Final Outcomes Summary

This educational grant was supported by AstraZeneca Pharmaceuticals LP, GlaxoSmithKline, and Novartis
Navigating Asthma Control: A Severe Asthma Roadmap for Improved Diagnosis and Personalized Treatment

Executive Summary

Program Design
Multimedia live (six two-hour evening symposium) and online case-based enduring activity following a guided workflow for diagnosis, assessment, and treatment selection of severe asthma designed to improve the knowledge and competence of allergists, pulmonologists, primary care physicians and pediatricians in the diagnosis, management, and treatment of severe asthma.

Key Features
- Whiteboard animation
- Challenging cases
- Infographic clinical aid
- Intra-activity polling questions
- Patient perspective video

Program Locations and Dates
(6) Live Evening Symposia:
1.) New York, NY (8/14/19);
2.) Denver, CO (9/4/19);
3.) Phoenix, AZ (9/5/19);
4.) Dallas, TX (11/12/19);
5.) Atlanta, GA (11/14/19);
6.) Miami, FL (12/5/19)

Online Enduring:
08/07/2019-08/07/2020 (freeCME)
01/10/2020-08/07/2020 (myCME)

Learning Objectives:
1. Apply current management guidelines to diagnose asthma correctly, optimize inhaled therapy, address comorbidities, and recognize when asthma is not well controlled.
2. Review evidence related to potential long-term effects of oral corticosteroids and assess their role in asthma management in the era of biologic therapies.
3. Identify key features of moderate to severe asthma that are targets for biologic therapies.
4. Individualize biologic and non-biologic therapies for patients based on their inflammatory phenotype, coexisting conditions, and other individual factors.

Defining the Patient Impact*
Learners were asked through a multiple choice question (MCQ) to identify the number of patients they treat per week with the condition of severe asthma. Four choices were provided ranging from ‘More than 15’ to ‘0 / Less than 5’. Totals were calculated based on conservative estimates within each category.
Navigating Asthma Control: A Severe Asthma Roadmap for Improved Diagnosis and Personalized Treatment

Live Activity Outcomes Summary

**Participation**
- **268 Learners**: 79% prescribers
- **Specialties**:
  - Family/Internal Med/Primary Care (50%)
  - Pulmonary (13%)
  - Pediatrics (15%)
  - Allergy (3%)
  - Other (19%)

**Educational Impact**
- **36%** overall relative knowledge gain
- **50,760** potential patients impacted annually*

**Narrowing the Gaps (Knowledge Gain by LO)**
- Apply current management guidelines: **48%** relative gain
- Review long-term OCS use and assess role in asthma management: **35%** relative gain
- Identify key features that are targets for biologics: **38%** relative gain
- Individualize biologic and non-biologic therapies: **21%** relative gain

**Competence and Performance**
- **99%** of learners (N=132) report that they are somewhat to extremely likely to make changes to their practice

**Top (3) intended changes to practice**
1. Incorporate different diagnostic strategies into patient evaluation (54%)
2. Modify treatment plans (46%)
3. Change screening/prevention practice (42%)

**Satisfaction**
- **98%** of respondents indicated the activity:
  - Met their educational needs
- **97%** of respondents indicated the activity:
  - Reinforced or improved current skills
- **96%** of respondents indicated the activity:
  - Met the learning objectives
- **95%** of respondents indicated the activity:
  - Improved ability to treat/manage patients

**Key Take-Aways**
- Benefit of biologics for asthma
- Heterogeneity of asthma
- New therapies and treatment options
- Understanding endotypes and phenotypes

*99% of learners (N=132) report that they are somewhat to extremely likely to make changes to their practice.
Navigating Asthma Control: A Severe Asthma Roadmap for Improved Diagnosis and Personalized Treatment

Online Outcomes Summary

**Participation**
- Completers (take post test): 1,521
- Learners (engage with content): 8,115
- Certificates (complete evaluation): 1,442

**Designation (Completers)**
- MD/DO 36%
- RN 23%
- NP 17%
- PA 15%
- Other 9%

**Specialty (Completers)**
- Critical Care 6%
- Emergency 6%
- Allergy 5%
- Surgery 4%
- Pulmona 12%
- Peds 10%
- M 28%
- Other 31%

**Educational Impact**
- 81% relative knowledge gain for all data combined
- 38% absolute change for all data combined

**Intent to Change:** 94% of all completers

**Top (3) intended changes to practice**
1. Incorporate different diagnostic strategies into patient evaluation (98%)
2. Modify treatment plans (91%)
3. Change screening/prevention (88%)

**Projected Patient Impact**
- 499,304* Annual Patient Visits Impacted
- 9,602* Weekly Patient Visits Impacted

**Engagement and Effectiveness**
- 209% Relative Increase in MASTERY
- 5.9 Average number of actions taken by each learner

**RISE IN MASTERY**
Average number of actions taken by each learner [59% higher than ArcheMedx benchmark]
Original program launched on August 8, 2019 where learners connect to the ArcheMedX platform via a single sign-on hosted on FreeCME

Launched on myCME January 10, 2020 to supplement the reach of original program


The online CME activity consisted of one 30-minute activity presented by our expert faculty, Dr. Michael Wechsler, from National Jewish Health. His presentation addressed his perspective on current and emerging treatments for severe asthma including diagnosis, current and emerging treatments, and the use of biologic therapies and oral corticosteroid reduction.

**Features included:**
- Whiteboard animation
- Challenging cases
- Infographic clinical aid
- Intra-activity polling questions

Screenshots of whiteboard animations
Level 1 Outcomes: Learner Participation

- Started Session: 3,052
- Completed Post-Test: 1,521
- Completed Evaluation: 1,442

Final Report
Level 1 Outcomes Participation: Profession and Specialty

Profession:
- MD/DO: 36%
- RN: 23%
- NP: 15%
- PA: 17%
- Other: 9%

Specialty:
- Fam Med: 22%
- Pediatrics: 12%
- Pulmonology: 8%
- Allergy: 5%
- Surgery: 4%
- IM: 6%
- EM: 6%
- CC / UC: 6%
- <2% / Other: 31%

N=1521 Post-tests Completed
ArcheMedX Insights: Participation Funnel

- **Start Session**: 1,394 Unique Learners started a session on ArcheMedX
- **Started Video**: 1,141 Unique Learners
- **Completed Video**: 776 Unique Learners
- **Completed Assessments**: 730 Paired Pre- & Post-tests
- **Completed Evaluation**: 679 Submitted Evaluations

**Mobile Use**
- 34% Of All Learners
- Learners who accessed the curriculum via a mobile device
- 4% utilized multiple devices across multiple sessions

**Time Watching Video**
- 61% Of All Learners
- Learners who watched a portion of every minute of the video

**Estimated Patient Visits Impacted**
- 943 Per Week

**Final Report**
ArcheMedX Insights: Learner Engagement

5,135 Learning Actions*

- Questions Answered: 2,651
- Resources Viewed: 1,301
- Resources Downloaded: 1,003
- Notes Taken: 66

Engagement Score: 5.9
Average number of actions taken by each learner

Engagement Score for this activity is 59% higher than the ArcheMedX Benchmark

*actions taken while watching the educational videos. Includes all learners who started a session

N=3,052
## Level 2 Outcomes: Satisfaction

### Learner Response to Educational Needs

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improving your ability to treat or manage your patients</td>
<td>95%</td>
</tr>
<tr>
<td>Enhancing your ability to apply the learning objectives to practice</td>
<td>95%</td>
</tr>
<tr>
<td>Reinforcing and/or improving your current skills</td>
<td>96%</td>
</tr>
<tr>
<td>Meeting your educational needs</td>
<td>96%</td>
</tr>
</tbody>
</table>

98% of Learners indicated the activity was **free** of any commercial bias.

### How well did the educational content meet the learning objectives?

- **Excellent**: 61%
- **Good**: 35%
- **Fair**: 4%
- **Poor**: 0%

N=1442 Evaluations Completed
Levels 3&4: Gains in Knowledge and Competence

Pre- and Post-Test Assessment

Pre-Test n=2001 / Post-Tests n=1521

- Competence: 35%
- Knowledge: 53%
- All Assessments: 47%

Post-Test: 77%, 90%, 85%

Relative Change

Pre-Test to Post-Test

- Competence: 120%
- Knowledge: 70%
- All Assessments: 81%
Level 3 & 4 Outcomes: Learning by Objective

- **Apply current management guidelines to diagnose asthma correctly, optimize inhaled therapy, address comorbidities, and recognize when asthma is not well controlled.**
  - Pre-test (n=2001): 59%  
  - Post-test (n=1521): 89%  
  - Relative knowledge gain: 51%

- **Review evidence related to potential long-term effects of oral corticosteroids and assess their role in asthma management in the era of biologic therapies.**
  - Pre-test (n=2001): 42%  
  - Post-test (n=1521): 88%  
  - Relative knowledge gain: 110%

- **Identify key features of moderate to severe asthma that are targets for biologic therapies.**
  - Pre-test (n=2001): 35%  
  - Post-test (n=1521): 80%  
  - Relative knowledge gain: 129%

- **Individualize biologic and non-biologic therapies for patients based on their inflammatory phenotype, coexisting conditions, and other individual factors.**
  - Pre-test (n=2001): 53%  
  - Post-test (n=1521): 83%  
  - Relative knowledge gain: 57%
Confidence-based Assessment goes beyond measuring correctness and dives deep into understanding a learner’s belief (confidence) in their knowledge and competence, specifically looking at each question and requiring the learner to indicate the confidence in their answers.
Q1: When a patient presents with uncontrolled asthma despite high intensity therapy, what is the most important initial assessment to consider?

Assessment Questions

**Question 1**

<table>
<thead>
<tr>
<th></th>
<th>Pre-Test (n=2,001)</th>
<th>Post-Test (n=1,521)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluate eNO</td>
<td>13%</td>
<td>3%</td>
</tr>
<tr>
<td>Order chest CT</td>
<td>15%</td>
<td>2%</td>
</tr>
<tr>
<td>Check blood eosinophils</td>
<td>13%</td>
<td>6%</td>
</tr>
<tr>
<td>Assess inhaler technique</td>
<td>89%</td>
<td>59%</td>
</tr>
</tbody>
</table>

Relative Change: 51%

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**ArcheMedX Only**

Confidence-based Assessment

**RISE IN MASTERY 160%**

Relative Increase in Learners who show **High Confidence** and **Correctness**

- **Misinformed**
  - Pre-Test: 4%
  - Post-Test: 4%

- **Uninformed**
  - Pre-Test: 24%
  - Post-Test: 10%

- **Guessing**
  - Pre-Test: 24%
  - Post-Test: 4%

- **Doubt**
  - Pre-Test: 29%
  - Post-Test: 30%

- **Mastery**
  - Pre-Test: 52%
  - Post-Test: 20%
Q2: Chronic oral corticosteroid use has been associated with which of the following adverse effects?

- Osteoarthritis: 41% Pre-Test, 2% Post-Test
- Atrial fibrillation: 9% Pre-Test, 1% Post-Test
- Anxiety and poor sleep: 47% Pre-Test, 97% Post-Test
- Diverticulitis: 3% Pre-Test, 1% Post-Test

Relative Change: 106%

ArcheMedX Only Confidence-based Assessment

RISE IN MASTERY 560%
Relative Increase in Learners who show High Confidence and Correctness
Q3: A 52-year old man has been dependent on oral steroids despite adherence to high dose ICS/LABA for his asthma for the last 3 years. He has had weight gain, cataracts, and low bone density. Which of the following have been demonstrated to facilitate oral steroid dose reduction while reducing asthma exacerbations:

- Regular use of a macrolide antibiotic
- Anti IL-13 monoclonal antibody
- Long-acting muscarinic antagonist
- Anti IL-5 monoclonal or anti IL-4 receptor alpha monoclonal antibody

Relative Change: 114%

ArcheMedX Only
Confidence-based Assessment
RISE IN MASTERY 400% Relative Increase in Learners who show High Confidence and Correctness.
Considerable decrease in guessing, yet doubt remains high. Potential persistent gap.
Q4: Type 2 inflammation is associated with all of the following except:

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

**Relative Change: 125%**

<table>
<thead>
<tr>
<th></th>
<th>Pre-Test (n=2,001)</th>
<th>Post-Test (n=1,521)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High exhaled nitric oxide</td>
<td>33%</td>
<td>6%</td>
</tr>
<tr>
<td>High blood eosinophils</td>
<td>16%</td>
<td>5%</td>
</tr>
<tr>
<td>High blood neutrophils</td>
<td>36%</td>
<td>81%</td>
</tr>
<tr>
<td>Allergies</td>
<td>15%</td>
<td>8%</td>
</tr>
</tbody>
</table>

**ArcheMedX Only**

**Confidence-based Assessment**

**RISE IN MASTERY 520%**

Relative Increase in Learners who show **High Confidence** and **Correctness**

Considerable decrease in guessing, however doubt remains high. Potential persistent gap.
Question 5

Q5: 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 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. What would you do next?
Q6: When a patient presents with uncontrolled asthma despite high intensity therapy, what is the most important initial assessment to consider?

**Relative Change: 29%**

- High exhaled nitric oxide: 93%\textsuperscript{a} to 72%\textsuperscript{b}
- High blood eosinophils: 10%\textsuperscript{a} to 3%\textsuperscript{b}
- High blood neutrophils: 11%\textsuperscript{a} to 2%\textsuperscript{b}
- Allergies: 7%\textsuperscript{a} to 2%\textsuperscript{b}

**ArcheMedX Only**

**RISE IN MASTERY 277%** Relative Increase in Learners who show **High Confidence** and **Correctness**.

Considerable decrease in guessing, yet doubt remains high. Potential persistent gap.
What indicator or indicators currently prompt you to classify a patient’s asthma as severe? (top 7 responses)

- Exacerbations: 63
- Shortness of Breath: 57
- Need for Rescue Inhaler: 39
- Need for Oral Corticosteroids: 16
- Uncontrolled Symptoms: 106
- Not Responding to Treatment: 55
- FEV1: 14

Learning moments are actions built into the activity to encourage uptake of resources, provide nudges or assess knowledge through questions.
Based on the information you have so far, how would you characterize Greg’s asthma?

- Controlled: 4%
- Uncontrolled: 90%
- Unsure - Need more information: 6%

N=603

Chronic oral corticosteroid use has been associated with which of the following adverse effects?

- Osteoarthritis: 23%
- Atrial Fibrillation: 2%
- Anxiety and Poor Sleep: 75%
- Diverticulitis: 0%

N=573

Learning moments are actions built into the activity to encourage uptake of resources, provide nudges or assess knowledge through questions.
What would you do next with Theresa's asthma regimen?

Possible persistent gap

Theresa’s CBC and differential indicate that her blood eosinophil count is 60/µL with 4% sputum eosinophils, how would you classify her asthma endotype?

- Type 2: 57%
- Non-type 2: 34%
- Neither: 9%

Taper tiotropium: 9%
Taper fluticasone/salmeterol: 7%
Taper prednisone: 80%
Taper dexlansoprazole: 4%
94% of respondents indicated that they are **extremely likely (50%)** or **somewhat likely (44%)** to make changes to their practice after participating in the education.

**Potential Practice Changes Include**

- **Diagnostic Strategies**: 98%
  - Incorporate different diagnostic strategies into patient evaluations

- **Screening/Prevention**: 88%
  - Change my screening/prevention practice

- **Communication Methodologies**: 68%
  - Use alternative communication methodologies with patients and families

- **Treatment Plans**: 91%
  - Modify treatment plans

N=1442 Evaluations Completed
## ArcheMedX Insights:
Top Resources Viewed, Downloaded

<table>
<thead>
<tr>
<th>SEVERE ASTHMA ROADMAP</th>
<th>GUIDELINES</th>
<th>SLIDE DECK</th>
<th>PATHO BIOLOGY</th>
<th>MEDFACTS (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navigating Asthma Control: A Severe Asthma Roadmap</td>
<td>2019 GINA Guidelines</td>
<td>Navigating Asthma Control Slide Deck</td>
<td>Video: Pathobiology of Asthma</td>
<td>Respiclick, Aerochamber, Using a Diskus, Respimmat</td>
</tr>
<tr>
<td>Views</td>
<td>417</td>
<td>103</td>
<td>55</td>
<td>65</td>
</tr>
<tr>
<td>Downloads</td>
<td>201</td>
<td>129</td>
<td>47</td>
<td>25</td>
</tr>
</tbody>
</table>

### Thumbnail Images:
- Navigating Asthma Control Slide Deck
- Video: Pathobiology of Asthma
- Respiclick, Aerochamber, Using a Diskus, Respimmat
93% of completers indicated that they were likely to use the infographic clinical reference aid in practice.

“Excellent program. Great educational aids. I like the road map.”
– online participant

n=1,442
Learner Take Aways

- Classification of asthma type 2 versus non-type 2 and the different treatment avenues for reducing the use of OCS
- Improving history taking skill, evaluate comorbidities and complicating factors
- Indications for Biologic therapy of uncontrolled asthma
- How important it is to determine asthma endotype in poorly controlled asthma
- Identify features of moderate to severe asthma that are targets for biologic therapy
- Assessment evaluation of inflammatory markers for treatment of asthma
- The role of biologics in reducing use of OCS
- Effects of chronic use of corticosteroids, phenotype and FeNO relevance
- Importance of measuring Eosinophils and IGE in patients
- Refer sooner to determine best regimen for better outcomes
- Better understanding of the complexities of asthma
- Road map – great resource
Recommendations for Future Topics

- COVID-19 management
- Atopic Dermatitis
- COPD management
- Pediatric asthma
- More asthma and COPD
- Asthma exacerbation during COVID treatment
- EoE
- Biologic therapy
- Hypertension
- Immunotherapy for Allergies/Asthma
- Asthma COPD/Overlap
- Pediatric COVID-19
- How to select biologics
Examples of positive feedback:

• One of the best online CME programs I’ve participated in.
• Very clear and valuable information.
• The presentation format was effective, straightforward and held my attention. Specifically enjoyed the mix of video, slides, animation, and interactive questions. The case studies were excellent.
• Excellent program. Great educational aids. I like the road map.
• It was very thorough and up to date.
• Excellent presentations and resources right at hand with just one click instead of looking up on my own resources which I would never have time to look up. Clear presentations and concise to the point to keep the audience attentive even without caffeine load. I would take more courses if the quality is this good.

Constructive feedback and observations:

• Any use of combined anti-IL therapy in EGPA?
• I’m a dermatologist. I took it for the atopic dermatitis patients.
• It is not always possible to implement suggested management protocols in resource poor countries because of unavailability of equipment, laboratory facilities and newer and more expensive drugs.
• This needs to be a 60 min activity.
Significant learning gains were noted across all learning objectives and across all questions; however, data from confidence-based assessment demonstrate that gaps persist in the following areas:

**Persistent Gap (1): Stepping up therapy to a biologic (Question 3)**

While 79% of learners got the answer right upon post-test (an overall relative increase of 116%), 38% of learners reported low confidence in their post-test answer, demonstrating they haven’t quite mastered that gap (N=730)

**Persistent Gap (2): Pathophysiology and Type 2 Inflammation (Question 4)**

While 81% of learners got the answer right regarding pathophysiology and type 2 inflammation upon post-test (an overall relative increase of 127%), 34% of learners reported low confidence in their post-test answer, demonstrating they haven’t quite mastered that gap (N=730)
Root Cause Analysis

In order to attempt to understand the root cause of these persistent gaps, NJH conducted an analysis upon completion of the online enduring activity to include a summary of focused interviews and key insights from program faculty.

- The consequences of physicians not understanding the importance of identifying and classifying phenotypes/endotypes and associated biomarker is that patients are not getting the treatment they need. If physicians don’t know biologic options they may keep patients on steroids with serious long-term effects. Steroid burden is high.

- Physicians are uncomfortable selecting biologic treatments without hands-on experience. This educational program provides important guidance, but confidence requires experience. You can close the knowledge gaps with education, but you can’t necessarily resolve barriers within logistics or comfort/confidence with selecting treatments.

- Further, if physicians don’t have the infrastructure to support prescribing biologics, that is a barrier. That infrastructure and practice burden includes: the ability to manage prior authorizations, communicating with patients, providing resources for payor or other coverage.

- Physicians seem to be fairly comfortable with ordering and interpreting tests to support identifying and classifying phenotypes/endotypes and associated biomarkers. What they are not comfortable with is identifying Type 2 Low (Non-eosinophilic) asthma, the nuances of selecting biologics for severe asthma, and coverage eligibility of biologics for patients.

- Regarding the target audience: It is important for primary care to learn about the process of diagnosing and treating Type 2 asthma so that they can make effective referrals to allergists and pulmonologists. This education should be most effective for the Specialty audience (allergists and pulmonologists).

- Future education should be focused on when to step up therapy and what biologic treatments to select for patients.
Navigating Asthma Control: A Severe Asthma Roadmap for Improved Diagnosis and Personalized Treatment

Live Activity Outcomes Summary

**Participation**
- 268 Learners
  - 79% prescribers
- PharmD: 1%
- RN: 13%
- PA: 9%
- NP: 16%
- MD/DO: 54%
- Other: 7%

**Specialties:**
- Family/Internal Med/Primary Care (50%)
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- Allergy (3%)
- Other (19%)

**Satisfaction**
- 98% of respondents indicated the activity:
  - Met their educational needs
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- 96% of respondents indicated the activity:
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- 95% of respondents indicated the activity:
  - Improved ability to treat/manage patients

**Educational Impact**
- 56% relative knowledge gain
- 76% relative knowledge gain
- 36% overall relative knowledge gain
- 50,760 potential patients impacted annually*

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- 99% of learners (N=132) report that they are somewhat to extremely likely to make changes to their practice

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**Key Take-Aways**
- Benefit of biologics for asthma
- Heterogeneity of asthma
- New therapies and treatment options
- Understanding endotypes and phenotypes

**Narrowing the Gaps (Knowledge Gain by LO)**
- Apply current management guidelines: 48% relative gain
- Review long-term OCS use and assess role in asthma management: 35% relative gain
- Identify key features that are targets for biologics: 38% relative gain
- Individualize biologic and non-biologic therapies: 21% relative gain

**Final Report**
The CME evening symposium consisted of six two-hour dinner meetings presented by one of two expert faculty from National Jewish Health and Mt. Sinai. They provided their perspective on current and emerging treatments for severe asthma. The experts lead discussion on diagnosis, current and emerging treatments, and the use of biologic therapies and oral corticosteroid reduction.

Features included:
- Whiteboard animation
- Challenging cases
- Infographic clinical aid
- Audience Response System

Live Meetings
New York, NY (8/14/2019): 78 Learners
Denver, CO (9/4/2019): 53 Learners
Phoenix, AZ (9/5/2019): 47 Learners
Dallas, TX (11/12/2019): 23 Learners
Atlanta, GA (11/14/2019): 36 Learners
Miami, FL (12/5/2019): 31 Learners
Total: 268 Learners
Level 1 Outcomes: Participation

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

Participation by Designation
- MD/DO: 54%
- NP: 16%
- PA: 9%
- RN: 13%
- PharmD: 1%
- Other: 7%

Participation by Specialty
- Primary Care/Family Medicine/Internal Medicine: 50%
- Pulmonary: 13%
- Allergy: 3%
- Pediatrics: 15%
- Other: 19%

79% of attendees are prescribers.
Analysis of participants responses related to educational needs

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

- Improving your ability to treat or manage your patients: 95.0%
- Enhancing your ability to apply the learning objectives to practice: 96.0%
- Reinforcing and/or improving your current skills: 97.0%
- Meeting your educational needs: 98.0%

N=133
Level 3 and 4 outcomes were measured by comparing participants’ pre- and post-test answers. The attendees’ responses to these questions demonstrated that participants gained knowledge as a result of the activity.

greater than 75% of the questions posed for this activity represented a medium to large effect size*

*Cohen (1988) .2=small, .5=medium, .8=large
*Wolf (1966) 0.25=educationally significant
Learning Objective: Apply current management guidelines to diagnose asthma correctly, optimize inhaled therapy, address comorbidities, and recognize when asthma is not well controlled.

Q1: When a patient presents with uncontrolled asthma despite high intensity therapy, what is the most important initial assessment to consider?

29% overall relative gain in knowledge

P value < .0001
Cohens d = 0.72
Medium Effect Size
Level 3 & 4 Outcomes: Learning Assessment

Question 2

Learning Objective: Apply current management guidelines to diagnose asthma correctly, optimize inhaled therapy, address comorbidities, and recognize when asthma is not well controlled.

Q2: 40 y.o. man with life-long severe asthma has persistent symptoms and exacerbations every 3 months despite prescribed controller medicines include high dose ICS + LABA, LAMA and a LTM. What intervention should be considered next?

Question 2: Pre- and Post-test

78% overall relative gain in knowledge

P value < .0001
Cohens d = 0.98
Large Effect Size
Learning Objective: Review evidence related to potential long-term effects of oral corticosteroids and assess their role in asthma management in the era of biologic therapies.

Q3: Chronic oral corticosteroid use has been associated with which of the following adverse effects?

- Osteoarthritis: 33.0% (Pre-test), 7.0% (Post-test)
- Atrial fibrillation: 4.0% (Pre-test), 0.0% (Post-test)
- Anxiety and poor sleep: 93.0% (Pre-test), 59.0% (Post-test)
- Diverticulitis: 4.0% (Pre-test), 0.0% (Post-test)

58% overall relative gain in knowledge

P value < .0001
Cohen's d = 0.90
Large Effect Size
**Q4:** A 52 year-old man has been dependent on oral steroids despite adherence to high dose ICS/LABA for his asthma for the last 3 years. He has had weight gain, cataracts, and low bone density. Which of the following have been demonstrated to facilitate oral steroid dose reduction while reducing asthma exacerbations:

- 6.0%
- 15.0%
- 28.0%
- 51.0%
- 32.0%
- 8.0%
- 5.0%
- 55.0%

**Learning Objective:** Review evidence related to potential long-term effects of oral corticosteroids and assess their role in asthma management in the era of biologic therapies.

**P value = 0.3994**
**Cohens d = 0.10**
**Very Small Effect Size**

Represents a possible persistent gap in knowledge.
**Learning Objective:** Identify key features of moderate to severe asthma that are targets for biologic therapies.

**Q5:** When a patient presents with uncontrolled asthma despite high intensity therapy, what is the most important initial assessment to consider?

**Question 5: Pre- and Post-test**

- IL-5 is produced exclusively by Th2 cells: 22.0% (Pre-test) vs. 20.0% (Post-test)
- Innate lymphoid cells (ILCs) can be activated: 46.0% (Pre-test) vs. 44.0% (Post-test)
- It is typically allergen dependent: 28.0% (Pre-test) vs. 26.0% (Post-test)
- It is a disease of former smokers: 4.0% (Pre-test) vs. 10.0% (Post-test)

- **P value = 0.113**
- **Cohens d = 0.20**
- **Small Effect Size**

Represents a possible persistent gap in knowledge
Level 3&4 Outcomes: Learning Assessment

Question 6

Learning Objective: Identify key features of moderate to severe asthma that are targets for biologic therapies.

Q6: Type 2 inflammation is associated with all of the following except:

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

Question 6: Pre- and Post-test

- High exhaled nitric oxide: 32.0% Pre-test, 10.0% Post-test
- High blood eosinophils: 15.0% Pre-test, 8.0% Post-test
- High blood neutrophils: 43.0% Pre-test, 78.0% Post-test
- Allergies: 10.0% Pre-test, 4.0% Post-test

81% overall relative gain in knowledge

P value <.0001
Cohens d = 0.92
Large Effect Size
Learning Objective: *Individualize biologic and non-biologic therapies for patients based on their inflammatory phenotype, coexisting conditions, and other individual factors.*

**Question 7:** 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 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. What would you do next?

- **Start omalizumab**
- **Start mepolizumab**
- **Focus on weight loss strategies**
- **Recommend oral steroids**

**Question 7: Pre- and Post-test**

- **Pre-test (N=156)**
  - Start omalizumab: 32.0%
  - Start mepolizumab: 20.0%
  - Focus on weight loss strategies: 43.0%
  - Recommend oral steroids: 5.0%

- **Post-test (N=133)**
  - Start omalizumab: 13.0%
  - Start mepolizumab: 14.0%
  - Focus on weight loss strategies: 66.0%
  - Recommend oral steroids: 7.0%

**Overall relative gain in knowledge:** 53%

*P value < .0001  
Cohens d = 0.60  
Medium Effect Size*
Level 3&4 Outcomes: Learning Assessment

Question 8

Learning Objective: *Individualize biologic and non-biologic therapies for patients based on their inflammatory phenotype, coexisting conditions, and other individual factors.*

Q8: When a patient presents with uncontrolled asthma despite high intensity therapy, what is the most important initial assessment to consider?

**Question 8: Pre- and Post-test**

- **To personalize therapy and maximize response to medications:**
  - Pre-test (N=156): 86.0%
  - Post-test (N=133): 93.0%
  - **8% overall relative gain in knowledge**

- **To measure cytokines that are driving the patient’s asthma:**
  - Pre-test (N=156): 8.0%
  - Post-test (N=133): 2.0%

- **To assist with the management of comorbid conditions:**
  - Pre-test (N=156): 3.0%
  - Post-test (N=133): 2.0%

- **To rule out eosinophilic granulomatosis with polyangiitis:**
  - Pre-test (N=156): 3.0%
  - Post-test (N=133): 2.0%

**P value = 0.0002**
**Cohens d = 0.47 Medium Effect Size**
Level 3&4 Outcomes: Learning by Objective

- **Learning Objective Knowledge Gain**
  - **Individualize biologic and non-biologic therapies for patients based on their inflammatory phenotype, coexisting conditions, and other individual factors.**
    - Pre-test (N=156): 65.0%
    - Post-test (N=133): 79.0%
    - Relative gain: 21%
  - **Identify key features of moderate to severe asthma that are targets for biologic therapies.**
    - Pre-test (N=156): 44.0%
    - Post-test (N=133): 61.0%
    - Relative gain: 38%
  - **Review evidence related to potential long-term effects of oral corticosteroids and assess their role in asthma management in the era of biologic therapies.**
    - Pre-test (N=156): 55.0%
    - Post-test (N=133): 74.0%
    - Relative gain: 35%
  - **Apply current management guidelines to diagnose asthma correctly, optimize inhaled therapy, address comorbidities, and recognize when asthma is not well controlled.**
    - Pre-test (N=156): 60.0%
    - Post-test (N=133): 89.0%
    - Relative gain: 48%

**Final Report**
### Level 3 & 4 Outcomes

**Aggregate scores by city**

<table>
<thead>
<tr>
<th>City</th>
<th>PreLive</th>
<th>PostLive</th>
</tr>
</thead>
<tbody>
<tr>
<td>NYC</td>
<td>53%</td>
<td>77%</td>
</tr>
<tr>
<td>Denver</td>
<td>62%</td>
<td>76%</td>
</tr>
<tr>
<td>Phoenix</td>
<td>59%</td>
<td>81%</td>
</tr>
<tr>
<td>Dallas</td>
<td>55%</td>
<td>80%</td>
</tr>
<tr>
<td>Atlanta</td>
<td>53%</td>
<td>78%</td>
</tr>
<tr>
<td>Miami</td>
<td>54%</td>
<td>63%</td>
</tr>
</tbody>
</table>

**Average Live:**

- Pre-Test N=156
- Post-Test N=133

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*Learning gains were relatively consistent from city to city.*
99% of respondents indicated that they planned to make the following changes to their practice following the education:

- Change my screening/prevention practice: 56 respondents
- Incorporate different diagnostic strategies into patient evaluation: 72 respondents
- Use alternative communication methodologies with patients and families: 54 respondents
- Modify treatment plans: 61 respondents
- Other (please specify): 10 respondents

N=133

*multiple responses could be selected*
Attendees rated their level of confidence related to addressing comorbidities of severe asthma after attending the meeting:

A confidence-based poll was used to assess attendee confidence in treating the many facets of severe asthma after the activity.
99% of attendees indicated that they planned to make changes to their practice.

35% of attendees indicated that they had already made changes to practice at 6 weeks following the activity.

50% of those who had not yet made changes 6 weeks following the activity, indicated that they still planned to make changes to practice.

35% overall relative gain in knowledge for all questions combined.

75% of questions represented a significant gain in knowledge as reflected by p values >0.05 thus the learning was not merely attributable to chance.

75% of questions represented a medium to large effect size as reflected by Cohen’s d statistic.

12,684 patients are reportedly impacted by the education provided.
Attendee Take Aways

- Biologic treatment for asthma management
- Benefits of additional asthma testing
- GINA guideline application to treatment
- Eosinophil categorization
- Identify phenotype and endotype and tailor therapy
- Criteria for biologics
- Different types of asthma
- Look out for comorbidities that may make asthma difficult to control
- Individualization of treatment and biologics
- Biomarkers for type 2 and non-type 2 [asthma]
- Taper steroids and use biologics
- New way to treat uncontrolled asthma
- Inhaler technique and adherence
- Understand heterogeneity of asthma
- Communication with patients
- Distinguishing from difficult to control asthma from true refractory asthma
Recommendations for Future Topics

- ILD and COPD
- Future role of biologic therapy in COPD patients with asthma overlap
- Hypertension
- Rheumatoid Arthritis
- More about biologic data (side effects, practical aspect)
- Assessing phenotypes
- NTM
- Diabetes
- Atopic Dermatitis
- EoE
- CRSwNP
- Pediatric asthma
98% of attendees (N=133) indicated that they were likely to use the infographic clinical reference aid in practice.

38% of attendees (N=37) responding to the 6-week follow-up survey indicated that they had used or referred to the infographic in clinical practice.

Most helpful aspects of infographic:

- Clarify decision-making process
- Easy to follow
- Biomarkers
- Phenotypes
- Algorithm
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 designated the live symposia for a maximum of 2.0 AMA PRA Category 1 Credits™; 2 ABIM MOC points, and 2.4 Nursing Contact Hours; and the online activity for a maximum of .5 AMA PRA Category 1 Credits™ and .5 ABIM MOC points.
Thank you for your support of this educational program!