A Severe Asthma Roadmap for Improved Diagnosis and Personalized Treatment – A Guided Workflow

- Case simulations for work-up of difficult-to-treat and severe asthma patients
- Strategies for selecting targeted therapies based on emerging evidence

A free CME/CNE/MOC evening symposium
Final Report: Program Overview

Objectives

• Describe key concepts in the pathophysiology of severe asthma and the features that are targets for biologic therapies.

• Distinguish severe asthma from difficult-to-treat asthma with improved diagnostic and assessment strategies, including training in proper inhaler technique.

• Review emerging evidence related to targeted therapies and potential biomarkers to select personalized treatment in severe asthma according to asthma subtype.

Target Audience

Allergists, Pulmonologists, along with Primary Care Physicians, Pediatricians, Nurse Practitioners, Physician Assistants and Registered Nurses who treat patients with asthma. Nurses are targeted for the live education only.

Program Faculty

Linda Rogers, MD
Associate Professor of Medicine, Pulmonary, Critical Care and Sleep Medicine
Director, Clinical Asthma Program, Icahn School of Medicine at Mount Sinai
Mount Sinai – National Jewish Health Respiratory Institute New York, NY

Michael E. Wechsler, MD, MMSc
Professor of Medicine
Director, NJH Cohen Family Asthma Institute
Department of Medicine
National Jewish Health
Denver, Colorado
Final Report: Live Program Dashboard

Participation

- Total Live Participation = 359
  - RN N=59 (8%)
  - NP/PA N=111 (31%)
  - MD/DO N=116 (45%)
  - Other N=28 (16%)

- 359 Prescribers
- 63% Specialists

Estimated number of patients impacted per month: 4,154

Learner Impact

- 40% overall relative gain in knowledge from pre to post test for live meetings

NARROWING THE GAPS

A lack of knowledge exists related to:

- Pathophysiology of severe asthma
- Proper assessment, diagnosis and inhaler
- Targeted therapies and biomarkers for personalized treatment

Performance

- 96% of learners report that this activity increased their awareness of gaps in evidence-aligned care
- 98% of learners report that the activity increased their knowledge of practice changes to improve gaps in patient care within their healthcare system

Satisfaction

- 97% of learners report activity addressed overcoming barriers to optimal patient care
- 95% of learners report activity met their educational needs
- 94% of respondents indicated that they were likely to use the infographic in practice
- 93% of respondents intend to make changes in practice as a result of the activity

Persistent Gaps/Needs

- Only 67% of learners were able to recognize biomarkers for personalized treatment in Case 1.
- Only 61% were able to associate phenotype with asthma endotype.
Final Report: Online Program Dashboard

**Participation**
- 2837 participants
- 1508 completers
  - 64% prescribers

**Satisfaction**
- “I loved the format…the interaction with the patient and then the narrative and explanations led to better processing of the information.”
- “Excellent presentation”
- “Very impressed with the presentation and the depth of the information that was communicated.”
- “It was absolutely phenomenal”

**Learner Impact**
- 106% overall relative gain in knowledge from pre to post test for live meetings
- 134% relative gain in knowledge from pre to post test
- 160% relative gain in knowledge from pre to post test
- 109% relative gain in knowledge from pre to post test

**Performance**
- 89% can classify asthma after participating in simulation
  - Knows to classify Audra’s asthma severity as severe persistent
- 84% can identify comorbid conditions after participating in simulation
  - Knows James’ rhinosinusitis is comorbid

**Persistent Gaps/Needs**
- Gaps remain related to the classification of asthma severity
- 79% remain unable to identify biomarkers
- 75% are unclear on test selection

NARROWING THE GAPS
A lack of knowledge exists related to:

<table>
<thead>
<tr>
<th>Pathophysiology of severe asthma</th>
<th>Proper assessment, diagnosis and inhaler</th>
<th>Targeted therapies and biomarkers for personalized treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>134% relative gain in knowledge from pre to post test</td>
<td>160% relative gain in knowledge from pre to post test</td>
<td>109% relative gain in knowledge from pre to post test</td>
</tr>
</tbody>
</table>
Background

The online enduring case-based simulation was developed first and then (6) live evening symposia were held in cities across the US. The live meeting employed the structure of cases developed for the online simulation to engage learners in the multi-media live presentations. An infographic clinical reference aid and use of the audience response system (ARS) were used to reinforce learning. Learners stepped through decisions in 2 case simulations to test and reinforce their skills in diagnosis, treatment, and management of severe asthma.
This collaborative program is in partnership with the Mount Sinai – National Jewish Health Respiratory Institute and will feature an online enduring program of case-based simulations as well as six interactive workshops in the United States. The goal of the proposed program will be to improve the knowledge and competence of allergists, pulmonologists, primary care physicians and pediatricians, in the diagnosis, management, and treatment of severe asthma during a live and online multimedia initiative.

**Format**
Interactive, multimedia online and live program with simulation-based structure that follows a workflow for treating severe asthma.

**Anticipated Reach**
**LIVE:** 210-270 learners for the live activities  
**ONLINE:** 4000 participants and 1000 completers

**Live Activity Dates & Locations:**
- July 19, 2018 in New York, NY
- August 1, 2018 in Denver, CO
- August 21, 2018 in Philadelphia, PA
- August 28, 2018 in Los Angeles, CA
- November 5, 2018 in San Francisco, CA
- November 14, 2018 in Houston, TX
Outcomes Strategy:

Outcomes will be measured via participation totals, specialty, designation, pre-test, post-test, clinically based decisions in case simulations, interactive polling questions, and evaluations. The metrics will demonstrate participation, satisfaction, engagement, and change in knowledge, competency, and performance to achieve Moore’s Level 5 outcomes. Impact was measured by effect size as calculated by Cohen’s d and levels of significance.
# A Severe Asthma Roadmap for Improved Diagnosis and Personalized Treatment

– A Guided Workflow

## Final Report: Six Live Activities

### Level 1 Outcomes: Participation

<table>
<thead>
<tr>
<th>Location, State, Date</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York, NY: 6/20/2018</td>
<td>77</td>
</tr>
<tr>
<td>Denver, CO: 8/1/2018</td>
<td>74</td>
</tr>
<tr>
<td>Philadelphia, PA: 8/21/2018</td>
<td>40</td>
</tr>
<tr>
<td>Los Angeles, CA: 8/28/2018</td>
<td>60</td>
</tr>
<tr>
<td>Houston, TX: 11/14/2018</td>
<td>47</td>
</tr>
</tbody>
</table>

**Total Live Participation**: 359
Final Report: Six Live Activities

Level 1 Outcomes: Participation

63% of learners are prescribers

- 44% MD/DO
- 31% MD/DO
- 0% NP
- 3% PA
- 3% RN
- 3% RT
- 12% PharmD
- Other

- Pulmonary 45%
- Internal Medicine 12%
- Pediatrics 16%
- Allergy/Asthma 7%
- Other 20%

Other: AE-C, MPH, BA, PhD, Nephrology, Occupational Health, ICU, Oncology, Pharmacy, Anesthesiology, Emergency
## Level 2 Outcomes: Learning & Satisfaction

<table>
<thead>
<tr>
<th>Activity</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improving your ability to treat or manage your patients</td>
<td>93%</td>
</tr>
<tr>
<td>Enhancing your ability to apply the LOs to practice</td>
<td>95%</td>
</tr>
<tr>
<td>Reinforcing and/or improving your current skills</td>
<td>98%</td>
</tr>
<tr>
<td>Meeting your educational needs</td>
<td>95%</td>
</tr>
</tbody>
</table>

N=164
Final Report: Six Live Activities

Level 2 Outcomes: Pre-Test/Post-Test

- **Pre-Test (Aggregate N=182)**: 57%
- **Post-Test (Aggregate N=226)**: 80%

Overall relative knowledge gain from pre- to post activities **40%**

Level 3 and 4 outcomes were measured by comparing pre- and post-test answers. Attendees’ responses to these questions demonstrated that participants gained knowledge as a result of the activity.

Overall impact for all live activities combined resulted in a moderate but significant (p<.0001) effect size as reflected by Cohen’s d statistic which detects the standardized difference between two means (d=0.54).

Cohen(1988): .2=small, .5=medium, .8=large
Wolf (1986): .25=educationally significant, .50 clinically significant.
Assessment: Pre-Test/Post-Test (Question 1)

Learning Objective: Review emerging evidence related to targeted therapies and potential biomarkers to select personalized treatment in severe asthma according to asthma subtype.

Q1: A 48-year-old lifetime non-smoker woman with a history of asthma, nasal polyps and chronic rhinosinusitis is referred for persistent symptoms, frequent exacerbations despite moderate dose ICS/LABA, LAMA, leukotriene modifier, rescue SABA, and nasal steroids. On your assessment: Her inhaler technique is good, Pharmacy records confirm monthly refills, Symptoms of allergic rhinitis are controlled and she has no other comorbidities, Her IgE is 30 and allergy testing is negative, Her absolute eosinophil count is 500/uL. You recommend the following treatment:

A. Chronic oral steroids
B. Anti-IL-5 ✓
C. Bronchial thermoplasty
D. Omalizumab

Relative gain: 50%
Aggregate Pre = 48%
Aggregate Post= 72%
P<.0001 d=0.49
A Severe Asthma Roadmap for Improved Diagnosis and Personalized Treatment – A Guided Workflow

**Assessment: Pre-Test/Post-Test (Question 2)**

**Learning Objective:** Distinguish severe asthma from difficult-to-treat asthma with improved diagnosis and assessment strategies, including proper inhaler technique.

Q2: A 70-year-old woman with lifelong severe allergic asthma presents to you with uncontrolled asthma despite prescribed high dose ICS/LABA, leukotriene modifiers and tiotropium. She is hospitalized twice per year and requiring oral prednisone rescue courses 4x per year. The next step in her management is the following:

A. Start her on omalizumab
B. Add theophylline
C. Add oral prednisone
D. Check her inhaler technique and pharmacy refill records ✓

**Relative gain: 24%**

Aggregate Pre = 74%
Aggregate Post = 92%
P<.0001 d=0.49

Average Pre N= 31
Average Post N= 38
A Severe Asthma Roadmap for Improved Diagnosis and Personalized Treatment – A Guided Workflow

Assessment: Pre-Test/Post-Test (Question 3)

Learning Objective: Distinguish severe asthma from difficult-to-treat asthma with improved diagnosis and assessment strategies, including proper inhaler technique.

Q3: Your patient is a 55-year-old obese woman (BMI 35 mg/kg²) with severe persistent asthma (onset at age 39) with uncontrolled symptoms despite intensive therapy. Comorbidities include GERD and sleep apnea controlled with PPI and CPAP. Skin prick testing is negative for common aeroallergens. IgE = 100 IU/L but allergy testing is negative. Absolute eosinophil count is 100/uL. FeNO = 10 ppb. Induced sputum shows neutrophilic inflammation. The next step in her management is the following:

A. Start omalizumab after patient loses significant weight
B. Start mepolizumab
C. Confirm adherence to current therapy, and recommend weight loss strategies ✓
D. Recommend oral steroids

Relative gain: 16%
Aggregate Pre = 67%
Aggregate Post= 78%
P=.033  d=0.22
A. Reduction in oral corticosteroid in steroid dependent patients ✓
B. No change in exacerbation rates
C. Increased risk of pneumonia compared to placebo
D. An increased risk of certain cancers

Relative gain: 21%
Aggregate Pre = 80%
Aggregate Post= 97%
P<.0001  d=0.98
**Assessment: Pre-Test/Post-Test (Question 5)**

**Learning Objective:** Describe key concepts in the pathophysiology of severe asthma and the features that are targets for biologic therapies.

**Q5:** Which of the following does not block IL-5 or its receptor?

A. Dupilumab ✓
B. Benralizumab
C. Mepolizumab
D. Reslizumab

**Average Pre = 31**
**Aggregate Pre = 44%**
**Average Post = 38**
**Aggregate Post= 81%**
**P<.0001  d=0.84**
Q6: Type 2 inflammation is associated with all of the following except:

A. High exhaled nitric oxide
B. High blood eosinophils
C. High blood neutrophils ✓
D. Allergies

**Learning Objective:** Describe key concepts in the pathophysiology of severe asthma and the features that are targets for biologic therapies.

**Assessment: Pre-Test/Post-Test (Question 6)**

**Relative gain:** **81%**

Average Pre = 31
Aggregate Pre = 42%
Aggregate Post = 76%
P < .0001  d = 0.72

Average Post = 38

NYC: 66% Pre, 82% Post
Denver: 45% Pre, 84% Post
Philly: 53% Pre, 61% Post
LA: 66% Pre, 75% Post
San Fran: 19% Pre, 40% Post
Houston: 88% Post
Assessment: Pre-Test/Post-Test (Question 7)

Learning Objective: Distinguish severe asthma from difficult-to-treat asthma with improved diagnosis and assessment strategies, including proper inhaler technique.

Q7: Which of the following is least commonly associated with non-type 2 asthma?

A. Childhood onset ✓
B. Steroid nonresponsiveness
C. Obesity
D. Viral infection

Relative gain: 45%
Aggregate Pre = 42%
Aggregate Post = 61%
P < .0001  d = 0.38

Average Pre = 31
Average Post = 38
The first three meetings featured interactive group polling questions via audience response system (ARS). The questions were asked of the entire group, however, each table of participants were given the opportunity to discuss and select an answer together as a group using one ARS key pad instead of providing individual answers. However, in the fourth, fifth and sixth meetings we changed some of the ARS questions and gave each audience member an ARS keypad in lieu of one per table to encourage group discussion and decision-making. We decided to make this change to get more data from participants to help elucidate some of the findings in our preliminary analysis of the online enduring program data.
A test and teach approach was used to engage learners during the live meetings by testing their existing knowledge and using the gaps to teach them the new material presented in the live activity. Over the course of the six live meetings, we adjusted the questions and the approach. Questions were tailored to the patient cases to test learner’s understanding of the proper steps in diagnosing and treating severe asthma.

Q1: Which of the following features is required for a diagnosis of asthma?

A. Eosinophilic airway inflammation  
B. Smooth muscle hypertrophy and hyperplasia  
C. Variable airflow limitation  
D. IgE to specific allergens
Formative Evaluation Strategies

The following question was added before the meeting in Philadelphia to dig deeper into the differences between the various biologic therapies.

Q4: For patients like Audra it is important to assess bone density. Low bone density, weight gain, and cataracts are some potential steroid-related side effects. All of the following have been demonstrated to facilitate steroid reduction while reducing asthma exacerbation except:

A. Anti IL-4 receptor alpha monoclonal antibody
B. Anti IL-13 monoclonal antibody
C. Anti IL-5 receptor monoclonal antibody
D. Anti IL-5 monoclonal antibody
Final Report: Six Live Activities

Learner Evaluation

- 93% of learners report that they intend to make changes to practice as a result of the activity
- 100% of learners report that the content presented was evidence based and clinically relevant
- 97% of learners report that the activity addressed strategies for overcoming barriers to optimal patient care
- 99% of learners report that the material was presented in an objective manner and free of commercial bias
Final Report: Level 5 Outcomes
Self-Reported Performance

- 49% of learners report that they have changed their screening and prevention practice as a result of this activity.
- 48% of learners report that the activity provided new ideas or information that they have used in practice.
- 96% of learners report that this activity increased their awareness of gaps in evidence-aligned care.
- 98% of learners report that the activity increased their knowledge of practice changes that may improve gaps in patient care within their healthcare system.
Learner Evaluation – Clinical Reference Aid

94% of learners report that they are somewhat to extremely likely to use the clinical reference aid infographic in practice

Attendee Feedback on the Infographic

“...wondering if I could get copies of the guided workflow to help educate the residents and fellows at our hospital.”

-MD attendee in New York, NY

“Would it be possible to get some extra copies of the folders with the slides and workflow to share with some colleagues and students who could not attend last night?”

-MD attendee in Denver, CO
Qualitative Summary of Live Activities

Key Lessons Learned

- Different phenotypes of asthma, new therapies and how to check technique
- Treatment modalities
- Classification of phenotypes and stepwise addition of medicines
- Reinforcing correct use of inhalers
- Systematically follow the severe asthma roadmap
- There are new biologic therapies to effectively treat severe asthma

Needs for Further Education

- Patient education about asthma
- Smoking cessation strategies
- Complicated asthma patients with significant co-morbidities
- COPD
- Urticaria
- ILD/IPF

Attendee Feedback

“The speaker was excellent and engaging.”

“It was excellent.”

“Really exceptional speaker. Very engaging, funny and obviously educated and passionate about the topic.”

“Thank you for a very well organized and interesting presentation.”

“Would love to attend another lecture by Dr. Wechsler. He is an excellent speaker and related so much valuable information in a short time.”
Online Activity: Final Report

Target Audience
Allergists, Pulmonologists, along with Primary Care Physicians, Pediatricians, Nurse Practitioners, Physician Assistants and Registered Nurses who treat patients with asthma.

Launched July 13, 2018

https://learning.freecme.com/a/29687PAvVjT
Participation

2837 participants
1508 completers
• 64% prescribers

Completer Goal exceeded by 67%

Learner Impact

106% overall relative gain in knowledge from pre to post test for live meetings

NARROWING THE GAPS
A lack of knowledge exists related to:

- Pathophysiology of severe asthma
  134% relative gain in knowledge from pre to post test

- Proper assessment, diagnosis, and inhaler
  160% relative gain in knowledge from pre to post test

- Targeted therapies and biomarkers for personalized treatment
  109% relative gain in knowledge from pre to post test

Performance

89% can classify asthma after participating in simulation

Persistent Gaps/Needs

Gaps remain related to the classification of asthma severity

- 79% remain unable to identify biomarkers
- 75% are unclear on test selection

Satisfaction

“I loved the format…the interaction with the patient and then the narrative and explanations led to better processing of the information.”

“Excellent presentation”

“Very impressed with the presentation and the depth of the information that was communicated.”

“It was absolutely phenomenal”
The online activity uses ProDoctor’s innovative simulation platform to highlight two patient cases (1 difficult-to-treat asthma and 1 severe asthma). Learners are challenged to make decisions regarding the workup, tests, and differential diagnosis of severe asthma in both cases. Key learning points were reinforced with an infographic clinical reference aid developed for the use in both the live and online activity.
Users make decisions on therapy choices, disease management, and many other competencies.

Which of the following consults will you request?

Answer Choices:

Select one

1) Gastroenterology for repeat EGD
2) Endocrinology for diabetes management
3) Endocrinology for repeat DEXA scan
4) Dietician for weight loss

If they make a correct decision on the first attempt then they are in the blue section of the heatmap.

If they make an incorrect choice they receive mentoring by Dr. Grey

If they make an incorrect choice they are in the red section of the heatmap.

Blue and orange represent learning or reinforcement. Analyze red as ongoing gaps.
Learning Objective 1: Describe key concepts in the pathophysiology of severe asthma and the features that are targets for biologic therapies.

ProDoctor Heatmap Data:

While the activity demonstrated significant learning related to add-on biologic therapy, a potential gap exists related to determining severe asthma endotype and phenotype for personalized treatment selection.
Learning Objective 2: Distinguish severe asthma from difficult-to-treat asthma with improved diagnostic and assessment strategies, including training in proper inhaler technique.

ProDoctor Heatmap Data:
Learners were able to classify Audra’s asthma (bottom graph) more proficiently than James (top graph) a potential gap exists related to the ability to distinguish asthma severity.

Learner performance after viewing simulation:

<table>
<thead>
<tr>
<th>Level 5 Performance by Learning Objective</th>
</tr>
</thead>
</table>

| Learning Objective 2: Distinguish severe asthma from difficult-to-treat asthma with improved diagnostic and assessment strategies, including training in proper inhaler technique.

ProDoctor Heatmap Data:
Learners were able to classify Audra’s asthma (bottom graph) more proficiently than James (top graph) a potential gap exists related to the ability to distinguish asthma severity.

Total correct or remediated:

<table>
<thead>
<tr>
<th>Severity</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe persistent</td>
<td>1,612</td>
</tr>
<tr>
<td>Moderate persistent</td>
<td>1,233</td>
</tr>
<tr>
<td>Mild persistent</td>
<td>697</td>
</tr>
<tr>
<td>Intermittent</td>
<td>483</td>
</tr>
</tbody>
</table>

Correct on 1st attempt:

<table>
<thead>
<tr>
<th>Severity</th>
<th>Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe persistent</td>
<td>1,270</td>
</tr>
<tr>
<td>Moderate persistent</td>
<td>610</td>
</tr>
<tr>
<td>Intermittent</td>
<td>216</td>
</tr>
</tbody>
</table>

Remediated by activity:

<table>
<thead>
<tr>
<th>Severity</th>
<th>Remediated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe persistent</td>
<td>21</td>
</tr>
<tr>
<td>Moderate persistent</td>
<td>32</td>
</tr>
<tr>
<td>Intermittent</td>
<td>47</td>
</tr>
</tbody>
</table>

Potential gap:

*Numbers represent percentages
In addition to questions posed in the online simulations, a set of standard pre/post questions were presented to learners upon entry into the activity via FreeCME and after completion of the ProDoctor simulation.

Overall impact for all live activities combined resulted in a large and significant (p<.0001) effect size as reflected by Cohen’s d statistic which detects the standardized difference between two means (d=0.90).

Cohen(1988): .2=small, .5=medium, .8=large
Wolf (1986): .25=educationally significant, .50 clinically significant.
**Level 3: Outcomes: Knowledge**

Learning Objective: Review emerging evidence related to targeted therapies and potential biomarkers to select personalized treatment in severe asthma according to asthma subtype.

**Question 1:** A 48-year-old lifetime non-smoker woman with a history of asthma, nasal polyps and chronic rhinosinusitis is referred for persistent symptoms, frequent exacerbations despite moderate dose ICS/LABA, LAMA, leukotriene modifier, rescue SABA, and nasal steroids.

On your assessment: Her inhaler technique is good. Pharmacy records confirm monthly refills. Symptoms of allergic rhinitis are controlled and she has no other comorbidities. Her IgE is 30 and allergy testing is negative. Her absolute eosinophil count is 500/uL. You recommend the following treatment:

- **Omalizumab:** Pre = 4%, Post = 24%, Relative gain: 81%
- **Anti-IL-5:** Pre = 2%, Post = 13%
- **Bronchial thermoplasty:** Pre = 26%, Post = 89%
- **Chronic oral steroids:** Pre = 5%, Post = 38%

Relative gain: 81%
Aggregate Pre = 42%
Aggregate Post = 76%
P < .0001  d = 0.72
Level 3 Outcomes: Knowledge
Learning Objective: Distinguish severe asthma from difficult-to-treat asthma with improved diagnosis and assessment strategies, including proper inhaler technique.

Question 2: A 70-year-old woman with lifelong severe allergic asthma presents to you with uncontrolled asthma despite prescribed high dose ICS/LABA, leukotriene modifiers and tiotropium. She is hospitalized twice per year and requiring oral prednisone rescue courses 4x per year. The next step in her management is the following:

- Check her inhaler technique and pharmacy refill records
- Add oral prednisone
- Add theophylline
- Start her on omalizumab

**Relative gain: 95%**
Aggregate Pre = 38%
Aggregate Post= 74%
P<.0001  d=0.35
Online Pre-Post Test Question

Level 3: Outcomes: Knowledge
Learning Objective: Review emerging evidence related to targeted therapies and potential biomarkers to select personalized treatment in severe asthma according to asthma subtype.

Question 3: Your patient is a 55-year-old obese woman (BMI 35 mg/kg^2) with severe persistent asthma (onset at age 39) with uncontrolled symptoms despite intensive therapy. Comorbidities include GERD and sleep apnea controlled with PPI and CPAP. Skin prick testing is negative for common aeroallergens. IgE = 100 IU/L but allergy testing is negative. Absolute eosinophil count is 100/uL. FeNO = 10 ppb. Induced sputum shows neutrophilic inflammation. The next step in her management is the following:

Relative gain: 100%
Aggregate Pre = 47%
Aggregate Post= 94%
P<.0001 d=0.51
Level 3: Outcomes: Knowledge
Learning Objective: Review emerging evidence related to targeted therapies and potential biomarkers to select personalized treatment in severe asthma according to asthma subtype.

**Question 4:** In patients with asthma, anti-IL-5 treatment is associated with:

- An increased risk of certain cancers: 2% (Pre) vs. 11% (Post)
- Increased risk of pneumonia compared to placebo: 2% (Pre) vs. 17% (Post)
- No change in exacerbation rates: 2% (Pre) vs. 10% (Post)
- Reduction in oral corticosteroid in steroid dependent patients: 62% (Pre) vs. 94% (Post)

Relative gain: 52%
Aggregate Pre = 62%
Aggregate Post= 94%
P<.0001 d=0.35
Level 3: Outcomes: Knowledge
Learning Objective: Review emerging evidence related to targeted therapies and potential biomarkers to select personalized treatment in severe asthma according to asthma subtype.

**Question 5:** Which of the following does not block IL-5 or its receptor?

- Reslizumab: 8% Pre, 17% Post
- Mepolizumab: 9% Pre, 24% Post
- Benralizumab: 8% Pre, 20% Post
- Dupilumab: 39% Pre, 75% Post

Relative gain: 92%
Aggregate Pre = 39%
Aggregate Post= 75%
P<.0001  d=0.36
Question 6: Type 2 inflammation is associated with all of the following except:

- Allergies
- High blood neutrophils
- High blood eosinophils
- High exhaled nitric oxide

Relative gain: 196%
Aggregate Pre = 25%
Aggregate Post= 74%
P<.0001  d=0.52
Level 3: Outcomes: Knowledge
Learning Objective: Review emerging evidence related to targeted therapies and potential biomarkers to select personalized treatment in severe asthma according to asthma subtype.

Question 6: Which of the following is least commonly associated with non-type 2 asthma?

- Viral infection: Pre 9%, Post 20%
- Obesity: Pre 9%, Post 21%
- Steroid nonresponsiveness: Pre 11%, Post 19%
- Childhood onset: Pre 40%, Post 71%

Relative gain: 78%
Aggregate Pre = 40%
Aggregate Post = 71%
P < .0001  d = 0.32
Online Enduring Evaluation Results

Level 4 Outcomes: Competence (Evaluation Results)

As a result of what I learned, I intend to make changes in my practice:

- Extremely Likely: 45%
- Somewhat Likely: 44%
- Not At All Likely: 10%

As a result of what I learned, I intend to make the following changes in my practice:

- Modify treatment plans: 25%
- Use alternative communication methodologies with patients and...: 20%
- Incorporate different diagnostic strategies into patient evaluation: 24%
- Change my screening/prevention practice: 25%

Note: 90% of Participants reported that they were somewhat or extremely likely to make a change in their practice

N=1522
Online Enduring Evaluation Results

Level 4 Outcomes: Competence (Evaluation Results)

Participants report the activity was “Excellent” to “Good” at:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improving your ability to treat or manage patients</td>
<td>72.0%</td>
</tr>
<tr>
<td>Enhancing your ability to apply the LOs to practice</td>
<td>72.0%</td>
</tr>
<tr>
<td>Reinforcing/Improving Your Current Skills</td>
<td>72.0%</td>
</tr>
<tr>
<td>Meeting your educational needs</td>
<td>73.0%</td>
</tr>
<tr>
<td>Meeting the LOs</td>
<td>97.0%</td>
</tr>
</tbody>
</table>

N=1522

Evaluation

- 99% reported the material was presented without commercial bias
- 99% reported the content presented was evidence-based and clinically relevant
Performance by learning objective reveals that live and online audiences saw relatively similar knowledge gains across learning objectives. The greatest gains were seen in LO’s 1 and 3.

1. Describe key concepts in the pathophysiology of severe asthma and the features that are targets for biologic therapies.
2. Distinguish severe asthma from difficult-to-treat asthma with improved diagnostic and assessment strategies, including training in proper inhaler technique.
3. Review emerging evidence related to targeted therapies and potential biomarkers to select personalized treatment in severe asthma according to asthma subtype.

Persistent gaps reveal that both live and online audiences struggled to correctly identify biomarkers for the classification of asthma endotypes and phenotypes.
National Jewish Health is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians; by the California Board of Registered Nursing to provide nursing contact hours for nurses; and by the American Board of Internal Medicine (ABIM) to provide Maintenance of Certification (MOC) points.

Accreditation Details: NJH designates the live and online program for 2 AMA PRA Category 1 Credits™ and 2 ABIM MOC points for physicians. NJH also designates the live program for 2.4 Nursing contact hours.