma outcomes

❖ Post-Test scores on the other three Learning Objectives were poor to moderate (56% to 73%), representing opportunities for further education on these subjects
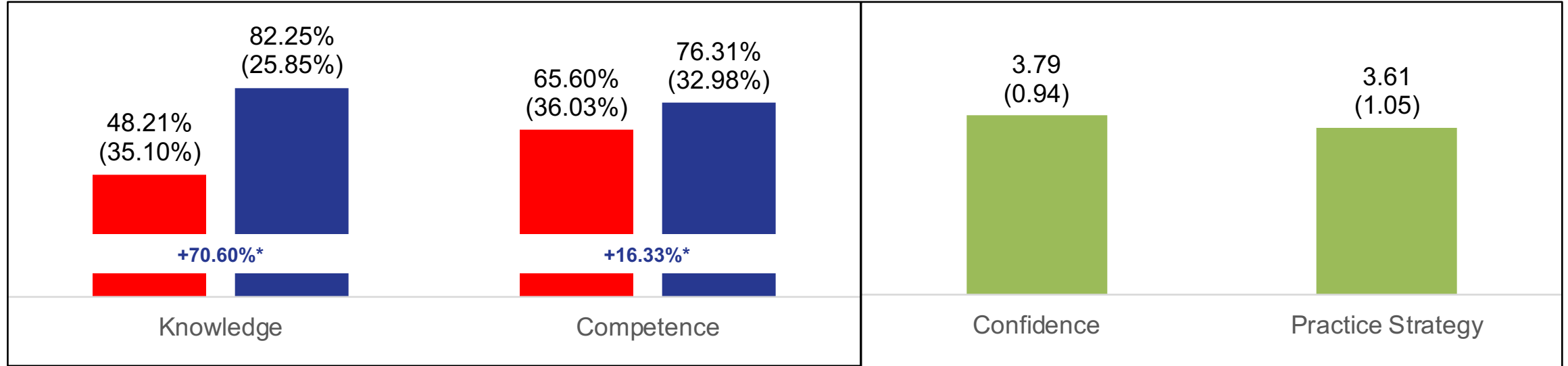
Note: data are matched.
* indicates significance, $p < 0.05$.

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Learning Domain Analysis

Legend: Pre-Test (red), Post-Test (blue), PCA (green)

Knowledge: Pre-Test 48.21% (35.10%), Post-Test 82.25% (25.85%), +70.60%*
Competence: Pre-Test 65.60% (36.03%), Post-Test 76.31% (32.98%), +16.33%*
Confidence: PCA 3.79 (0.94)
Practice Strategy: PCA 3.61 (1.05)

- ❖ Learners demonstrated strong, significant improvements from Pre- to Post-Test in Knowledge and Competence
  - ❖ These improvements are seen in combination with low scores on three of the four Learning Objectives due to a low scoring Competence item mapped to all four Objectives, presenting an asthma patient with comorbid GERD and a negative Allergy evaluation.
  - ❖ Scores on Knowledge questions were high at Post-Test (> 89%) for two of the three Knowledge items; the third addressed biomarkers that indicate type 2 airway inflammation
- ❖ In Confidence and practice strategy, which were measured at follow-up only, moderate scores were observed

Note: data for Knowledge and Competence is matched; learners with a score for the given domain on both the Pre-Test and Post-Test are included
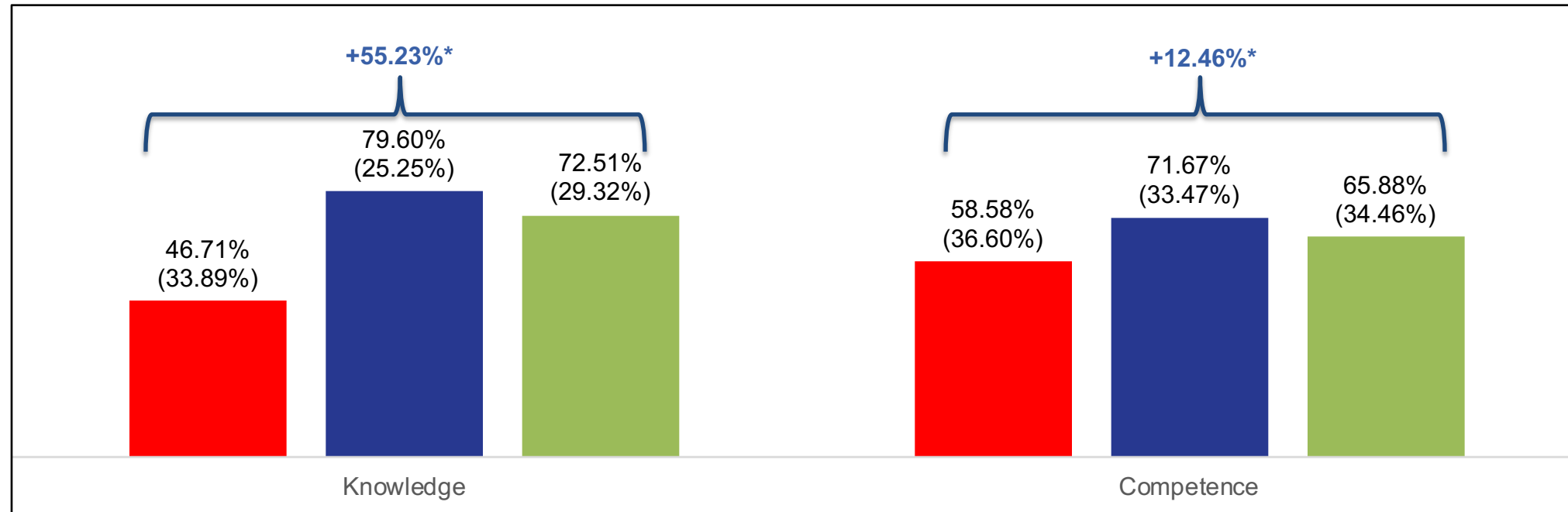
significant at the $p \leq 0.05$ level, matched data

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4-Week Retention Analysis: Learning Domains

Pre-Test   Post-Test   PCA

+55.23%*

+12.46%*

Knowledge
- 46.71% (33.89%)
- 79.60% (25.25%)
- 72.51% (29.32%)

Competence
- 58.58% (36.60%)
- 71.67% (33.47%)
- 65.88% (34.46%)

At follow-up:

❖ In addition to collecting Confidence and Practice data for the curriculum, the Post Curriculum Assessment (PCA) repeated questions from the Knowledge and Competence domains

❖ A statistically significant net gain was measured from Pre-Test to the Post Curriculum Assessment (PCA) in both Knowledge (55%) and Competence (12%)

❖ In both Knowledge and Competence, some decrease in score was measured between Post-Test and PCA, reflecting a need for further reinforcement of both declarative and case-based content
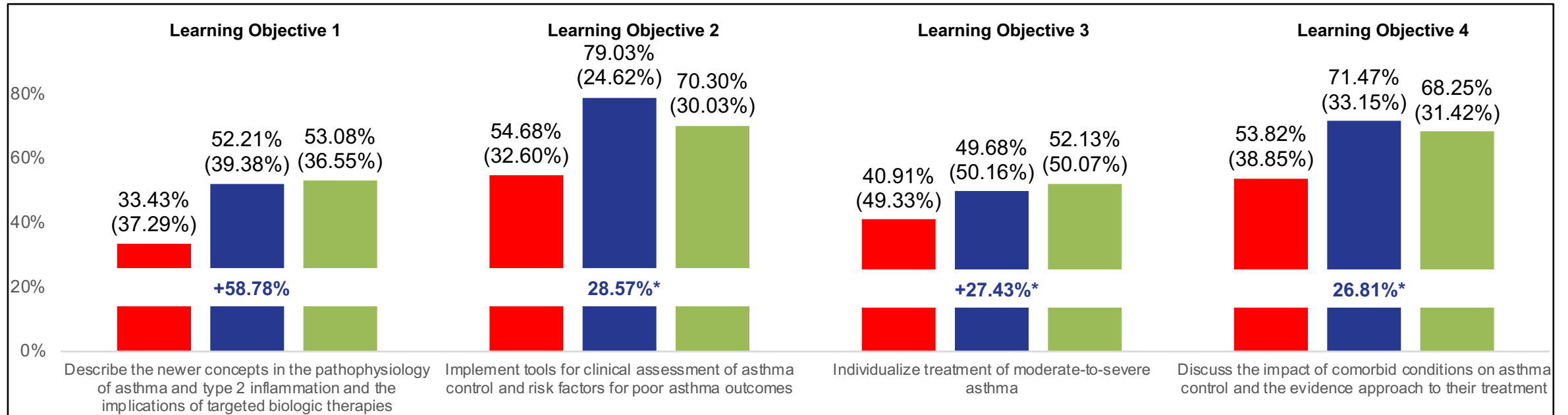
Note: data is matched; learners with a score for the given domain on both the Pre-Test and PCA are included

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*significant at the p ≤ 0.05 level

4-Week Retention Analysis: Learning Objectives

(*N* = 211)

Learning Objective 1

33.43% (37.29%)
52.21% (39.38%)
53.08% (36.55%)

+58.78%

Describe the newer concepts in the pathophysiology of asthma and type 2 inflammation and the implications of targeted biologic therapies

Learning Objective 2

54.68% (32.60%)
79.03% (24.62%)
70.30% (30.03%)

28.57%*

Implement tools for clinical assessment of asthma control and risk factors for poor asthma outcomes

Learning Objective 3

40.91% (49.33%)
49.68% (50.16%)
52.13% (50.07%)

+27.43%*

Individualize treatment of moderate-to-severe asthma

Learning Objective 4

53.82% (38.85%)
71.47% (33.15%)
68.25% (31.42%)

26.81%*

Discuss the impact of comorbid conditions on asthma control and the evidence approach to their treatment

- ❖ Substantial and significant gains, ranging from 27% to 60%, were retained across all four curriculum learning objectives, from Pre-Test to the PCA

- ❖ On all three of the four Learning Objectives, some slippage in score was observed between the Post-Test and PCA; additional gains were observed in individualizing treatment of moderate-to-severe asthma

  - ❖ The only question mapped to this Objective was a Competence question presenting the case of a patient with uncontrolled asthma, GERD, and a negative Allergy evaluation

- ❖ PCA scores on all four Learning Objectives were low (49% to 58%), reflecting a need for further reinforcement in this area

Note: data is matched; learners with a score for the given domain on both the Pre-Test and PCA are included
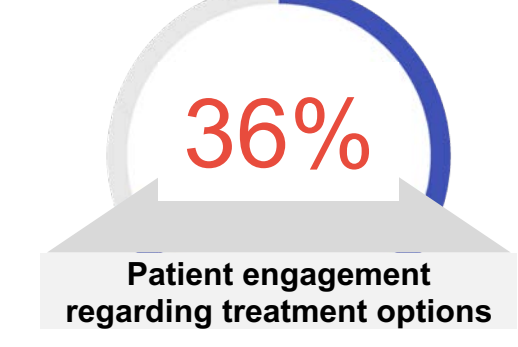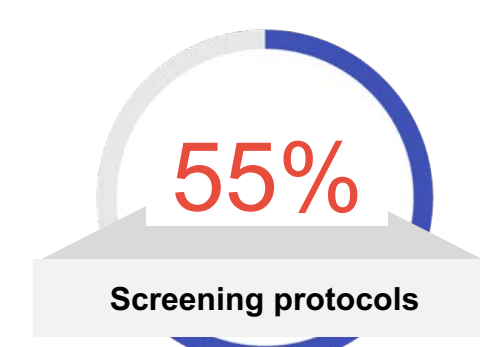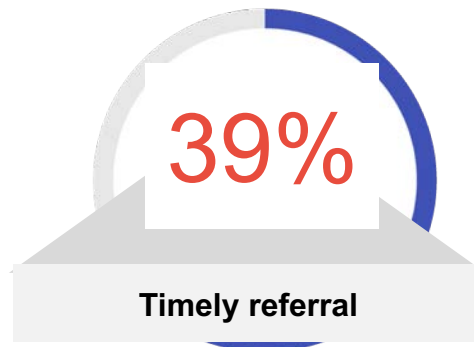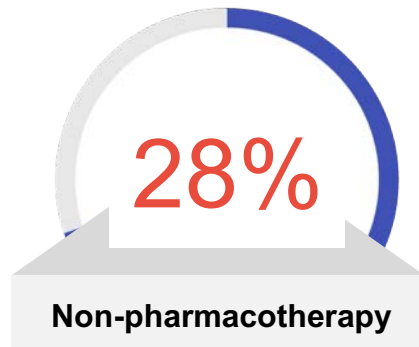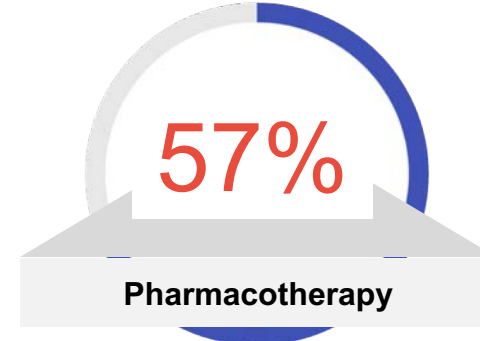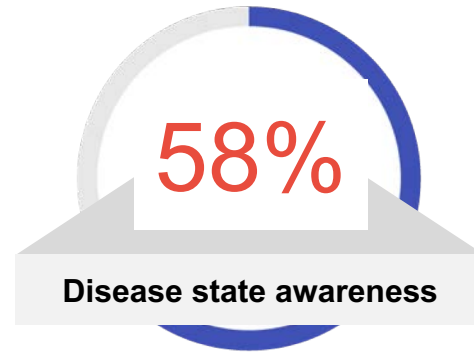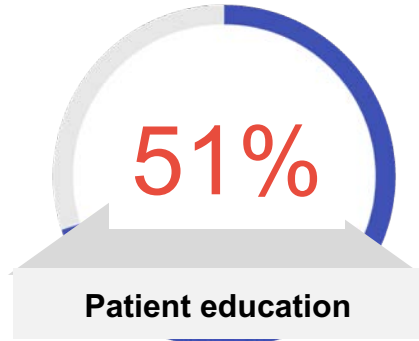
**significant at the p ≤ 0.05 level*

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Please select the specific areas of *skills, or practice behaviors*, you have improved regarding the treatment of patients with asthma since this CME activity. (Select all that apply.)

N=423

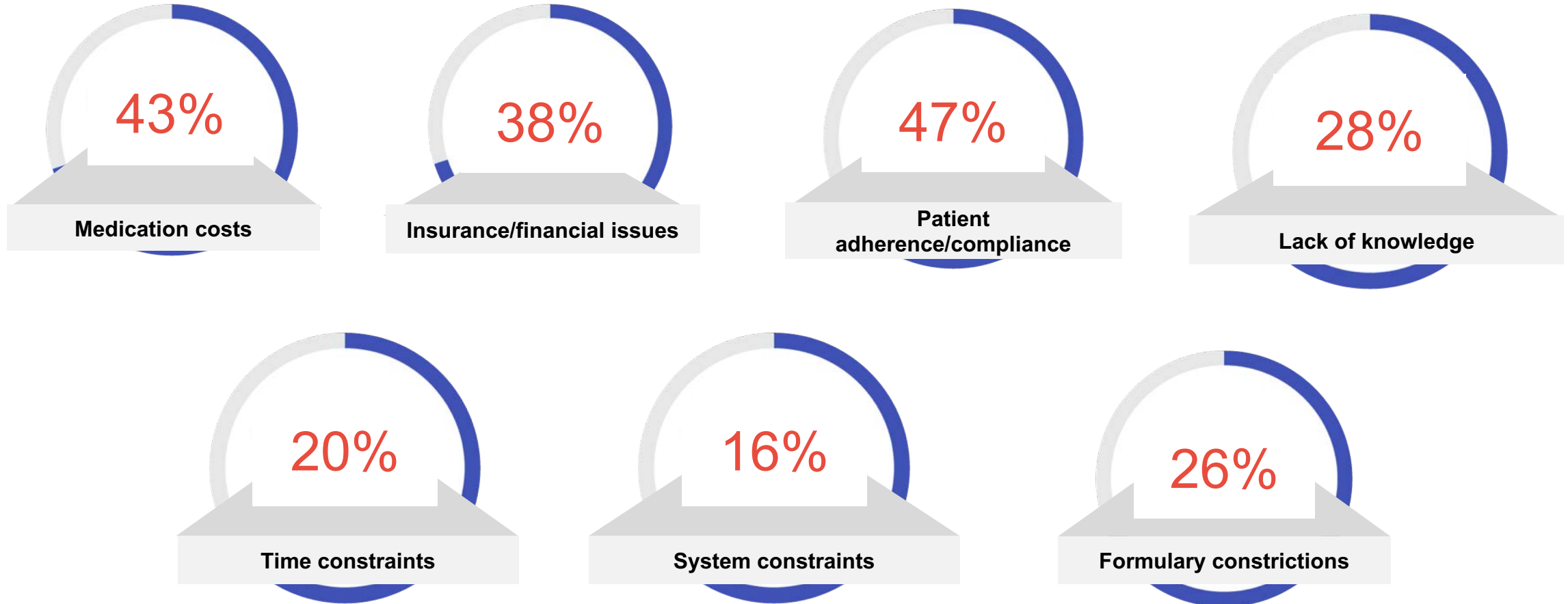|	
51% Patient education	**58%** Disease state awareness
57% Pharmacotherapy	**49%** Diagnostic evaluation
28% Non-pharmacotherapy	**39%** Timely referral
55% Screening protocols	**36%** Patient engagement regarding treatment options
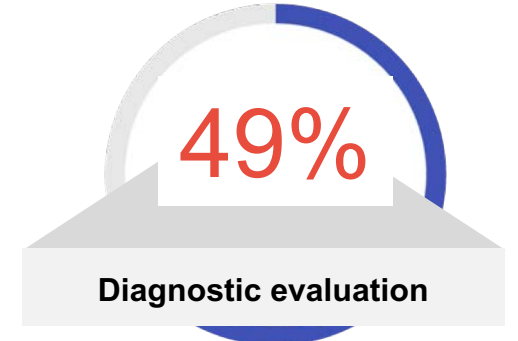
- Learners also reported increased routine use of the Asthma Control Test when assessing asthma control, more often assessing for environmental triggers, inhaler technique, and comorbidities, and greater use of eosinophil counts and IgE levels when evaluating patients with Asthma.

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What specific *barriers* have you encountered that may have prevented you from successfully implementing strategies for patients with asthma since this CME activity? (Select all that apply.)

N=423

43% Medication costs

38% Insurance/financial issues

47% Patient adherence/compliance

28% Lack of knowledge

20% Time constraints

16% System constraints

26% Formulary constrictions

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Cohort Comparison by Profession: Learning Objectives

Learning Objective	Nurse Practitioners				Physicians			
	N	Pre-Test	Post-Test	% Change	*N*	Pre-Test	Post-Test	% Change
Describe the newer concepts in the pathophysiology of asthma and type 2 inflammation and the implications of targeted biologic therapies	198	37.88% (40.26%)	56.82% (40.41%)	+50.00%*	49	38.78% (40.74%)	68.37% (41.27%)	+76.30%*
Implement tools for clinical assessment of asthma control and risk factors for poor asthma outcomes	210	60.08% (32.53%)	81.98% (27.26%)	+36.45%*	55	62.73% (33.02%)	88.18% (22.40%)	+40.57%*
Individualize treatment of moderate-to-severe asthma	166	45.18% (49.77%)	57.23% (49.47%)	+26.67%*	36	41.67% (49.30%)	69.44% (46.06%)	+66.64%*
Discuss the impact of comorbid conditions on asthma control and the evidence approach to their treatment	198	58.59% (38.95%)	74.49% (33.61%)	+27.14%*	47	59.57% (38.09%)	82.98% (33.06%)	+39.30%*

❖ Both nurse practitioners and physicians achieved substantial and significant improvements on all four curriculum Learning Objectives

❖ For all Learning Objectives, physicians had higher Post-Test scores, and stronger improvements from Pre-Test to Post-Test, compared to nurse practitioners

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Cohort Comparison by Profession: Learning Domains

Learning Domain	Nurse Practitioners				Physicians			
	N	Pre-Test	Post-Test	% Change	N	Pre-Test	Post-Test	% Change
Knowledge	195	48.55% (34.00%)	82.39% (23.88%)	+69.70%*	51	51.31% (36.73%)	83.33% (27.02%)	+62.40%*
Competence	209	66.27% (34.91%)	77.51% (32.02%)	+16.96%*	53	70.75% (34.25%)	85.85% (28.11%)	+21.34%*

❖ Both nurse practitioners and physicians achieved significant improvements in both Knowledge and Competence, from Pre- to Post-Test

❖ Compared to nurse practitioners, physicians had higher Pre- and Post-Test scores in both Knowledge and Competence
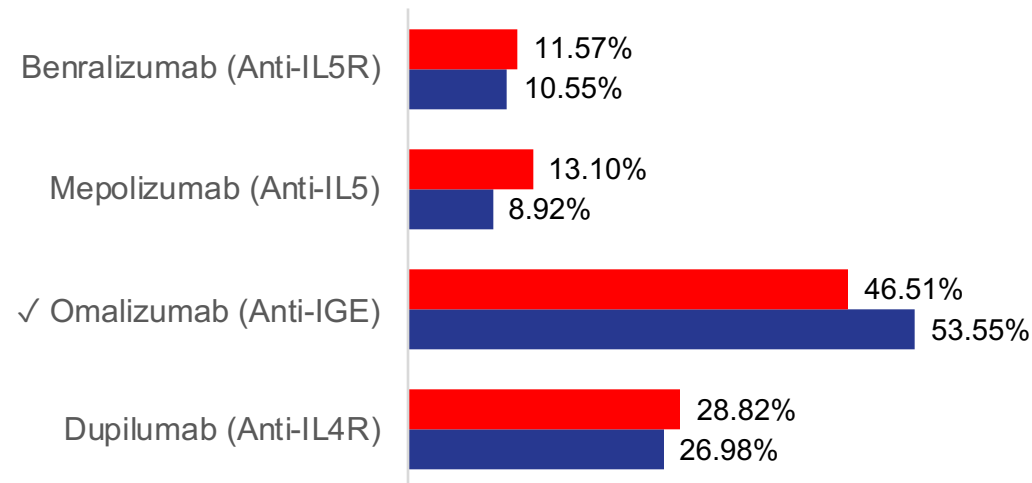
Identified Learning Gap, 1 of 2:
Treatment selection for patients with uncontrolled asthma, low serum IgE, and a negative Allergy evaluation

On a Competence item presenting the case of a patient with severe, uncontrolled asthma, low serum IgE and negative allergy evaluation, learners struggled at Post-Test to correctly identify the inappropriate biologic agent among the answer choices:

Competence: A 41-year-old man presents with severe, uncontrolled asthma. He also has a history of GERD. Current medications include high-dose ICS/LABA, tiotropium, and lansoprazole. His blood work-up shows serum IgE level 15 IU/mL, blood eosinophil count 450 cells/mcL, and Allergen specific IgE (RAST) negative for common aeroallergens. Based on these findings, which of the following is NOT an appropriate biologic agent:

Results:

- At Post-Test, 54% of learners correctly answered: "Omalizumab (Anti-IGE)"

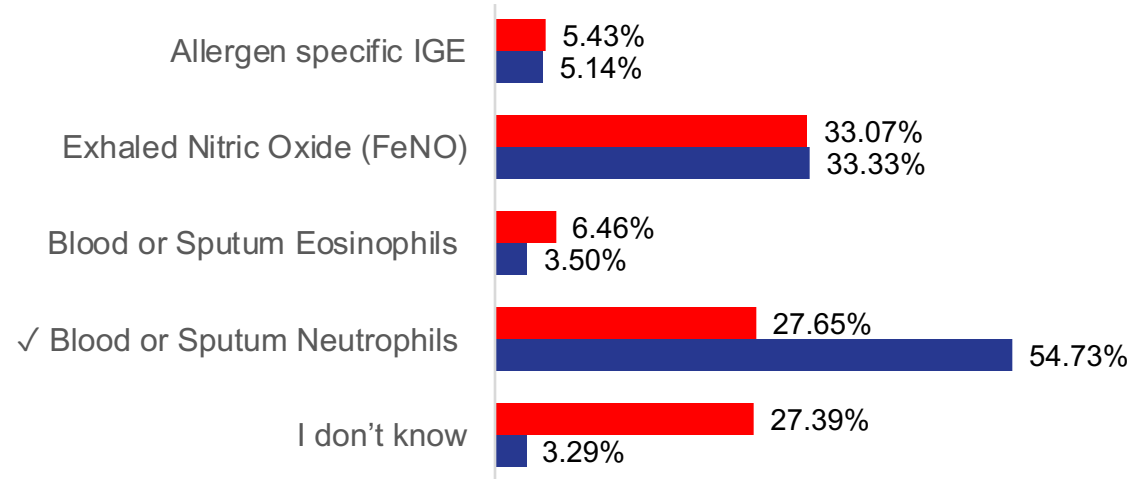| Biologic agent	Red	Blue
Benralizumab (Anti-IL5R)	11.57%	10.55%
Mepolizumab (Anti-IL5)	13.10%	8.92%
✓ Omalizumab (Anti-IGE)	46.51%	53.55%
Dupilumab (Anti-IL4R)	28.82%	26.98%

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Identified Learning Gap, 2 of 2:
Biomarkers reflecting type 2 airway inflammation

On a Knowledge item on biomarkers indicating type 2 airway inflammation, low scores were measured at Post-Test:

Knowledge: All of the following are Biomarkers that reflect type 2 airway inflammation except:

Results:

- At Post-Test, 55% of learners correctly answered: "Blood or Sputum Neutrophils"

Allergen specific IGE
5.43%
5.14%

Exhaled Nitric Oxide (FeNO)
33.07%
33.33%

Blood or Sputum Eosinophils
6.46%
3.50%

✓ Blood or Sputum Neutrophils
27.65%
54.73%

I don't know
27.39%
3.29%

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Overall Educational Impact

❖ Significant improvements (of 70% and 16%) were seen in both learner Knowledge and Competence
- Moderate Post-Test scores (76%) were measured in Competence, with high (82%) Post-Test scores in Knowledge
  - This low average Competence score was driven by poor Post-Test scores on an item presenting the case of a patient with severe asthma, GERD and a negative Allergy evaluation
- In Confidence and Practice Strategy, which were measured at 4 week follow-up only, moderate scores were observed.

❖ Substantial and significant improvements ranging from 24% to 55% were measured across all Learning Objectives, from Pre-Test to Post-Test.
- Learners exceled at Post-Test (81%) on implementing tools for clinical assessment of asthma control and recognizing risk factors for poor asthma outcomes

Overall Educational Impact

❖ The analysis of the Knowledge and Competence domains identified two **persistent learning gaps related to treatment selection for patients with uncontrolled asthma, GERD, and a negative Allergy evaluation, and biomarkers reflecting type 2 airway inflammation**

- Pre- and Post-Test scores (47% and 54%) were low on a Competence item about a patient presenting with uncontrolled asthma, comorbid GERD, low serum IgE, and a negative Allergy evaluation
- On a Knowledge question about biomarkers reflecting type 2 airway inflammation, learners struggled to achieve high scores following very low Pre-Test scores (28%, Pre-Test, to 55%, Post-Test)

❖ Future educational activities should focus on helping providers understand the role of biomarkers in the evaluation of patients with Asthma, and how to select appropriate treatment for patients with severe Asthma based on their risk factors and comorbid conditions.
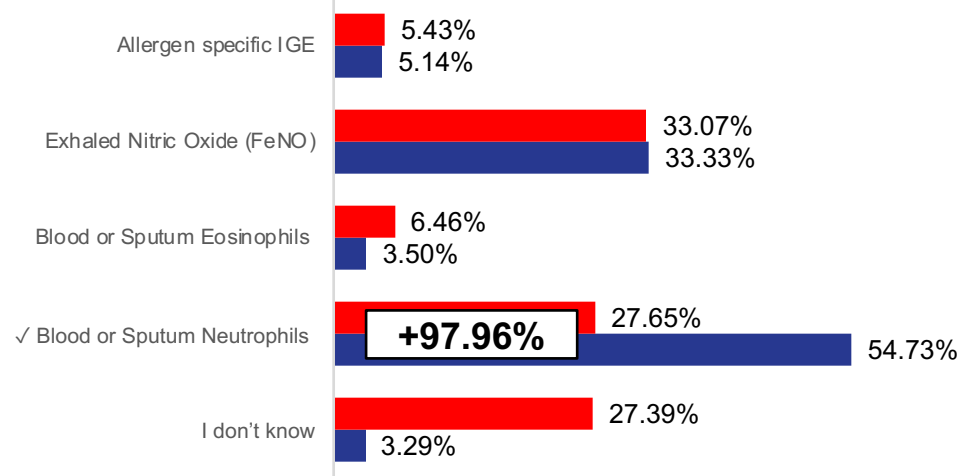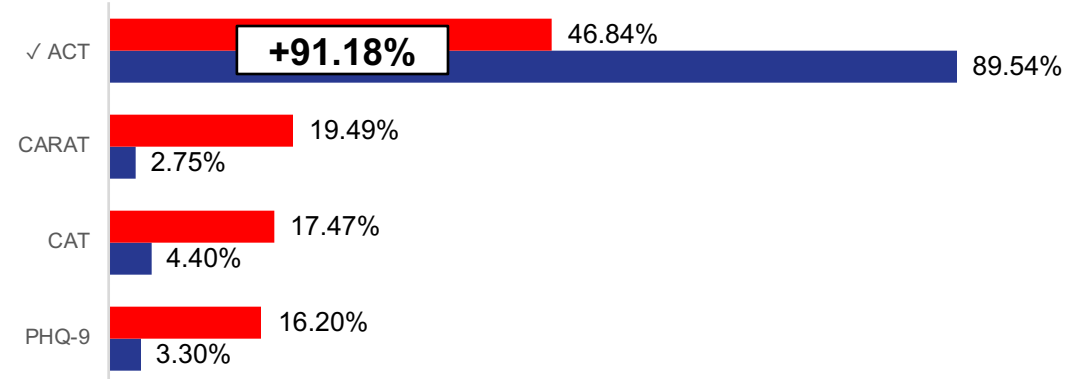
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Appendix

Knowledge Items

All of the following are Biomarkers that reflect type 2 airway inflammation except:

N = 387 – 486

- Allergen specific IGE
  - 5.43%
  - 5.14%
- Exhaled Nitric Oxide (FeNO)
  - 33.07%
  - 33.33%
- Blood or Sputum Eosinophils
  - 6.46%
  - 3.50%
- ✓ Blood or Sputum Neutrophils
  - **+97.96%** 27.65%
  - 54.73%
- I don't know
  - 27.39%
  - 3.29%

Which of the following tools is an evidence-based instrument for assessing asthma control in adult primary care patients?
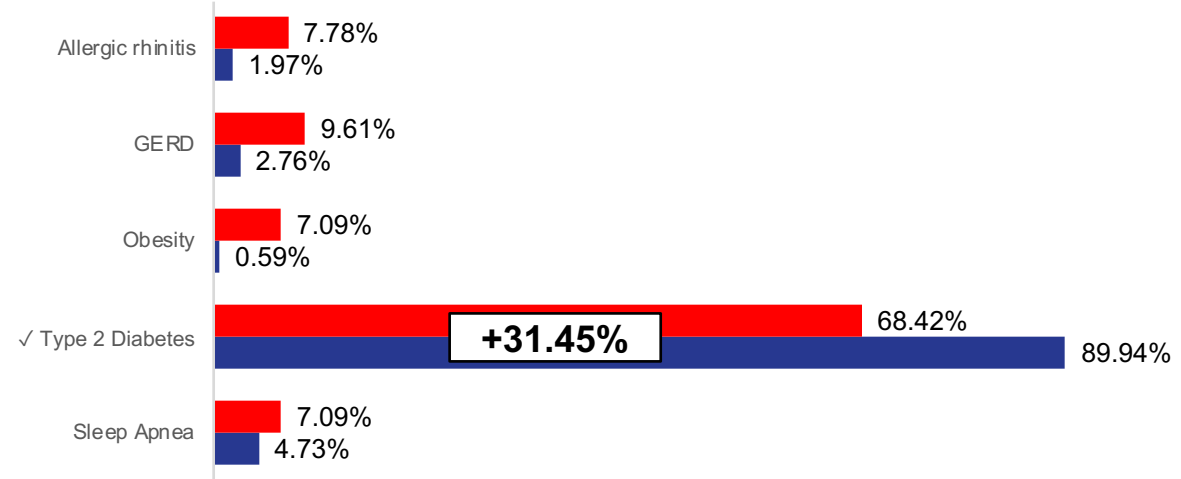
N = 395 – 545

- ✓ ACT
  - **+91.18%** 46.84%
  - 89.54%
- CARAT
  - 19.49%
  - 2.75%
- CAT
  - 17.47%
  - 4.40%
- PHQ-9
  - 16.20%
  - 3.30%

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Knowledge Items

All of the following comorbidities are common in patients with asthma and can affect asthma control, EXCEPT:

N = 437 − 507

Allergic rhinitis — 7.78% / 1.97%

GERD — 9.61% / 2.76%

Obesity — 7.09% / 0.59%

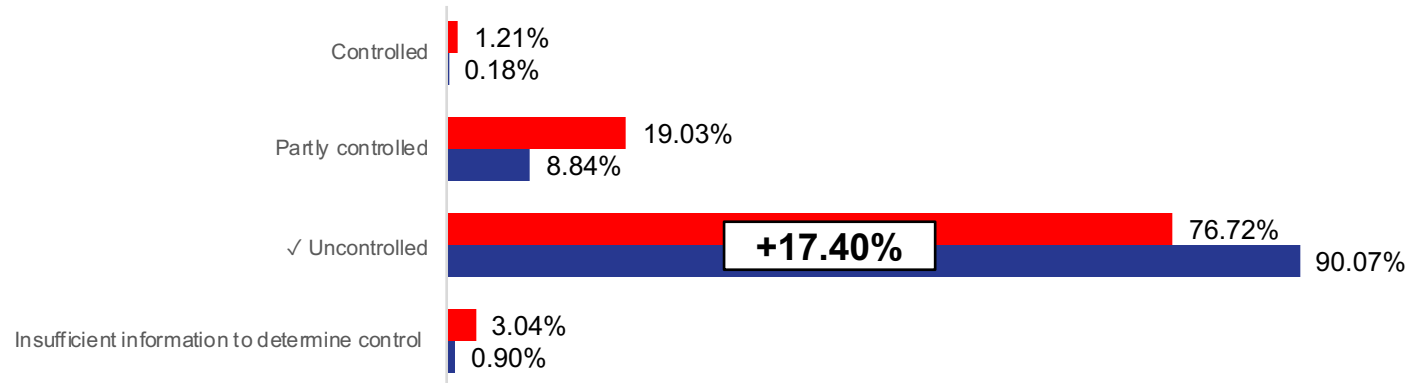✓ Type 2 Diabetes — **+31.45%** — 68.42% / 89.94%

Sleep Apnea — 7.09% / 4.73%

RealCME
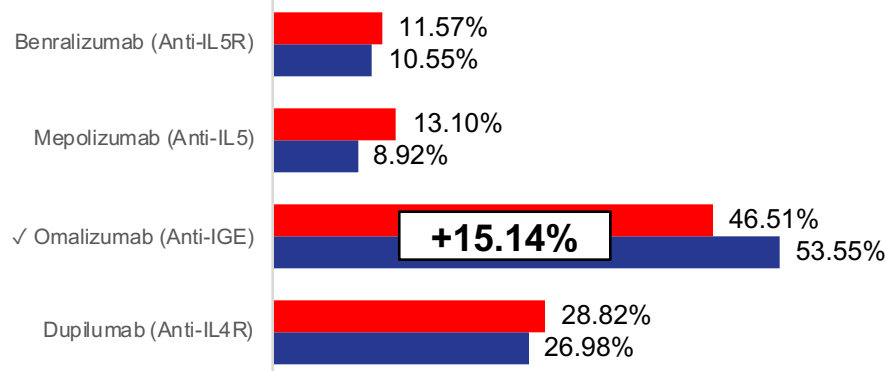
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Competence Items

A 34-year-old woman with a 15-year history of asthma reports daily asthma symptoms and nighttime awakenings 2 nights per week. The symptoms prevent her from exercising most days. She uses albuterol 1-2 times/d and reports daily adherence to high-dose ICS/LABA. Her ACT score is 12. How would you grade this patient's level of asthma control?

N = 494 – 554

Controlled
- 1.21%
- 0.18%

Partly controlled
- 19.03%
- 8.84%

✓ Uncontrolled
- **+17.40%**
- 76.72%
- 90.07%

Insufficient information to determine control
- 3.04%
- 0.90%

A 41-year-old man presents with severe, uncontrolled asthma. He also has a history of GERD. Current medications include high-dose ICS/LABA, tiotropium, and lansoprazole. His blood work-up shows serum IgE level 15 IU/mL, blood eosinophil count 450 cells/mcL, and Allergen specific IgE (RAST) negative for common aeroallergens. Based on these findings, which of the following is NOT an appropriate biologic agent:

N = 458 – 493

Benralizumab (Anti-IL5R)
- 11.57%
- 10.55%

Mepolizumab (Anti-IL5)
- 13.10%
- 8.92%

✓ Omalizumab (Anti-IGE)
- **+15.14%**
- 46.51%
- 53.55%

Dupilumab (Anti-IL4R)
- 28.82%
- 26.98%

RealCME
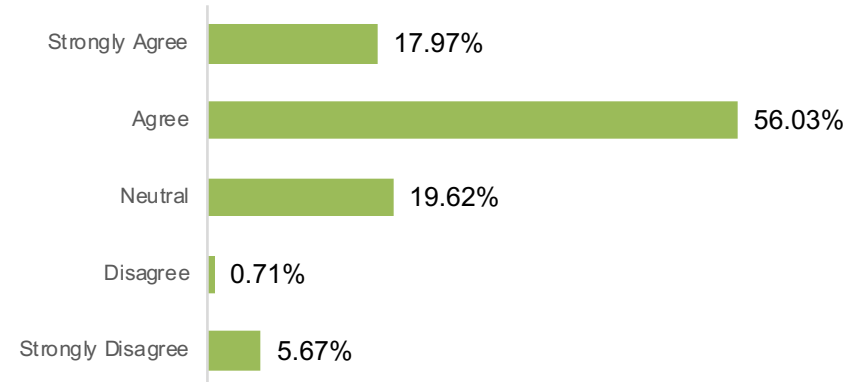
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Confidence items (given at 4 week follow-up)

Please rate your level of agreement with the following statement: "I am more confident in understanding how to manage patients who present with severe, uncontrolled asthma."   **N = 423**

Strongly Agree	17.73%
Agree	54.61%
Neutral	21.04%
Disagree	0.71%
Strongly Disagree	5.91%
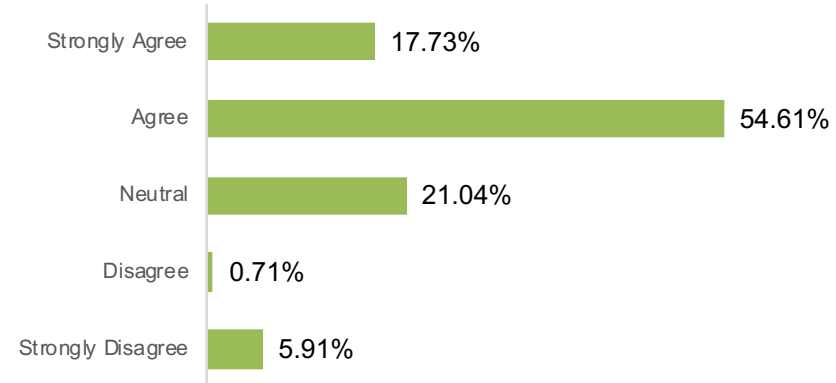
Please rate your level of agreement with the following statement: "I am more confident in my ability to recognize patients that meet the diagnostic criteria for severe asthma."   **N = 423**
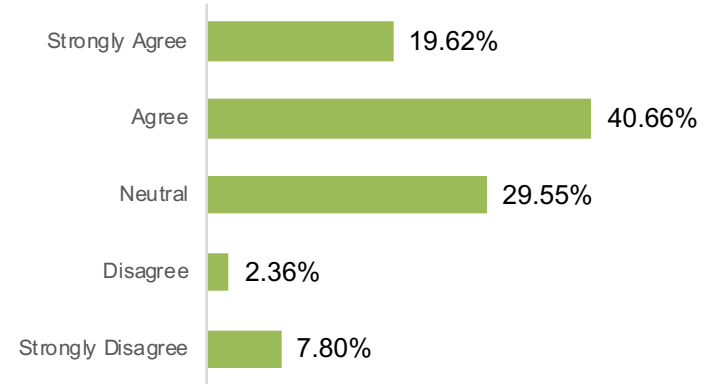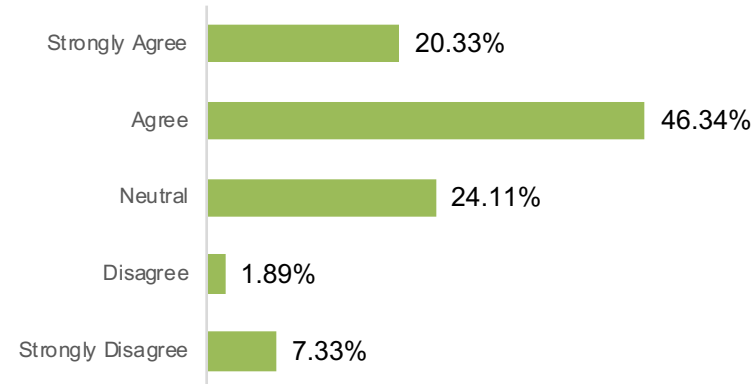
Strongly Agree	17.97%
Agree	56.03%
Neutral	19.62%
Disagree	0.71%
Strongly Disagree	5.67%

RealCME

NACE

Practice Strategy Items (given at 4 week follow-up)

■ PCA

Please rate your level of agreement with the following statement: "I have increased routine use of the Asthma Control Test when assessing asthma control."   **N = 423**

- Strongly Agree — 19.62%
- Agree — 40.66%
- Neutral — 29.55%
- Disagree — 2.36%
- Strongly Disagree — 7.80%

Please rate your level of agreement with the following statement: "I more often assess patients who have uncontrolled asthma for environmental triggers, inhaler technique, and comorbidities."   **N = 423**

- Strongly Agree — 20.33%
- Agree — 46.34%
- Neutral — 24.11%
- Disagree — 1.89%
- Strongly Disagree — 7.33%

RealCME

NACE

Practice Strategy Items, Continued (given at 4 week follow-up)

Please rate your level of agreement with the following statement: "I have increased my use of eosinophil counts and IgE levels when evaluating patients with Asthma'"

N = 423

Response	Percentage
Strongly Agree	15.37%
Agree	38.06%
Neutral	36.17%
Disagree	3.07%
Strongly Disagree	7.33%

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