Where Are the New Targets in Severe Asthma?

Looking Upstream in the Inflammatory Cascade

Final Outcomes Summary:
Live Broadcasts and Online Enduring
(Online Data from 11/9/21 – 11/29/22)
Grant ID: 66540617
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### Executive Summary

#### Final Outcomes Summary – Live Broadcasts and Online Enduring

<table>
<thead>
<tr>
<th>Program Overview</th>
<th>Program Faculty</th>
<th>Learning Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>This program was delivered as a pre-recorded, video-based activity with live Q&amp;A, held as an adjunct symposium to the American College of Chest Physicians Annual Meeting (CHEST 2021), and as a second broadcast on the ReachMD platform. The activity was then endured on the CHEST Annual Meeting platform, and on the ReachMD and myCME platforms. This multimedia activity includes 2D/3D animations and patient case scenarios to illustrate a new paradigm of severe asthma pathophysiology and potential treatment targets that may impact patients with non-allergic and non-eosinophilic as well as eosinophilic severe asthma.</td>
<td><strong>Michael E. Wechsler, MD, MMSc</strong>  Director of The Cohen Family Asthma Institute and Professor of Medicine  Division of Pulmonary, Critical Care, &amp; Sleep Medicine  Department of Medicine  National Jewish Health  Denver, Colorado  <strong>Eileen Wang, MD, MPH</strong>  Assistant Professor  Division of Allergy &amp; Clinical Immunology  Department of Medicine  National Jewish Health  Denver, Colorado</td>
<td>• Define the epithelial alarmins and their pivotal role in inflammation in asthma.  • Describe how the epithelial alarmins impact both T2 and non-T2 downstream inflammation in asthma.  • Explain how therapies, such as anti-TSLP, would be expected to modulate airway inflammation in patients with either a T2-high or T2-low phenotype.  • Evaluate the results of clinical trials of novel therapies that target the epithelial alarmins.</td>
</tr>
</tbody>
</table>

| **Target Audience & Accreditation** | |
| **Target Audience:** Pulmonologists, Allergists, and Nurse Practitioners and Physician Assistants in those specialties who treat severe asthma. | National Jewish Health designates the live activities and online enduring activity for a maximum of 1.0 AMA PRA Category 1 Credit™. |

<table>
<thead>
<tr>
<th><strong>Live Broadcast Dates:</strong></th>
<th><strong>Online Enduring Dates:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>October 17, 2021 (CHEST)</td>
<td>Nov 9, 2021 – Nov 9, 2022 (ReachMD)</td>
</tr>
<tr>
<td>November 2, 2021 (ReachMD)</td>
<td>Nov 29, 2021 – Nov 29, 2022 (myCME)</td>
</tr>
</tbody>
</table>
**Program Features**

**Final Outcomes Summary – Live Broadcasts and Online Enduring**

### Whiteboard Animations

**Case 2**

**Patient Case Scenarios with Interactive Polling and Faculty Discussion**

**Case Details:**
- 44 year old male with daily asthma symptoms
- History of eosinophilic asthma
- No history of allergies
- 4 exacerbations/year
- FEV1 66% predicted

**Medications:**
- High dose ICS/LABA
- Started on Mepolizumab; improved but still with 2 exacerbations/year and symptoms 3-4 days/week

**Testing:**
- Total IgE 55
- Absolute Eosinophil Count 80
- Exhaled Nitric Oxide 36 ppb
- ACT score 36

**Live Q&A with Faculty**

**Emerging therapies include:**

Tezepelumab: a monoclonal antibody targeting TSLP

- Release of cytokines: TSLP, IL-25, and IL-33
- ALARMS
- Th0 Cell
- APC
- Type 2 Cytokines: IL-4, IL-9, IL-13
- Neutrophilic Inflammation
- Macrophage
- Neutrophil Remodeling

**Whiteboard Animations**

**Online Enduring Live Q&A with Faculty**
Personalized targeting tools across numerous tactics reach HCPs by leveraging demographic data (such as location, profession, specialty) and behavioral data (such as learner participation history, areas of interest).

Personalized emails and e-newsletters: CHEST registrants & members, ReachMD, myCME & NJH databases

Preferences in ReachMD and myCME user online profiles

Dedicated landing page on NJH website & ReachMD and myCME platforms

Search engine optimization on ReachMD and myCME platforms

Social media ads and posts

Featured Industry Event Listing – CHESTDailyNews.org
Overall Program Impact
Final Outcomes Summary – Live Broadcasts and Online Enduring

4,803 total learners across entire program:
360 learners/completers in live broadcasts
4,443 learners in online enduring

MD/DO = 2068
PA = 761
RN = 345
NP = 307
PharmD = 46
Other = 581
Unidentified/unknown* = 695
Total Learners = 4,803

Potential impact to 246,480 patient visits this year

“The presentation provided a concise review of the various cascades leading to inflammation and the various pharmacological therapies targeting each pathway.”
- Online enduring learner

Exceeded total guaranteed learners by 1,243!
Online Enduring Program
Final Outcomes Summary – Online Enduring Outcomes

ReachMD
Launched 11/9/2021
Where are the New Targets in Severe Asthma? Looking Upstream in the Inflammatory Cascade
https://reachmd.com/programs/cme/where-are-new-targets-severe-asthma-looking-upstream-inflammatory-cascade/12973/

myCME
Launched 11/29/2021
Where are the New Targets in Severe Asthma? Looking Upstream in the Inflammatory Cascade
https://www.mycme.com/courses/new-treatment-targets-in-severe-asthma-7964
Educational Impact Summary
Final Outcomes Summary – Online Enduring Outcomes

**Participation**
- MD/DO=1,943
- NP=296
- PA=735
- PharmD=34
- RN=342
- Other=502
- Unidentified*=591

*Total Learners=4,443*

*Unidentified = viewed at least 2 pages of the activity on myCME but did not proceed further for the platform to collect demographic information.

**Evaluation**
- Met their educational needs (94%)
- Reinforced or improved current skills (92%)
- Improved ability to treat patients (92%)

**Potential Impact To 241,644 Patient Visits This Year**

**Confidence Gain by Objective**
- Define epithelial alarmins and their role in asthma inflammation: 34% Before activity (N=1035) vs 76% After activity (N=846)
- Describe how epithelial alarmins impact T2 & non-T2 inflammation: 31% Before activity (N=1035) vs 75% After activity (N=846)
- Explain how therapies modulate airway inflammation: 29% Before activity (N=1035) vs 74% After activity (N=846)
- Evaluate clinical trials of new therapies targeting the alarmins: 31% Before activity (N=1035) vs 74% After activity (N=846)

**Exceeded learner guarantee by over 1,000 learners!**

*Unidentified = viewed at least 2 pages of the activity on myCME but did not proceed further for the platform to collect demographic information.*
### Educational Impact Summary

**Final Outcomes Summary – Online Enduring Outcomes**

<table>
<thead>
<tr>
<th>Patient Impact</th>
<th>Educational Impact</th>
<th>Practice Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>842</strong> evaluation respondents</td>
<td><strong>132%</strong> relative knowledge gain seen from learners in defining the epithelial alarmins and their pivotal role in asthma inflammation (N=990)</td>
<td><strong>Top intended practice changes:</strong></td>
</tr>
<tr>
<td>Who see <strong>4,647</strong> severe asthma patients weekly</td>
<td><strong>181%</strong> relative knowledge gain in describing how the epithelial alarmins impact T2 and non-T2 downstream inflammation in asthma (N=984)</td>
<td>• Improve patient evaluation and consider inflammation type</td>
</tr>
<tr>
<td>Which translates to <strong>241,644</strong> potential patient visits annually</td>
<td><strong>133%</strong> relative knowledge gain seen from learners in explaining how therapies, such as anti-TSLP, would be expected to modulate airway inflammation in patients with either a T2-high or T2-low phenotype (N=982)</td>
<td>• Use new knowledge and awareness to improve patient care</td>
</tr>
<tr>
<td></td>
<td><strong>87%</strong> relative knowledge gain in evaluating the results of clinical trials of novel therapies that target the epithelial alarmins (N=981)</td>
<td>• Incorporate novel therapies</td>
</tr>
<tr>
<td></td>
<td><strong>142%</strong> relative gain in confidence across learning objectives (N=846)</td>
<td><strong>71%</strong> indicated the activity addressed strategies for overcoming barriers to optimal patient care (N=842)</td>
</tr>
</tbody>
</table>
Level (1) Outcomes: Participation (Degree)

Final Outcomes Summary – Online Enduring Outcomes

<table>
<thead>
<tr>
<th>Degree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD/DO</td>
<td>1,943</td>
</tr>
<tr>
<td>NP</td>
<td>296</td>
</tr>
<tr>
<td>PA</td>
<td>735</td>
</tr>
<tr>
<td>RN</td>
<td>342</td>
</tr>
<tr>
<td>PharmD</td>
<td>34</td>
</tr>
<tr>
<td>Other (student,</td>
<td>502</td>
</tr>
<tr>
<td>dentist, consumer</td>
<td></td>
</tr>
<tr>
<td>patient)</td>
<td></td>
</tr>
<tr>
<td>Unidentified*</td>
<td>591</td>
</tr>
<tr>
<td>TOTAL LEARNERS</td>
<td>4,443</td>
</tr>
</tbody>
</table>

67% of learners were physicians and advanced practice providers.

*Unidentified learners are clinicians who view at least two pages of the enduring activity on myCME but do not proceed further for the platform to collect their demographic information.
Level (1) Outcomes: Participation (Specialty)

Final Outcomes Summary – Online Enduring Outcomes

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Care/Family/General</td>
<td>1,360</td>
</tr>
<tr>
<td>Pulmonology</td>
<td>418</td>
</tr>
<tr>
<td>Allergy &amp; Immunology</td>
<td>266</td>
</tr>
<tr>
<td>Oncology</td>
<td>124</td>
</tr>
<tr>
<td>Surgery</td>
<td>124</td>
</tr>
<tr>
<td>Hospital Medicine</td>
<td>104</td>
</tr>
<tr>
<td>Internal Medicine</td>
<td>119</td>
</tr>
<tr>
<td>Psychiatry/mental health</td>
<td>99</td>
</tr>
<tr>
<td>Cardiology</td>
<td>94</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>81</td>
</tr>
<tr>
<td>Emergency Medicine</td>
<td>80</td>
</tr>
<tr>
<td>Unidentified*</td>
<td>605</td>
</tr>
<tr>
<td>Other (Radiology, critical care, infectious disease, otolaryngology, and specialty not reported)</td>
<td>969</td>
</tr>
</tbody>
</table>

*Unidentified learners are clinicians who view at least two pages of the enduring activity on myCME but do not proceed further for the platform to collect their demographic information.

TOTAL LEARNERS 4,443
### Level (2) Outcomes: Satisfaction

Final Outcomes Summary – Online Enduring Outcomes

<table>
<thead>
<tr>
<th>Evaluation respondents report the activity was “Excellent” to “Good” at:</th>
<th>95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting the learning objectives</td>
<td></td>
</tr>
<tr>
<td>Meeting your educational needs</td>
<td>94%</td>
</tr>
<tr>
<td>Reinforcing and/or improving current skills</td>
<td>92%</td>
</tr>
<tr>
<td>Giving you tools and strategies to apply in practice</td>
<td>91%</td>
</tr>
<tr>
<td>Improving your ability to treat or manage patients</td>
<td>92%</td>
</tr>
</tbody>
</table>

99%
Reported the material was presented without commercial bias

98%
Reported the content was evidence-based and clinically relevant
Level (3 & 4) Outcomes: Knowledge & Competence

Final Outcomes Summary – Online Enduring Outcomes

Overall Knowledge Gain across Learning Objectives

- **125%** Relative Knowledge Gain
- **45%** Absolute Knowledge Gain

Overall Knowledge Gain: 81%

Pre-test (AVG N=1013) vs. Post-test (AVG N=984)

- Pre-test: 36%
- Post-test: 81%
Level (3 & 4) Outcomes: Knowledge & Competence

Final Outcomes Summary – Online Enduring Outcomes

Learning Objective: Define the epithelial alarmins and their pivotal role in inflammation in asthma

Question 1: Which one of these statements is true of epithelial alarmins?

- 24% They are downstream cytokines released by neutrophils
- 6% They include IL-25, thymic stromal lymphopoietin (TSLP), and IL-33
- 37% They are involved with non-type 2 inflammation but not type 2 inflammation
- 23% Their release is triggered by pollutants but not viruses, microbes, or allergens

132% Relative Knowledge Gain
49% Absolute Knowledge Gain
Level (3 & 4) Outcomes: Knowledge & Competence

Final Outcomes Summary – Online Enduring Outcomes

Learning Objective: Describe how the epithelial alarmins impact both T2 and non-T2 downstream inflammation in asthma

Question 2: Alarmins have been shown to mediate all of the following except:

- Airway remodeling
- Eosinophilic inflammation
- Mast cell activation
- Both innate and adaptive immune responses

27% Pre-test (N=1014) 76% Post-test (N=984)

181% Relative Knowledge Gain
49% Absolute Knowledge Gain
She continues to demonstrate eosinophilic inflammation despite anti-IL-5/5R therapy.

Her initial evaluation was consistent with a paucigranulocytic inflammatory pattern.

She would be characterized as non-type 2 or type 2 low.

She may benefit from switching to anti-IL-4R, anti-IgE or anti-TSLP when available.
**Learning Objective:** Evaluate the results of clinical trials of novel therapies that target the epithelial alarmins

**Question 4:** Which of the following airway submucosal inflammatory cells have been shown to be reduced in bronchoscopic biopsies following anti-TSLP therapy?

<table>
<thead>
<tr>
<th>Cell Type</th>
<th>Pre-test (N=1009)</th>
<th>Post-test (N=981)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eosinophils</td>
<td>45%</td>
<td>84%</td>
</tr>
<tr>
<td>Neutrophils</td>
<td>25%</td>
<td>5%</td>
</tr>
<tr>
<td>CD4+ T-cells</td>
<td>19%</td>
<td>6%</td>
</tr>
<tr>
<td>Chymase+ mast cells</td>
<td>12%</td>
<td>5%</td>
</tr>
</tbody>
</table>

- 87% Relative Knowledge Gain
- 39% Absolute Knowledge Gain
Level (4) Outcomes: Competence
Final Outcomes Summary – Online Enduring Outcomes

Evaluation respondents reported their confidence as it relates to the learning objectives before and after the activity (Very confident – confident)

- Define the epithelial alarmins and their pivotal role in inflammation in asthma
  - Before activity (N=1035): 34%
  - After activity (N=846): 76%

- Describe how the epithelial alarmins impact both T2 and non-T2 downstream inflammation in asthma
  - Before activity (N=1035): 31%
  - After activity (N=846): 75%

- Explain how therapies, such as anti-TSLP, would be expected to modulate airway inflammation in patients with either a T2-high or T2-low phenotype
  - Before activity (N=1035): 29%
  - After activity (N=846): 74%

- Evaluate the results of clinical trials of novel therapies that target the epithelial alarmins
  - Before activity (N=1035): 31%
  - After activity (N=846): 74%
Level (4) Outcomes: Competence
Final Outcomes Summary – Online Enduring Outcomes

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

- Improve evaluation and consider inflammation type (36 responses)
- Incorporate novel therapies (20 responses)
- Improve management of patients with severe asthma (14 responses)
- Consider biologics more frequently (16 responses)
- Educate other providers and refer to a specialist (19 responses)
- Use new knowledge to improve patient care (22 responses)

What change(s) will you incorporate in your practice?

84%
N=820

N=127
Evaluation Survey Results
Final Outcomes Summary – Online Enduring Outcomes

What barriers will the education provided help to address?

- Access to care
- Accurate diagnosis
- Understanding use of newer therapies
- Complexity of asthma therapy
- Considering different strategies
- Patient education and communication

What barriers to optimal patient care are you facing that were not addressed in this activity?

- Cost of biologics
- Insurance coverage
- Availability of medication
- Patient compliance

Evaluation respondents indicated the activity addressed strategies for overcoming barriers to optimal patient care. 71% (N=842)
Evaluation Survey Results

Final Outcomes Summary – Online Enduring Outcomes

Key Takeaways

- Advances in treatment of severe asthma
- The inflammatory cascade of asthma and the role of epithelial alarmins
- Epithelial alarmins impact both T2 and non-T2 downstream inflammation in asthma
- Pathophysiology of asthma
- Better classification of asthma type to guide therapy
- Better evaluation of non-T2 asthma
- Complexity of asthma treatment
- Targets for asthma treatment
- Strategies for improved management of severe asthma
- Importance of thorough evaluation
- Importance of biologics in the treatment of asthma
- New options for poorly controlled asthma

Future Topics

- Dosage of biologics
- Asthma phenotypes
- Emerging treatment options
- Asthma in pregnancy
- Treatment of acute exacerbations
- Disparities in asthma
- Biologics in the pipeline
- More patient cases

“Excellent presentation. The graphics made the different pathways much easier to understand.”

– Online enduring learner
Live Broadcasts
Final Outcomes Summary – Live Broadcasts

CHEST 2021 Broadcast
October 17, 2021

ReachMD Broadcast
November 2, 2021
Educational Impact Summary
Final Outcomes Summary – Live Broadcasts

**Participation**
- MD/DO=125
- NP=11
- PA=26
- RN=3
- PharmD=12
- Other=79
- Unknown*=104
- Total Learners=360

*Unknown = attended ReachMD broadcast via Facebook. Learner data not collected.

**Evaluation**
- Met their educational needs (96%)
- Reinforced or improved current skills (100%)
- Improved ability to treat patients (91%)

**Learner Confidence Post-Activity**
- N=23
- Define epithelial alarmins and their role in asthma... 85%
- Describe how epithelial alarmins impact... 84%
- Explain how therapies would be expected to... 84%
- Evaluate the results of clinical trials of novel... 80%

**Potential Impact To**
4,836 Patient Visits This Year

Exceeded learner guarantees by 150!
### Educational Impact Summary

**Final Outcomes Summary – Live Broadcasts**

<table>
<thead>
<tr>
<th>Patient Impact</th>
<th>Educational Impact</th>
<th>Practice Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>23</strong> evaluation respondents</td>
<td><strong>50%</strong> relative knowledge gain seen from learners in defining the epithelial alarmins and their pivotal role in asthma inflammation (N=20)</td>
<td><strong>93%</strong> intend to make changes in practice as a result of what they learned (N=16)</td>
</tr>
<tr>
<td>Who see <strong>93</strong> severe asthma patients weekly</td>
<td><strong>30%</strong> relative knowledge gain seen from learners in explaining how therapies, such as anti-TSLP, would be expected to modulate airway inflammation in patients with either a T2-high or T2-low phenotype (N=20)</td>
<td><strong>95%</strong> indicated the activity gave tools and strategies to apply in practice (N=23)</td>
</tr>
<tr>
<td>Which translates to <strong>4,836</strong> potential patient visits annually</td>
<td><strong>83%</strong> of evaluation respondents demonstrated confidence with regard to the learning objectives post-activity (N=20)</td>
<td><strong>65%</strong> indicated the activity addressed barriers to optimal patient care (N=23)</td>
</tr>
</tbody>
</table>
Level (1) Outcomes: Participation (Degree)

Final Outcomes Summary – Live Broadcasts

<table>
<thead>
<tr>
<th>Degree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD/DO</td>
<td>125</td>
</tr>
<tr>
<td>NP</td>
<td>11</td>
</tr>
<tr>
<td>PA</td>
<td>26</td>
</tr>
<tr>
<td>RN</td>
<td>3</td>
</tr>
<tr>
<td>PharmD</td>
<td>12</td>
</tr>
<tr>
<td>Other</td>
<td>79</td>
</tr>
<tr>
<td>Unknown*</td>
<td>104</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>360</strong></td>
</tr>
</tbody>
</table>

*Unknown = attended ReachMD broadcast via Facebook. Learner data not collected.
Level (1) Outcomes: Participation by Broadcast (Degree)
Final Outcomes Summary – Live Broadcasts

**CHEST 2021 Broadcast**
- MD/DO: 48
- NP: 11
- PA: 1
- RN: 3
- PharmD: 12
- Other: 14
- TOTAL: 89

**ReachMD Broadcast**
- MD/DO: 77
- PA: 25
- Other: 65
- Unknown*: 104
- TOTAL: 271

67% of learners at the CHEST 2021 Broadcast were physicians and advanced practice providers.

*Unknown = attended ReachMD broadcast via Facebook. Learner data not collected.
Level (1) Outcomes: Participation (Specialty)

Final Outcomes Summary – Live Broadcasts

**CHEST 2021 and ReachMD Broadcasts**

**Specialty** | **Total**
--- | ---
Primary Care/Family/General | 116
Pulmonology | 48
Allergy & Immunology | 19
Hospital Medicine | 10
Surgery | 8
Pain Medicine | 7
Critical Care | 4
Internal Medicine | 3
Other (Pediatrics, radiology, infectious disease, emergency) | 41
Unknown* | 104
**TOTAL** | **360**

*Unknown = attended ReachMD broadcast via Facebook. Learner data not collected.
Level (1) Outcomes: Participation by Broadcast (Specialty)

Final Outcomes Summary – Live Broadcasts

**CHEST 2021 Broadcast**

- Pulmonology: 54%
- Allergy & Immunology: 21%
- Primary Care/Family/General: 14%
- Surgery: 5%
- Critical Care: 3%
- Internal Medicine: 2%

**ReachMD Broadcast**

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmonology</td>
<td>48</td>
</tr>
<tr>
<td>Allergy &amp; Immunology</td>
<td>12</td>
</tr>
<tr>
<td>Primary Care/Family/General</td>
<td>2</td>
</tr>
<tr>
<td>Surgery</td>
<td>1</td>
</tr>
<tr>
<td>Critical Care</td>
<td>4</td>
</tr>
<tr>
<td>Internal Medicine</td>
<td>3</td>
</tr>
<tr>
<td>Other (Pediatrics, infectious disease, emergency)</td>
<td>19</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>89</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Care/Family/General</td>
<td>114</td>
</tr>
<tr>
<td>Hospital Medicine</td>
<td>10</td>
</tr>
<tr>
<td>Allergy &amp; Immunology</td>
<td>7</td>
</tr>
<tr>
<td>Surgery</td>
<td>7</td>
</tr>
<tr>
<td>Pain Medicine</td>
<td>7</td>
</tr>
<tr>
<td>Other (Pediatrics, radiology, infectious disease, emergency)</td>
<td>22</td>
</tr>
<tr>
<td>Unknown*</td>
<td>104</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>271</strong></td>
</tr>
</tbody>
</table>

*Unknown = attended ReachMD broadcast via Facebook. Learner data not collected.
### Level (2) Outcomes: Satisfaction

**Final Outcomes Summary – Live Broadcasts**

<table>
<thead>
<tr>
<th>Participants report the activity was “Excellent” to “Good” at:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting the learning objectives</td>
<td>100%</td>
</tr>
<tr>
<td>Meeting your educational needs</td>
<td>96%</td>
</tr>
<tr>
<td>Reinforcing and/or improving current skills</td>
<td>100%</td>
</tr>
<tr>
<td>Giving you tools and strategies to apply in practice</td>
<td>95%</td>
</tr>
<tr>
<td>Improving your ability to treat or manage patients</td>
<td>91%</td>
</tr>
</tbody>
</table>

- **96%** Reported the material was presented without commercial bias
- **96%** Reported the content was evidence-based and clinically relevant

*N=23*
Level (3 & 4) Outcomes: Knowledge & Competence

Final Outcomes Summary – Live Broadcasts

Learning Objective: **Define the epithelial alarmins and their pivotal role in inflammation in asthma**

**Question 1:** Which one of these statements is true of epithelial alarmins?

- **They are downstream cytokines released by neutrophils**
  - Pre-test (N=78): 34%
  - Post-test (N=20): 0%
  - 50% Relative Knowledge Gain
  - 25% Absolute Knowledge Gain

- **They include IL-25, thymic stromal lymphopoietin (TSLP), and IL-33**
  - Pre-test (N=78): 50%
  - Post-test (N=20): 75%

- **They are involved with non-type 2 inflammation but not type 2 inflammation**
  - Pre-test (N=78): 10%
  - Post-test (N=20): 20%

- **Their release is triggered by pollutants but not viruses, microbes, or allergens**
  - Pre-test (N=78): 6%
  - Post-test (N=20): 5%
Level (3 & 4) Outcomes: Knowledge & Competence
Final Outcomes Summary – Live Broadcasts

Learning Objective: *Describe how the epithelial alarmins impact both T2 and non-T2 downstream inflammation in asthma*

**Question 2:** Alarmins have been shown to mediate all of the following except:

- Airway remodeling, Pre-test (N=75): 55%, Post-test (N=20): 45%
  - 18% Relative Knowledge Gain
  - 10% Absolute Knowledge Gain

- Eosinophilic inflammation, Post-test (N=20): 12%

- Mast cell activation, Post-test (N=20): 20%

- Both innate and adaptive immune responses, Post-test (N=20): 21%

This question shows a slight decrease in knowledge gain. However, because our sample includes unmatched learners and the post-test N is relatively low, these data may not be truly representative of changes in knowledge from pre- to post-test. Faculty will continue to monitor live post-test responses and enduring pre/post-test performance, and will revise the question if needed.
Level (3 & 4) Outcomes: Knowledge & Competence

Final Outcomes Summary – Live Broadcasts

Learning Objective: *Explain how therapies, such as anti-TSLP, would be expected to modulate airway inflammation in patients with either a T2-high or T2-low phenotype*

**Question 3:** Ms. P is a 58 year old woman with a history of severe uncontrolled asthma. She has had 5 exacerbations in the last year requiring OCS bursts. She notes triggers of environmental allergens, upper respiratory infections, and cigarette smoke. Her evaluation reveals elevated FeNO of 51 ppb, elevated absolute eosinophil count of 400 cells/mcL, and BAL with high neutrophils (60%) and eosinophils (7%). She is started on an anti-IL-5/5R biologic and repeat evaluation reveals FeNO 48 ppb, absolute eosinophil count of 0, and sputum cell count with 50% neutrophils and 1% eosinophils. She has clinically improved but is still having 3 exacerbations per year requiring OCS bursts. Which of these apply to Ms. P?

- She may benefit from switching to anti-IL-4R, anti-IgE or anti-TSLP when available.

**Pre-test (N=76)**

- 26% She continues to demonstrate eosinophilic inflammation despite anti-IL-5/5R therapy.
- 0% Her initial evaluation was consistent with a paucigranulocytic inflammatory pattern.
- 18% She would be characterized as non-type 2 or type 2 low.

**Post-test (N=20)**

- 50% 15% 65% Relative Knowledge Gain
- 30% Absolute Knowledge Gain

**Final Outcomes Summary – Live Broadcasts**

- Knowledge Gain: 15%
- Competence Gain: 0%
Level (3 & 4) Outcomes: Knowledge & Competence

Learning Objective: *Evaluate the results of clinical trials of novel therapies that target the epithelial alarmins*

**Question 4:** Which of the following airway submucosal inflammatory cells have been shown to be reduced in bronchoscopic biopsies following anti-TSLP therapy?

- **Eosinophils**
  - Pre-test (N=75): 55%
  - Post-test (N=20): 45%
  - Relative Knowledge Gain: -18%
  - Absolute Knowledge Gain: -10%

- **Neutrophils**
  - Pre-test (N=75): 17%
  - Post-test (N=20): 5%

- **CD4+ T-cells**
  - Pre-test (N=75): 20%
  - Post-test (N=20): 25%

- **Chymase+ mast cells**
  - Pre-test (N=75): 8%
  - Post-test (N=20): 25%

This question shows a slight decrease in knowledge gain. However, because our sample includes unmatched learners and the post-test N is relatively low, these data may not be truly representative of changes in knowledge from pre- to post-test. Faculty will continue to monitor live post-test responses and enduring pre/post-test performance, and will revise the question if needed.
Level (4) Outcomes: Competence
Final Outcomes Summary – Live Broadcasts

N=23

Learners reported their confidence as it relates to the learning objectives after the activity
(Very confident – confident)

<table>
<thead>
<tr>
<th>Objective</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define the epithelial alarmins and their pivotal role in inflammation in asthma</td>
<td>85%</td>
</tr>
<tr>
<td>Describe how the epithelial alarmins impact both T2 and non-T2 downstream inflammation in asthma</td>
<td>84%</td>
</tr>
<tr>
<td>Explain how therapies, such as anti-TSLP, would be expected to modulate airway inflammation in patients with either a T2-high or T2-low phenotype</td>
<td>84%</td>
</tr>
<tr>
<td>Evaluate the results of clinical trials of novel therapies that target the epithelial alarmins</td>
<td>80%</td>
</tr>
</tbody>
</table>
Level (4) Outcomes: Competence
Final Outcomes Summary – Live Broadcasts

What change(s) will you incorporate in your practice?

- Improve differential diagnosis
- Determine inflammatory markers to decide on treatment regimen
- Explore other treatment options for severe asthma
- Conduct sputum studies
- Order more specific tests
- Improve evaluation of severe asthma

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

93%  
N=16
Evaluation Survey Results

Final Outcomes Summary – Live Broadcasts

**What barriers will the education provided help to address?**

- Knowledge deficit
- Lab tests and procedures
- Current evaluation and treatment

65%
N=23

**What barriers to optimal patient care are you facing that were not addressed in this activity?**

- Affordability of new treatment options
- Availability of testing
- Insurance coverage for medication and testing
- Access to pulmonary specialists

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

• The importance of phenotyping patients with severe asthma
• Biologics are changing the face of asthma
• TSLP is a highly relevant player in the inflammatory cascade
• Extensive testing may be necessary to formulate appropriate treatment plans
• Newer therapies targeting epithelial alarmins are available for severe asthma

Future Topics

• Treatment of elderly patients with lifelong asthma
• How to change asthma therapy
• Information about biologics
• Differences between biologics
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NJH designates the enduring material for a maximum of 1.0 AMA PRA Category 1 Credit™.