National Jewish Health®

PERSONALIZED MEDICINE IN SEVERE ASTHMA

Applying Emerging Data and Treatments to Everyday Clinical Practice

Final Outcomes Report

07/23/18

Personalized Medicine in Severe Asthma

Applying Emerging Data and Treatments to Everyday Clinical Practice

36880883	Personalized Medicine in Severe Asthma; Applying Emerging Data and Treatments to Everyday Clinical Practice

Educational Objectives

1. Describe key concepts in the pathophysiology of severe asthma.
2. Analyze recent clinical data of current and emerging targeted therapies and potential biomarkers for severe asthma.
3. Select personalized treatment approaches for severe asthma best suited to various phenotypes and endotypes.

Intended Audience: pulmonologists, allergists and primary care physicians, as well as physician assistants and nurse practitioners	**Anticipated Reach:** 270-360 Actual Reach: 323	**Modality/# Activities:** Live evening symposia consisting of interactive, case-based presentations
Program Locations: Dallas, TX; Cleveland, OH; Chicago, IL; Dearborn, MI; Seattle, WA; San Jose, CA; Miami, FL; Tampa, FL; Raleigh, NC; Portland, OR	**Dates (Live Activity):** 6/20/2017 – 11/14/2017	**Relevant Links:** https://www.nationaljewish.org/education-training/pro-ed/live-events/severeasthmapm
Outcomes Levels: Level 1, Level 2, Level 3, Level 4, Level 5	**Outcomes Planning:** Pre-test and post-test; program evaluation; 45-day follow up survey	

Summary: The live portion of this educational initiative encompasses 10 meetings across the country featuring expert speakers, video patient cases, ARS polling and resources to help improve the knowledge and competence of pulmonologists, allergists and primary care physicians in the diagnosis, management, and treatment of severe asthma.

Personalized Medicine in Severe Asthma

Final Report - Dashboard

Program Impact: Live and Online Activity Aggregate Outcomes

3,951 Total Learners

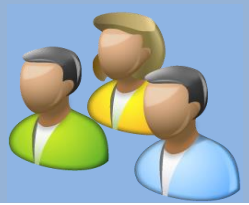
70% Prescribers

- 48% MD/DO
- 22% NP/PA

Overall relative knowledge gain from pre- to post-test for all activities

50%

Estimated # of total patients impacted per month



75,542

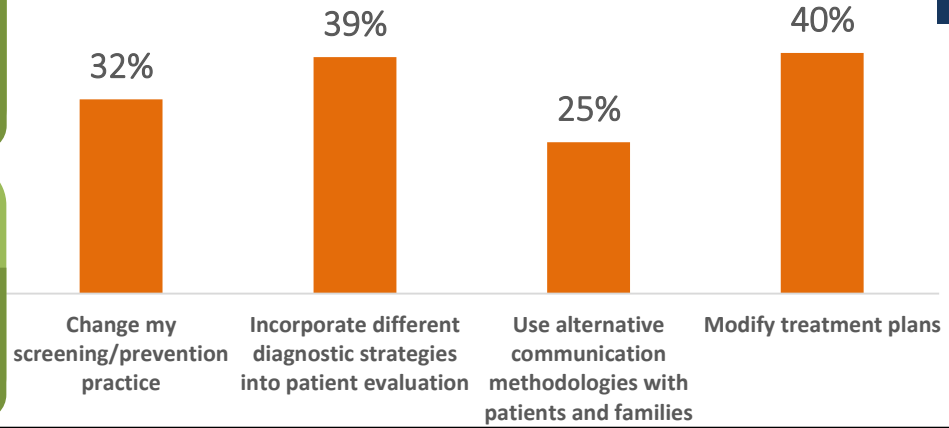
89%

Participants reporting they were somewhat – extremely likely to make changes to their practice.

93%

Participants reporting they gained skills to overcome barriers to patient care

As a result of what they learned, Learners intend to make the following changes in their practice:



Participation: Top Specialties

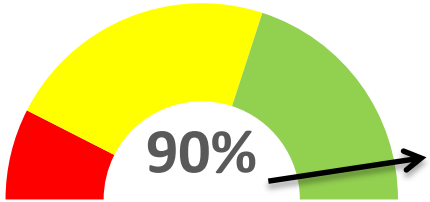
- Primary Care 33 %
- Pulmonology 11%
- Allergy 6 %

Personalized Medicine in Severe Asthma

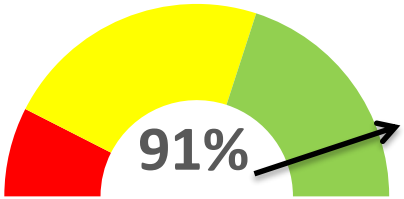
Final Report - Activity Impact: Dashboard

(10) Live Symposia

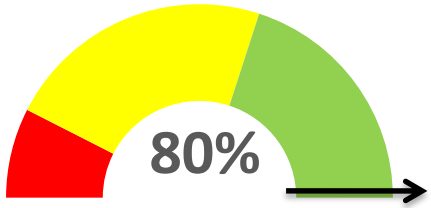
Participants who reported that the activity addresses strategies for overcoming barriers to optimal patient care



Participants who intend to make changes in practice as a result of activity



Participants who report that one or more of their patients benefitted from the information learned in the activity in a 45 day follow up



Overall relative knowledge gain from pre- to post-activities

36%

323

Learners (Live)

81%

Prescribers

- 59% MD/DO
- 22% NP/PA

Estimated # of patients impacted per month

5,884

Personalized Medicine in Severe Asthma

Final Report - Activity Impact: Dashboard

Online Enduring Program Metrics (3 Modules)

***Asthma: Symptoms to Pathophysiology* (Module 1):**

- ✓ Completers: 1,195
- Total Learners: 1,929
- Total Participants: 4,017

***Current and Emerging Asthma Therapies* (Module 2):**

- ✓ Completers: 799
- ✓ Total Learners: 1,077
- ✓ Total Participants: 2,010

***Roundtable Discussion on Personalized Treatment Approaches* (Module 3):**

- ✓ Completers: 447
- ✓ Total Learners: 622
- ✓ Total Participants: 1,230

TOTAL PARTICIPATION

Completers: 2,441

Certificates: 2,374

Learners: 3,628

Participants: 7,287

Participant Breakdown:

59% Prescribers

- 37% MD/DO
- 22% NP/PA

Overall relative knowledge gain from pre- to post activities **63%**

222%

% of Completer Guarantees

40%

Conversion Rate: Learner To Completer

86% of Learners

reported that they intend to make changes in practice as a result of the activity

Live Activity

Final Outcomes Report

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Personalized Medicine in Severe Asthma

Final Report **(10) Live Symposia**

Background

Background:

The live portion of this educational initiative encompasses 10 meetings across the country featuring expert speakers, video patient cases, ARS polling and resources to help attendees convert information into practice. The goal of this program is to improve the knowledge and competence of pulmonologists, allergists and primary care physicians, as well as physician assistants and nurse practitioners in the diagnosis, management, and treatment of severe asthma.

Learning Objectives:

1. Describe key concepts in the pathophysiology of severe asthma.
2. Analyze recent clinical data of current and emerging targeted therapies and potential biomarkers for severe asthma.
3. Select personalized treatment approaches for severe asthma best suited to various phenotypes and endotypes.

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Final Report **(10) Live Symposia**

Accreditation, Audience and Outcomes Strategy

Accreditation Details: In support of improving patient care, NJH is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians. NJH is also accredited by the Accreditation Council for Pharmacy Education (ACPE) and the California Board of Registered Nursing (CBRN) to provide continuing education for the healthcare team. ***NJH has designated the live evening symposia for a maximum of 2.0 AMA PRA Category 1 Credits™.***

Target Audience: Primary Care Physicians, Community Pulmonologists and Allergists are the primary target audience. Allied health professionals involved in the management of severe asthma are the secondary target audience. Anticipated reach includes approximately 270-360 attendees for the live series.

Educational Outcomes Strategy: Outcomes will be measured via participation totals, specialty, designation, pre-test, post-test, interactive polling questions, evaluations and 45-day follow-up surveys. The metrics will demonstrate participation, satisfaction, learning, engagement and change in knowledge, competency, and self-reported performance to achieve Moore's Level 4 outcomes.

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Personalized Medicine in Severe Asthma

Final Report **(10) Live Symposia**

Faculty

Michael E. Wechsler, MD, MMSc
Co-Director, The Cohen Family Asthma Institute at National Jewish Health
Professor, Department of Medicine, Division of Pulmonary, Critical Care and Sleep Medicine
National Jewish Health, Denver, CO

Anthony Gerber, MD, PhD
Associate Professor, Department of Medicine, Division of Pulmonary, Critical Care and Sleep Medicine
Department of Biomedical Research
National Jewish Health, Denver, CO

Flavia Hoyte, MD
Associate Professor, Department of Medicine, Division of Allergy and Immunology
Director, National Jewish Health/University of Colorado Adult Allergy and Immunology Fellowship Training Program
National Jewish Health, Denver, CO

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Attendees Per City **(10) Live Symposia**

Dallas, TX: 6/20/2017	**57**
Cleveland, OH: 7/27/2017	**33**
Chicago, IL: 8/23/2017	**38**
Dearborn, MI: 8/24/2017	**29**
Seattle, WA: 9/27/2017	**27**
San Jose, CA: 9/28/2017	**27**
Miami, FL: 10/23/2017	**32**
Tampa, FL: 10/24/2017	**41**
Durham, NC: 11/7/2017	**20**
Portland, OR: 11/14/2017	**19**
Total Live Participation	**323**

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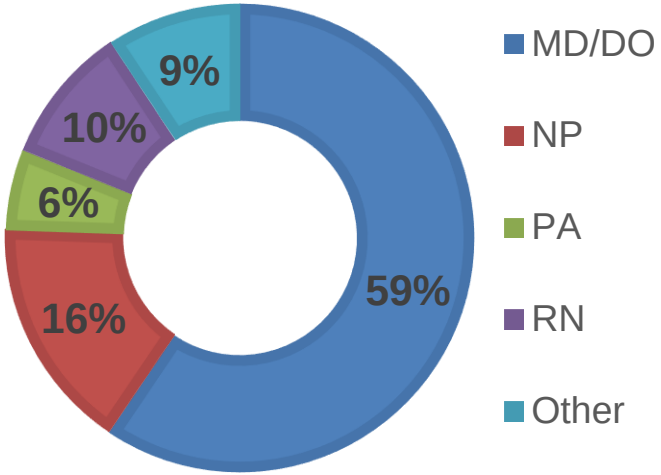
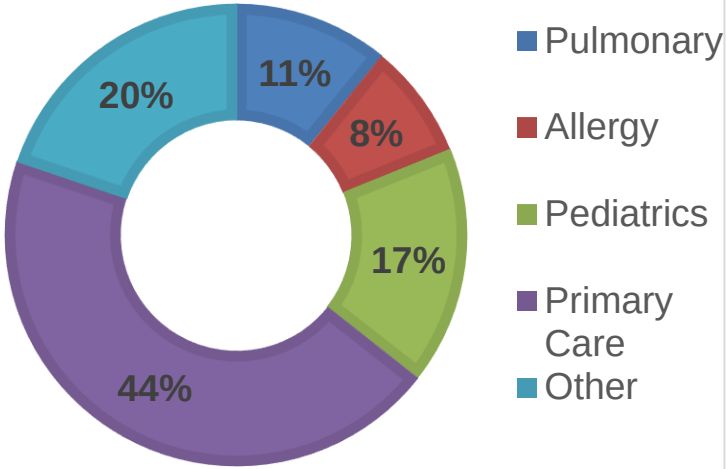
Level 1 Outcomes: Participation **(10) Live Symposia**

Attendee Designation



*Other: MSW, PharmD, RPh, RRT

Attendee Specialty



*Other: Cardiology, Dermatology, Pharmacy, ENT, Pathology, Geriatrics, Pain Management, Urology, Surgery, Neurology, Emergency Medicine

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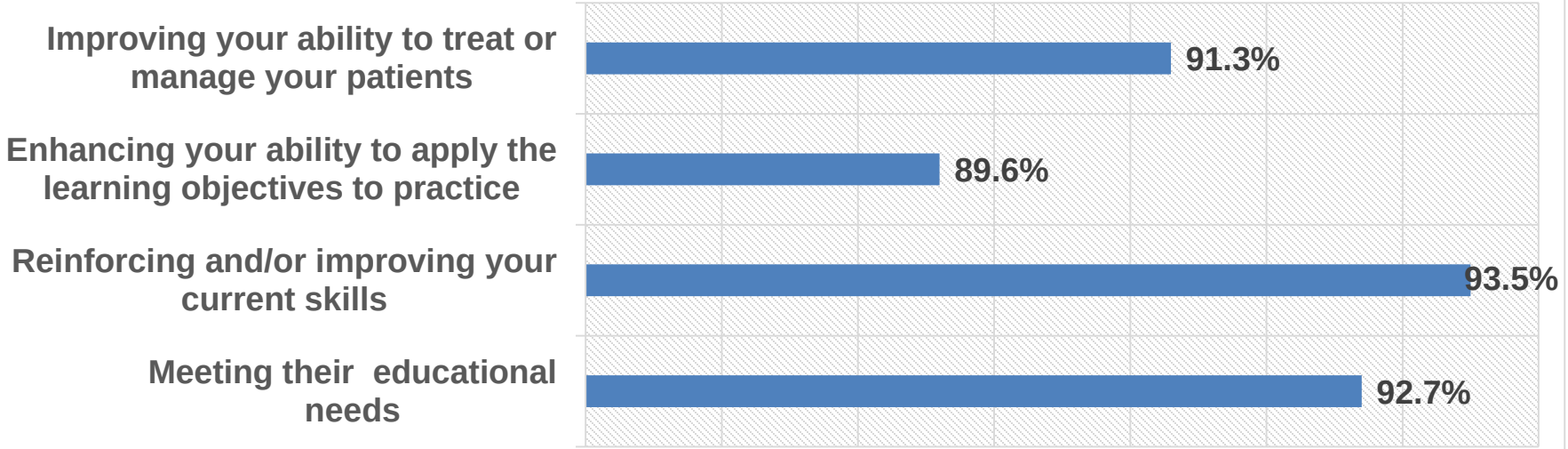
81% of all participants in the live activities are prescribers

N=323

Participants reported that the activity was "Good" to "Excellent" at:



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N=198

Personalized Medicine in Severe Asthma

Final Report

Pre-test/Post-test Questions **(10) Live Symposia**

Question 1

Which of the following clinical criteria factor into the "risk" aspect of classifying asthma control?

A.) Asthma Control Test (ACT) score

B.) Number of prednisone bursts in the past year, frequency of nighttime awakenings

C.) Frequency of albuterol use

D.) Assessment of lung function (%predicted FEV1 or %personal best peak flow)

Question 2

Which of the following blood tests is a commercially available biomarker that is helpful in determining asthma phenotype/endotype?

A.) Absolute lymphocyte count

B.) Periostin level

C.) Total IgE level

D.) DPP4 (dipeptidyl peptidase 4)

E.) Exhaled nitric oxide

Question 3

Which of the following biologic agents are approved for the treatment of severe persistent asthma characterized as Th2 high?

A.) Mepolizumab

B.) Lebrikizumab

C.) Dupilumab

D.) Benralizumab

E.) Tralokinumab

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Personalized Medicine in Severe Asthma

Final Report

Pre-test/Post-test questions **(10) Live Symposia**

Question 4	Question 5	Question 6	Question 7
Which of the following is NOT a criterion for the diagnosis of asthma? A.) History of symptoms consistent with intermittent airway obstruction B.) Physiologic testing confirming airway **C.) Peripheral eosinophilia** D.) Hypertrophy and hyperplasia of the smooth muscle cells	**Which of the following does NOT represent an airway abnormality in asthma?** A.) Increased mucus secretion B.) Thickening of the basement membrane in airways **C.) Reduced number and size of airway smooth muscle cells causing "floppy airways"** D.) Hypertrophy and hyperplasia of the smooth muscle cells	**Which of the following describes an asthma endotype?** A.) Asthma in the elderly B.) Obese asthma **C.) IL_5 mediated asthma** D.) Nocturnal asthma E.) Occupational asthma	**Which of the following is NOT a FDA approved biologic agent** A.) Omalizumab B.) Mepolizumab C.) Dupilumab D.) Reslizumab **E.) Tralokinumab**

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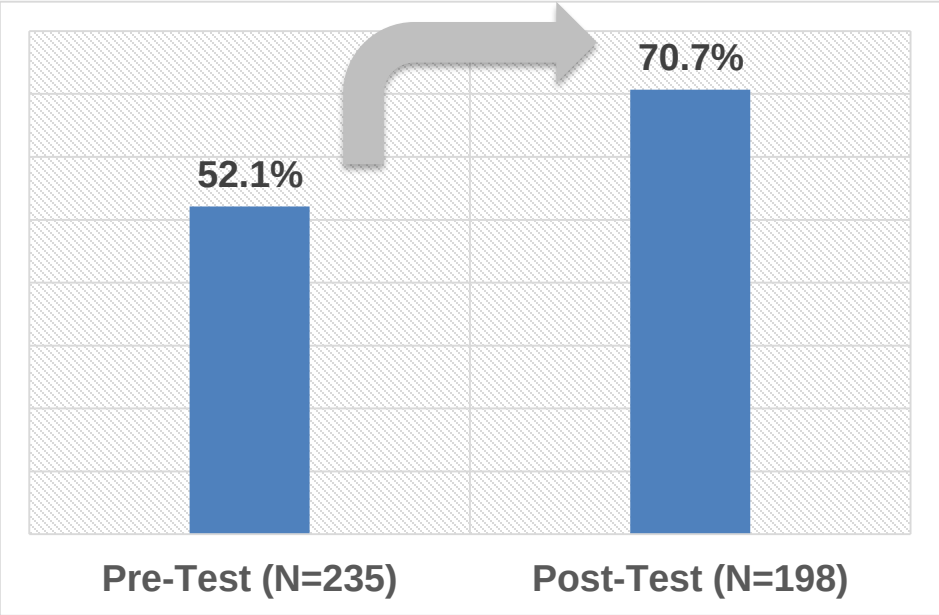
Level 3 & 4 Outcomes: Knowledge/Competence **(10) Live Symposia**



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

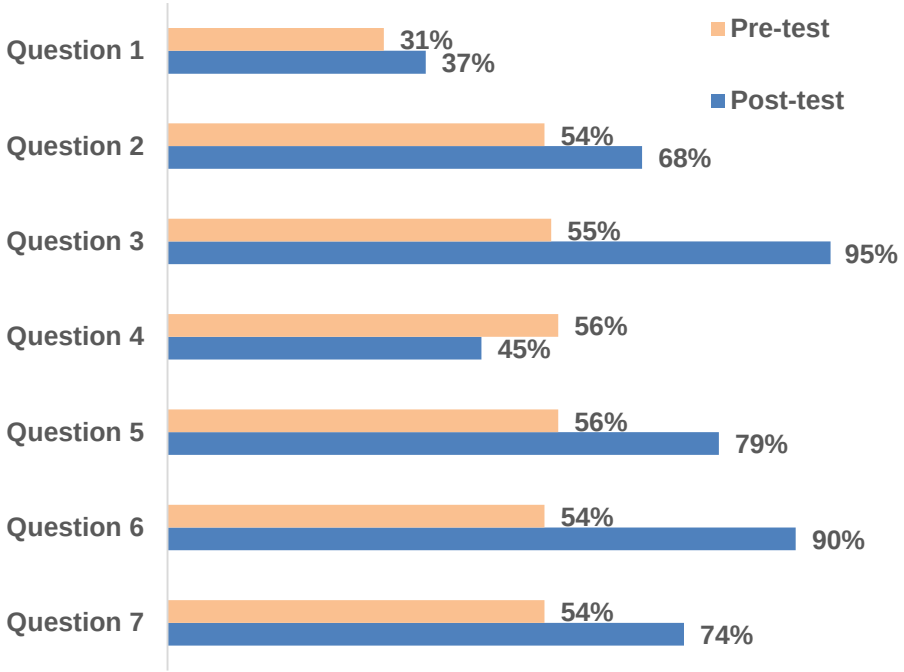
Overall relative increase from pre- to post-activity

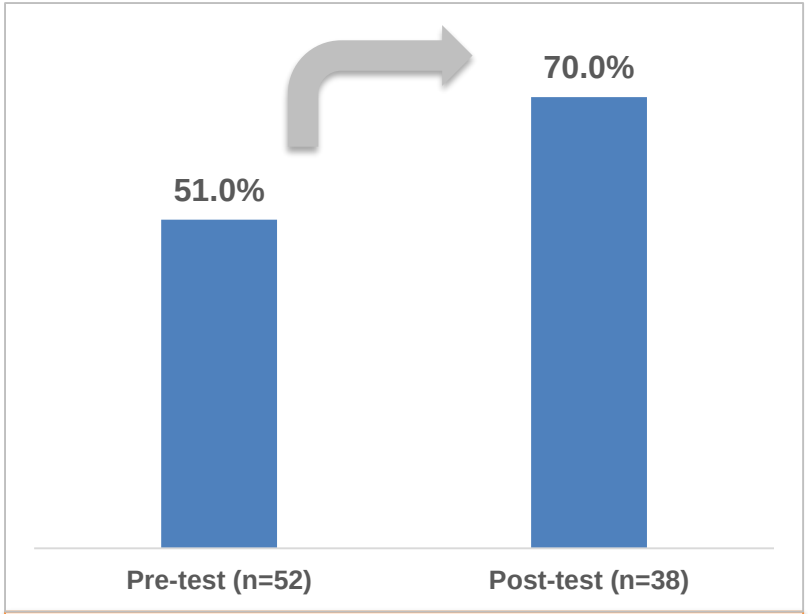
36%

Personalized Medicine in Severe Asthma

Final Report

Pre- to Post-Test Analysis: Dallas **(10) Live Symposia**





Average relative change in knowledge and competence: 37% increase from baseline to post-test. Since Question 4 saw a decrease from pre to post-test, the faculty have modified the question to make it more clear.

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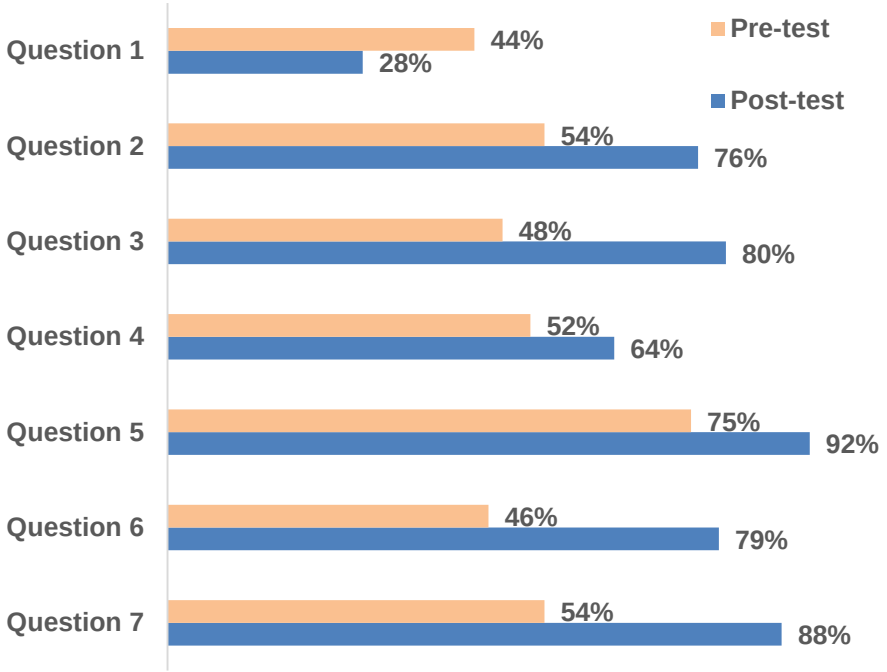
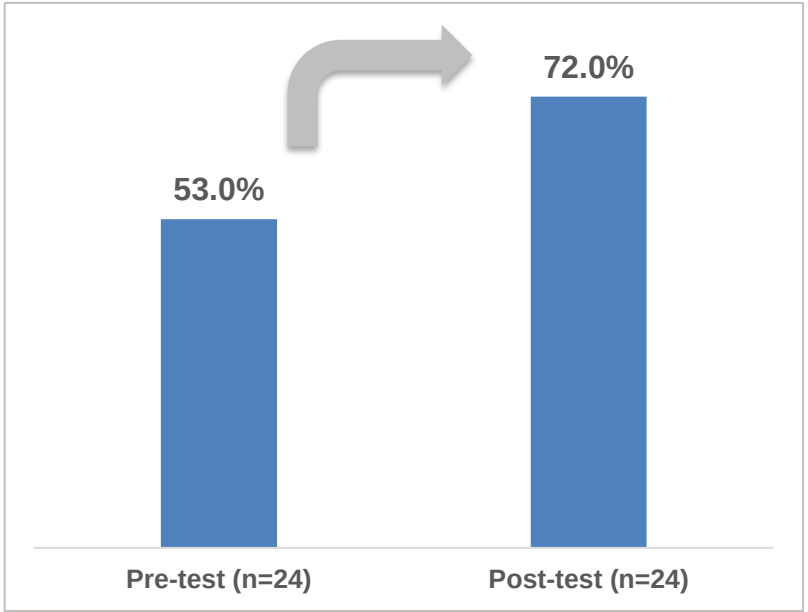
Pre- to Post-Test Analysis: Cleveland **(10) Live Symposia**





Average relative change in knowledge and competence: 36% increase from baseline to post-test. *Since Question 1 saw a decrease from pre to post-test, faculty worked to address the content more clearly during their presentation.*

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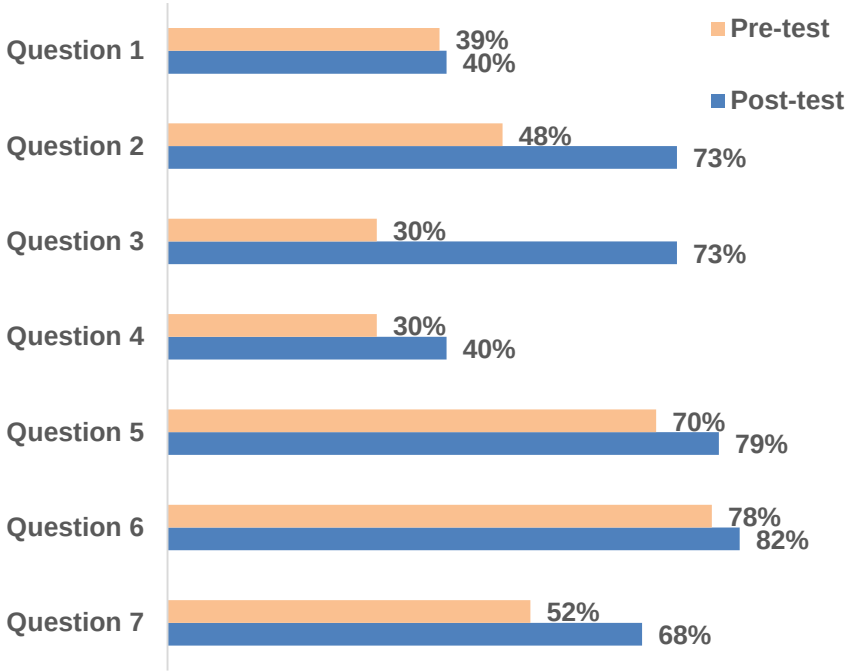
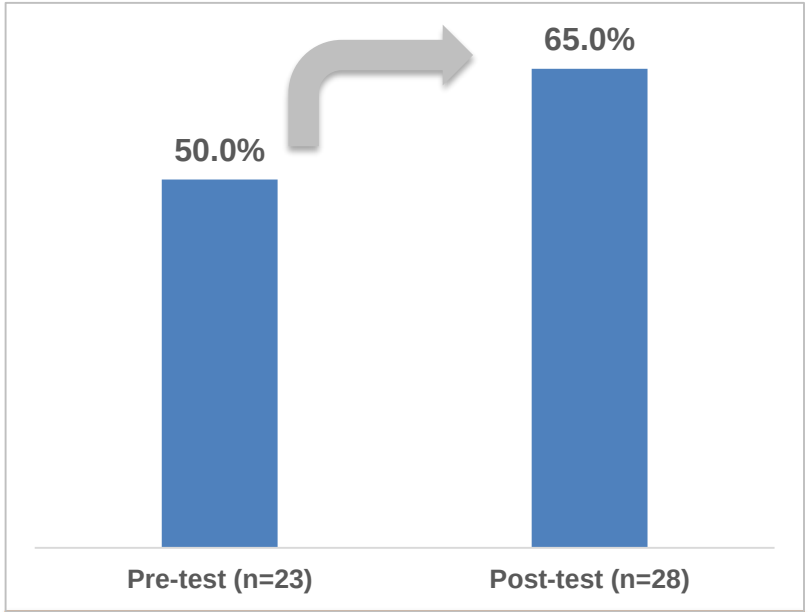
Pre- to Post-Test Analysis: Chicago **(10) Live Symposia**





Average relative change in knowledge and competence: 30% increase from baseline to post-test.

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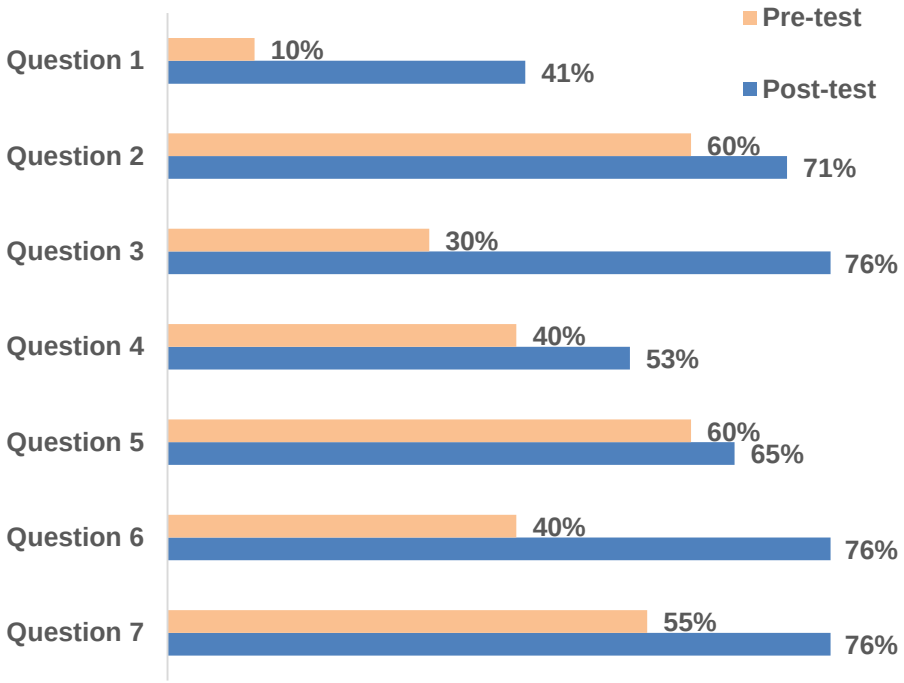
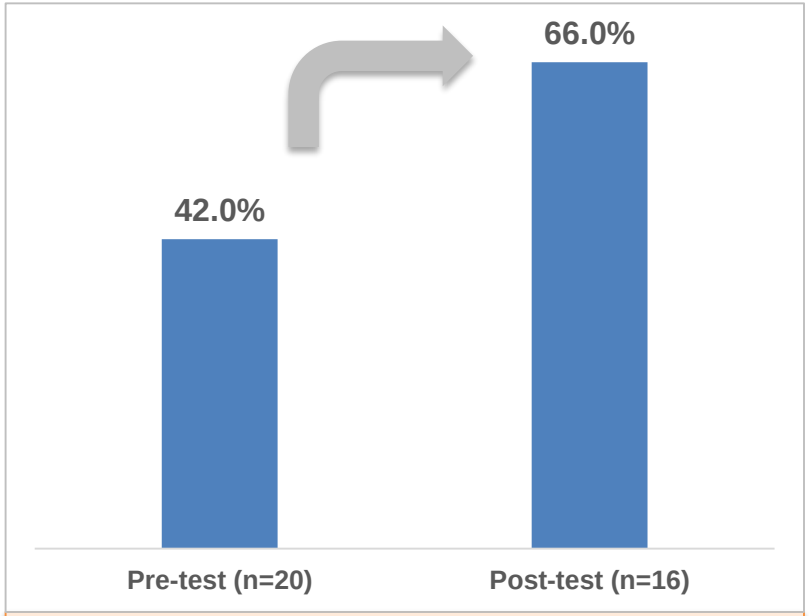
Pre- to Post-Test Analysis: Dearborn **(10) Live Symposia**





Average relative change in knowledge and competence: 57% increase from baseline to post-test.

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Personalized Medicine in Severe Asthma

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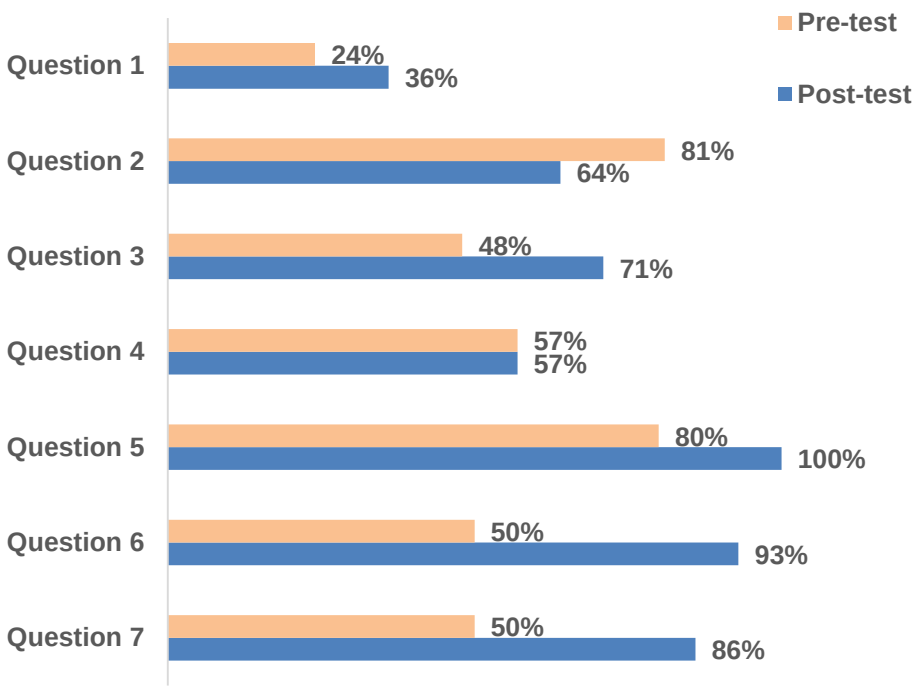
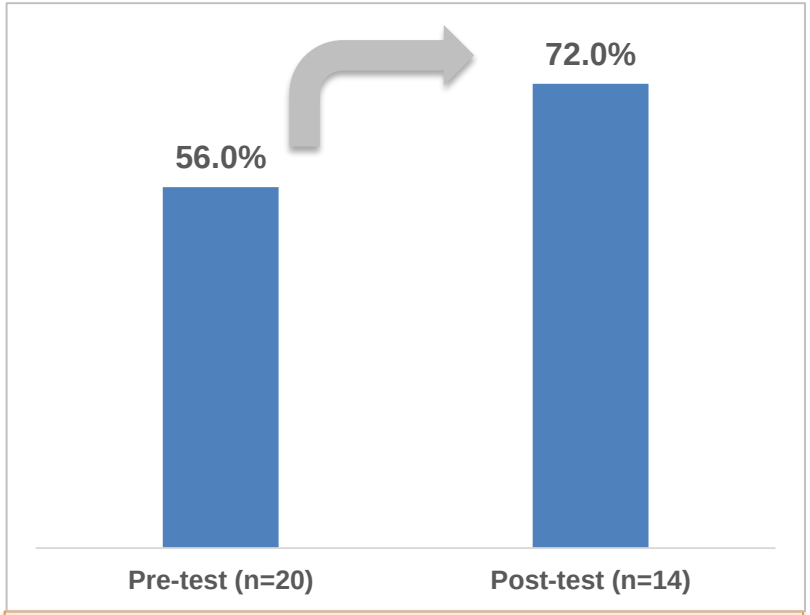
Pre- to Post-Test Analysis: Seattle **(10) Live Symposia**





Average relative change in knowledge and competence: 29% increase from baseline to post-test.

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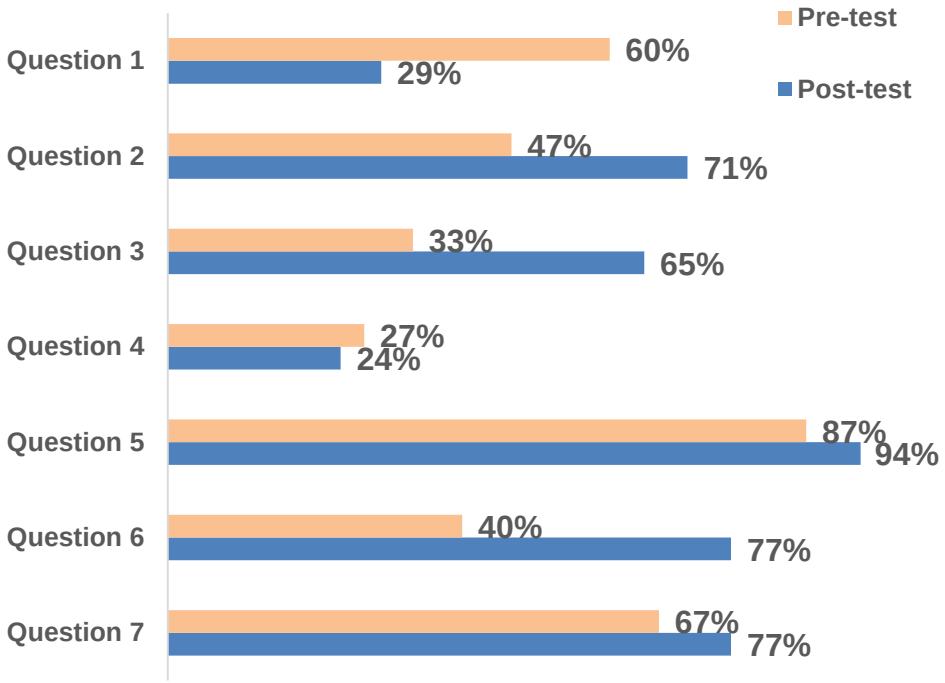
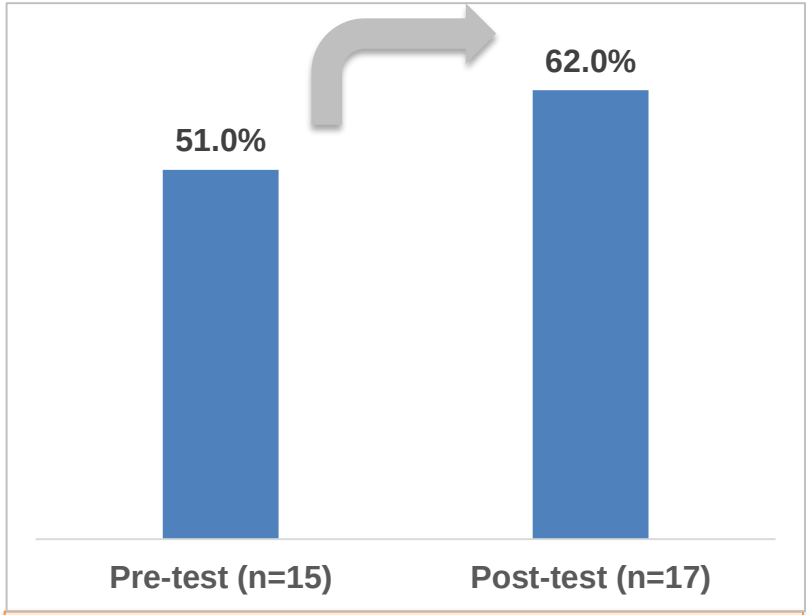
Final Report

Pre- to Post-Test Analysis: San Jose **(10) Live Symposia**





Average relative change in knowledge and competence: 22% increase from baseline to post-test.

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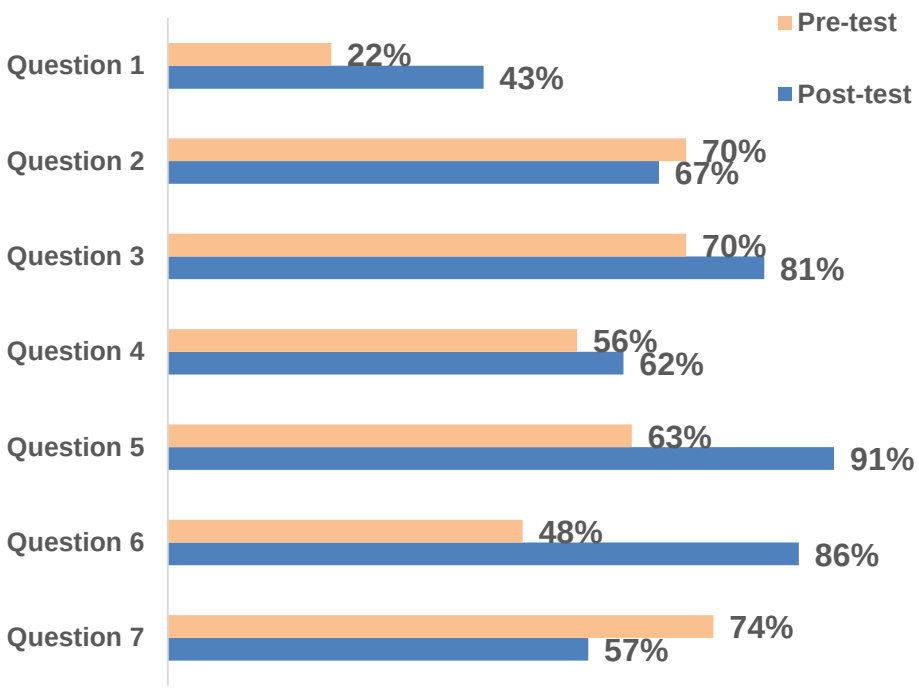
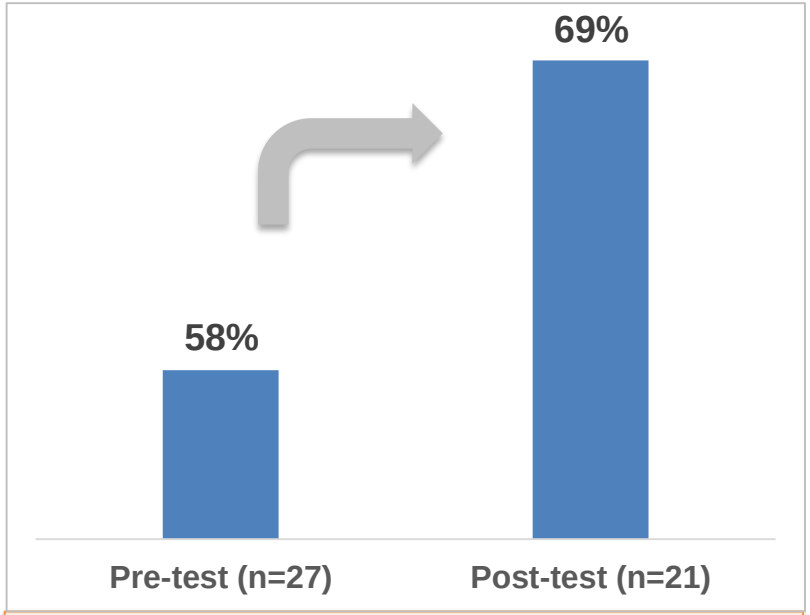
Pre- to Post-Test Analysis: Tampa, FL **(10) Live Symposia**





Average relative change in knowledge and competence: 19% increase from baseline to post-test.

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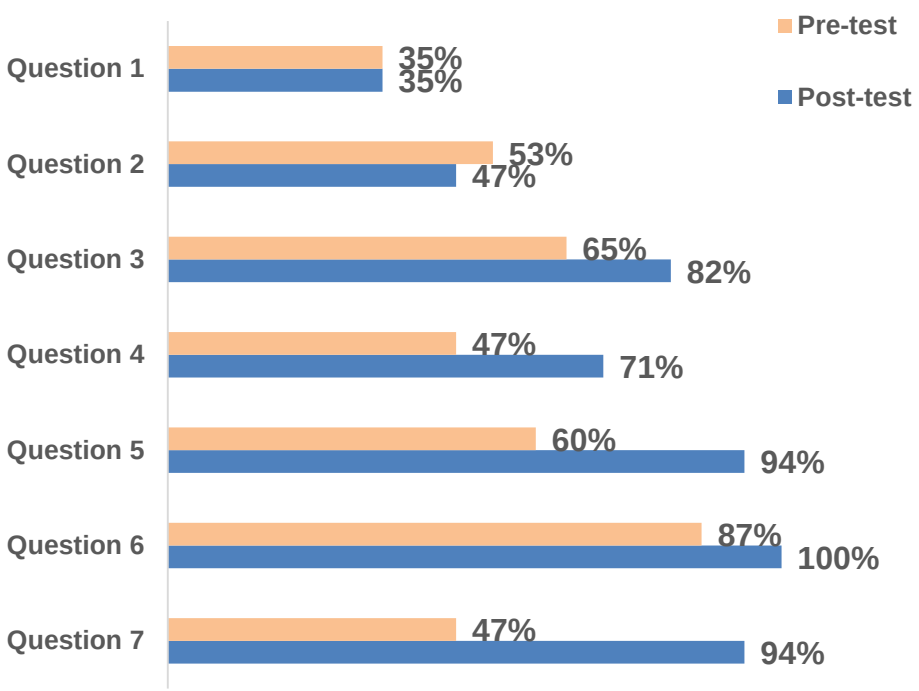
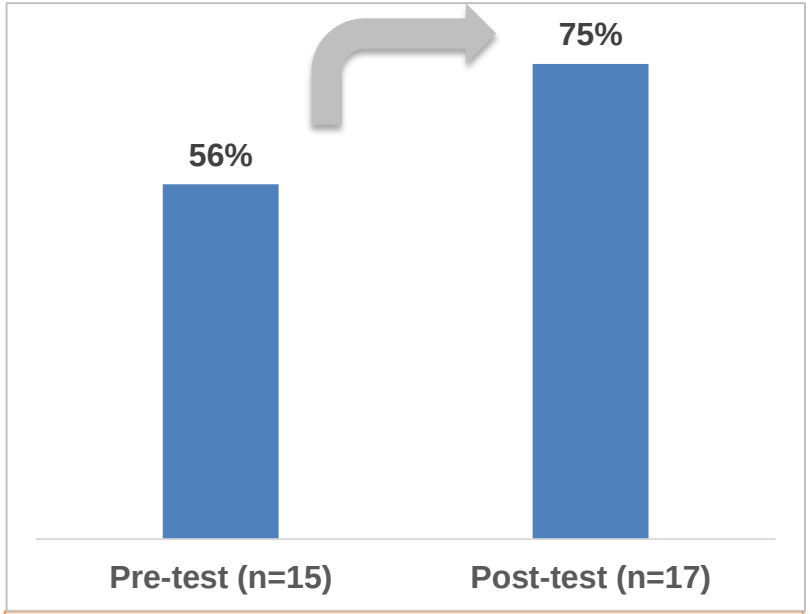
Pre- to Post-Test Analysis: Miami, FL **(10) Live Symposia**





Average relative change in knowledge and competence: 34% increase from baseline to post-test.

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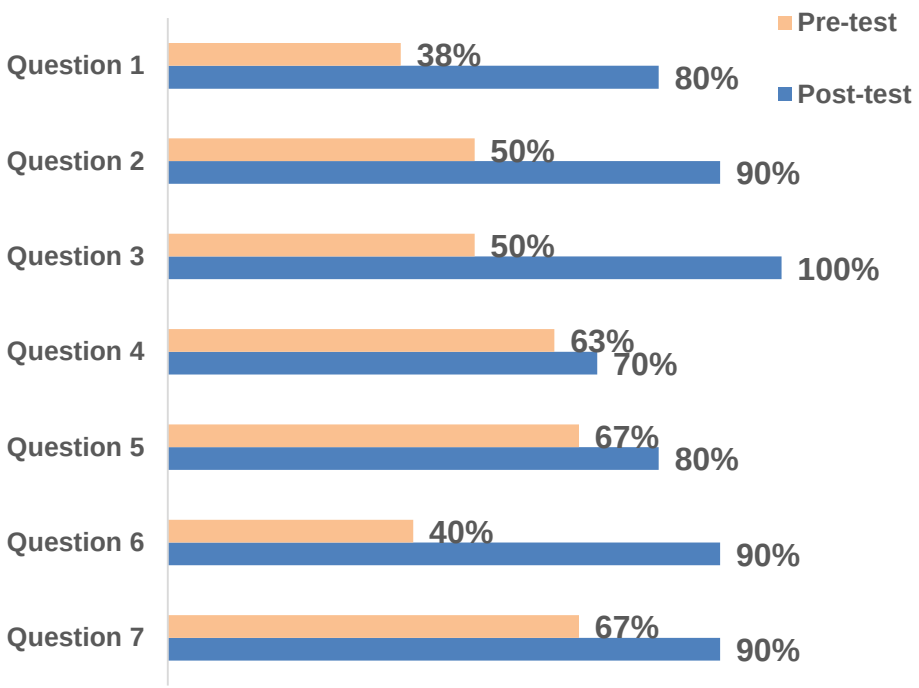
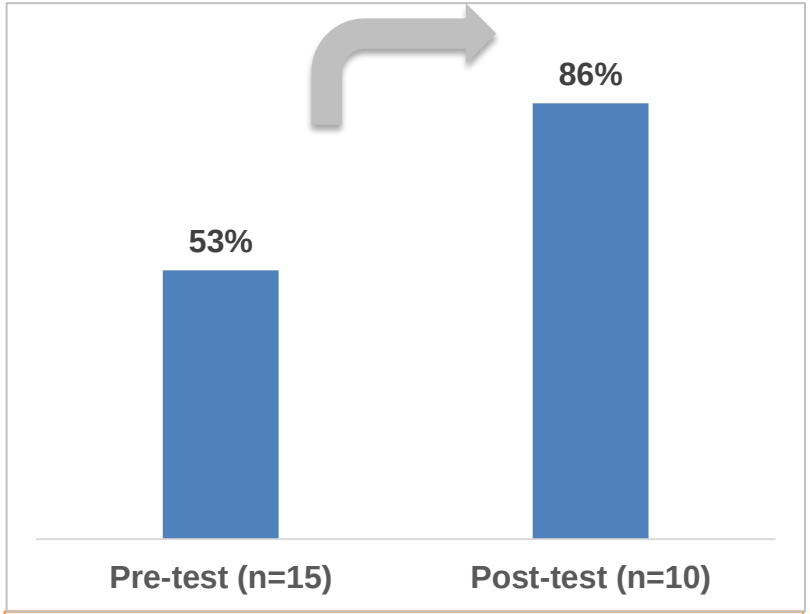
Pre- to Post-Test Analysis: Raleigh, NC **(10) Live Symposia**





Average relative change in knowledge and competence: 62% increase from baseline to post-test.

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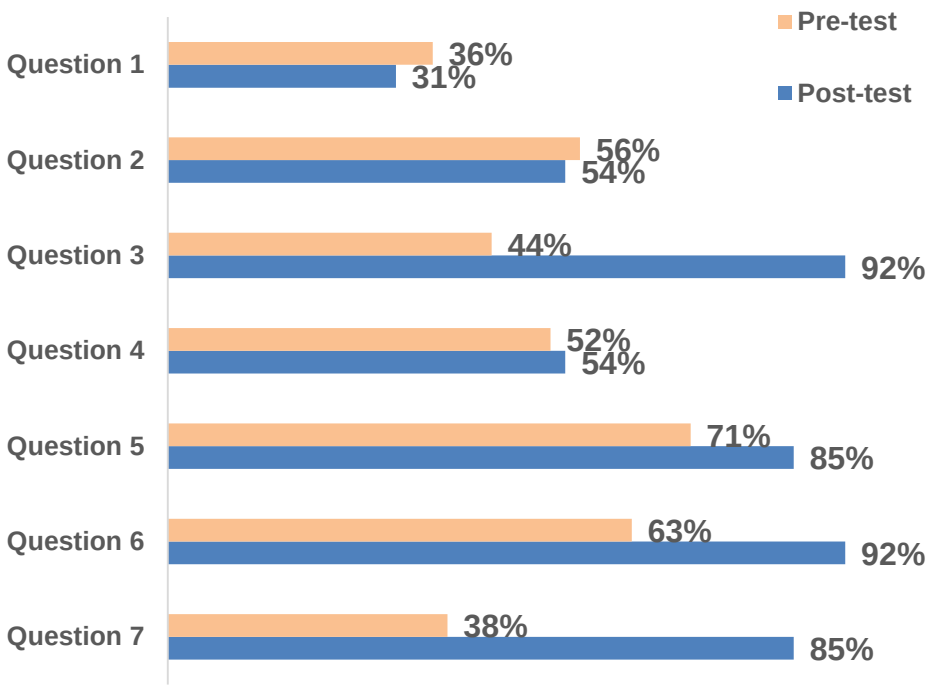
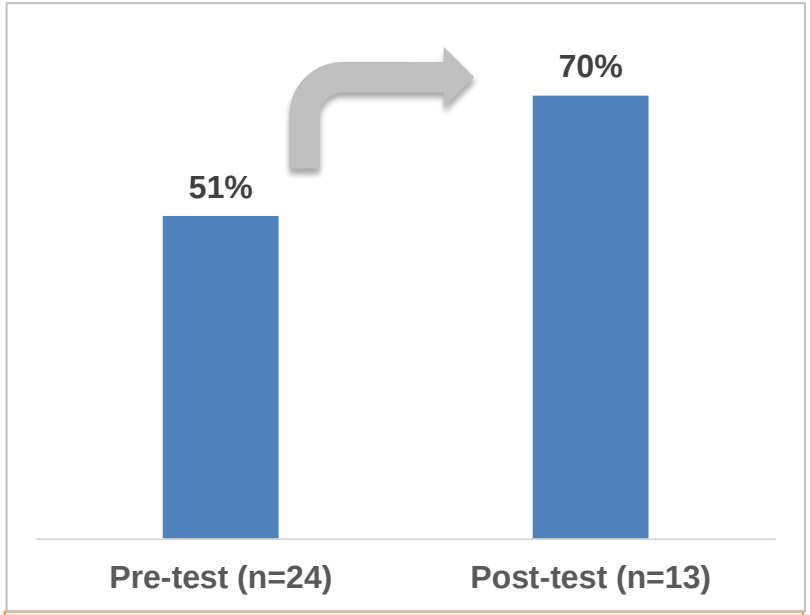
Pre- to Post-Test Analysis: Portland, OR **(10) Live Symposia**





Average relative change in knowledge and competence: 37% increase from baseline to post-test.

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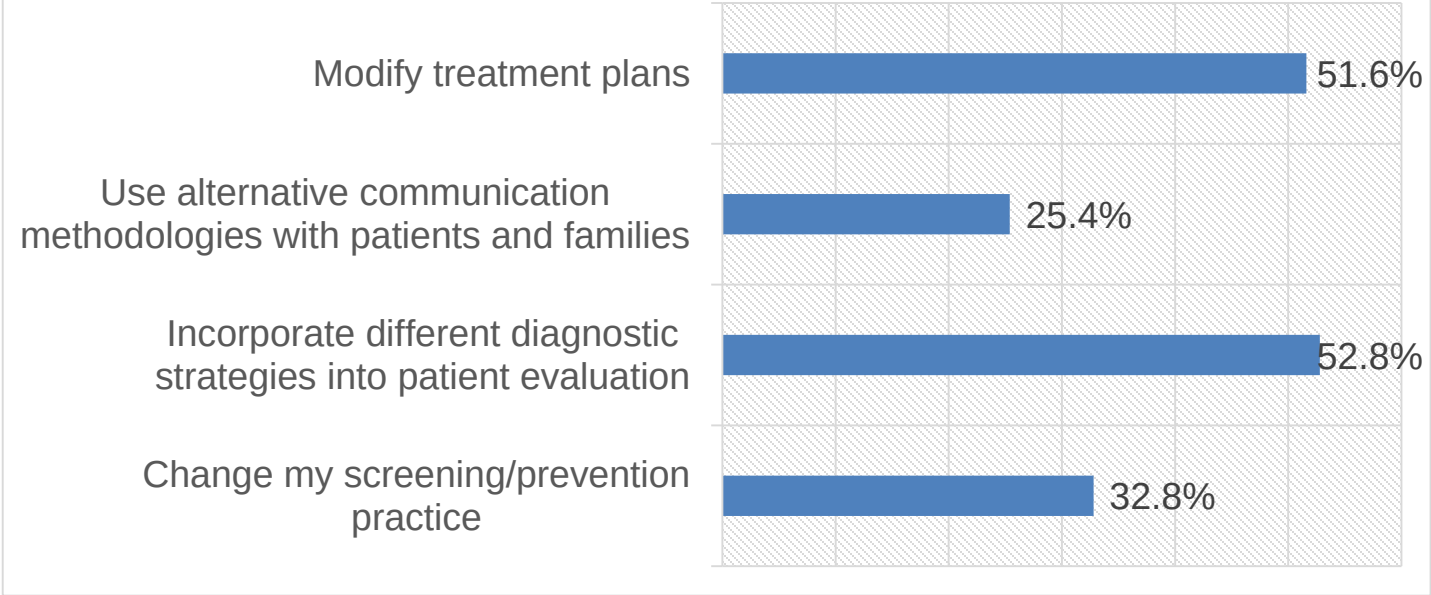
Level 4 Outcomes: Competence **(10) Live Symposia**

91% of participants report that they intend to make changes as a result of this activity. Those changes include:



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N=198

Personalized Medicine in Severe Asthma

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Evaluation **(10) Live Symposia**

- ✓ **91%** of participants reported that they intend to make changes in practice as a result of this activity
- ✓ **99%** of participants reported that the content presented was evidence-based and clinically relevant
- ✓ **90%** of participants reported that the activity addresses strategies for overcoming barriers to optimal patient care

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Personalized Medicine in Severe Asthma

Final Report

Feedback **(10) Live Symposia**

Key Lessons Learned

- Targets for different biologics
- Workup of refractory asthma
- Biologic medication management
- Importance of biomarkers in asthma diagnosis/management
- Treatment of refractory asthma
- New IL5 agents
- The changing paradigm for classifying asthma
- Looking at phenotypes and endotypes of asthma

Needs for Additional Education

- GERD
- Spirometry technique
- TB and other lung infections
- COPD
- Use of biological agents in children
- Asthma phenotypes
- Pediatric asthma
- The biological marker

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What Attendees are Saying

"I enjoyed the conference very much, the staff was friendly and efficient with registration, the venue was great and the speaker was knowledgeable."

"It was a well balanced and informative presentation."

"Best presentation I have attended this year."

Personalized Medicine in Severe Asthma

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Level 5 Outcomes: Self-Reported Performance **(10) Live Symposia**

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80% report that **one or more of their patients have already benefited** from the information learned in the educational activity

The **top two changes** respondents have made or intend to make (for those that had not seen any patients in that target therapeutic area within the 45-day time period) are:

- ✓ Change my screening/prevention practice (42%)
- ✓ Modify treatment plans (54%)

Personalized Medicine in Severe Asthma

Final Report

ARS Group Questions **(10) Live Symposia**

One unique aspect of this program are the interactive group polling questions via audience response system (ARS), interspersed strategically in the presentation to segue into an important topic. The questions are asked of the entire group, however, each table of participants must discuss and select an answer together as a group using one ARS key pad instead of providing individual answers. Once the results show on the screen, the presenter provides rationale for the correct answer and can address as thoroughly as needed depending on the answers provided.

ARS Question 1

Based on this clip, how would you classify the patient's asthma using ERP-3 criteria from the most recent NHLBI guidelines published in 2007?

A. Mild intermittent
B. Mild persistent
C. Moderate persistent
D. Severe persistent

ARS Question 2

Based on what you know of our patient, which endotype or phenotype would best characterize our patient?

A. Late-onset asthma
B. Th2 high
C. Th2 low
D. Neutrophilic asthma

ARS Question 3

What is the next best step for the patient in our video?

A. Omalizumab
B. Mepolizumab
C. Bronchial thermoplasty
D. Reslizumab
E. Continue current therapy and reassess in 8 weeks

**This question does not have just one answer and was used as a pool question to promote discussion amongst the audience.*

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*The ARS system did not capture the Tampa data. However, the ARS questions were still asked; the presenter had each table raise their hands to respond to the questions as opposed to using the ARS keypads, encouraging participation and engagement .

Personalized Medicine in Severe Asthma

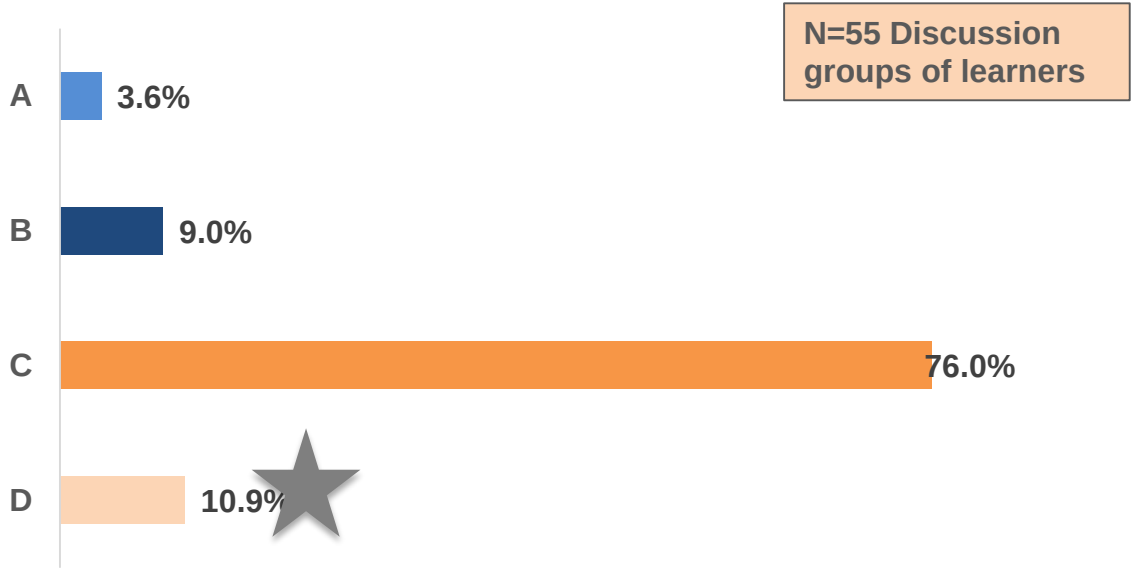
Final Report

ARS Group Question 1 **(10) Live Symposia**

ARS Question 1

Based on this clip, how would you classify the patient's asthma using ERP-3 criteria from the most recent NHLBI guidelines published in 2007?

A. Mild intermittent
B. Mild persistent
C. Moderate persistent
D. Severe persistent ★



**Due to the low correct response rate, the presenters have made sure to cover this question thoroughly immediately following the responses to address the demonstrated gap. At the direction of the faculty, we added a slide after each of the ARS questions that helps facilitate the table discussion further before they select their answer as a group.*

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Personalized Medicine in Severe Asthma

Final Report

ARS Group Question 2 **(10) Live Symposia**

ARS Question 2

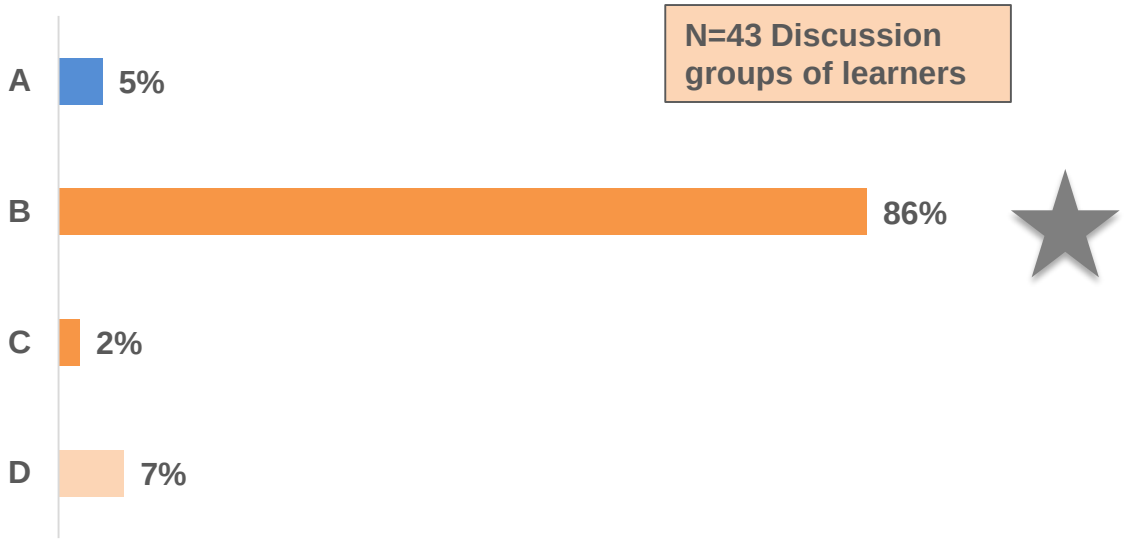
Based on what you know of our patient, which endotype or phenotype would best characterize our patient?

A. Late-onset asthma

B. Th2 high

C. Th2 low

D. Neutrophilic asthma



**The majority of attendees answered this question correctly (B); therefore, the presenters were able to go more in depth on the topic as the baseline knowledge was higher. At the direction of the faculty, we added a slide after each of the ARS questions that helps facilitate the table discussion further before they select their answer as a group.*

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Personalized Medicine in Severe Asthma

Final Report

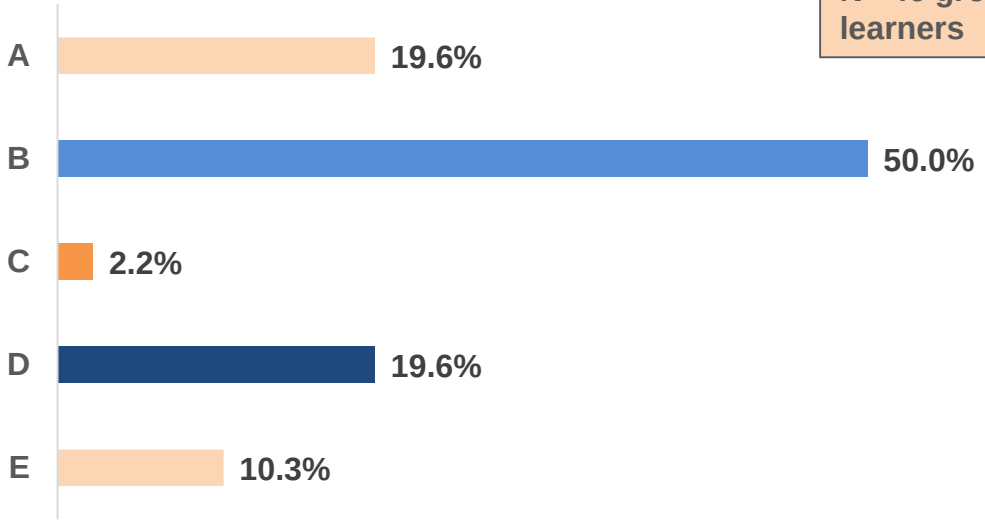
ARS Group Question 3 **(10) Live Symposia**

ARS Question 3

What is the next best step for the patient in our video?

A. Omalizumab
B. Mepolizumab
C. Bronchial thermoplasty
D. Reslizumab
E. Continue current therapy and reassess in 8 weeks

N= 46 groups of learners



**This question does not have a "right" answer. It was used to spark discussion amongst the audience. At the direction of the faculty, we added a slide after each of the ARS questions that helps facilitate the table discussion further before they select their answer as a group.*

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Online Activity

Final Outcomes Report

Launched June 2, 2017

National Jewish Health®

Personalized Medicine in Severe Asthma

Applying Emerging Data and Treatments to Everyday Clinical Practice

36880883	Personalized Medicine in Severe Asthma; Applying Emerging Data and Treatments to Everyday Clinical Practice

Educational Objectives

1. Describe key concepts in the pathophysiology of severe asthma.
2. Analyze recent clinical data of current and emerging targeted therapies and potential biomarkers for severe asthma.
3. Select personalized treatment approaches for severe asthma best suited to various phenotypes and endotypes.

Intended Audience: Pulmonologists, Allergists, Primary Care Physicians and other health care professionals who treat patients with severe asthma.	**Anticipated Reach:** 1,100 completers and 4,800 learners	**Modality/# Activities:** Online enduring activity featuring 3 modules
Program Locations: N/A	**Dates (Enduring Activity):** June 2, 2017 – June 2, 2018	**Relevant Links:** https://severeasthmapm.njhealtheducation.org/
Outcomes Levels: Level 1, Level 2, Level 3, Level 4	**Outcomes Planning:** Pre-test and post-test; program evaluation	

Summary: The online portion of this educational initiative encompasses three modules featuring expert speakers and interactive polling and feedback, as well as a clinical reference aid and downloadable resources to help improve the knowledge and competence of pulmonologists, allergists and primary care physicians in the diagnosis, management, and treatment of severe asthma.

Personalized Medicine in Severe Asthma

Final Report – **Online Enduring Program – (3) Modules**

Background

Background:

The online portion of this educational initiative encompasses three interactive modules featuring expert speakers in severe asthma. The goal of this program is to improve the knowledge and competence of pulmonologists, allergists and primary care physicians, as well as physician assistants and nurse practitioners in the diagnosis, management, and treatment of severe asthma.

Learning Objectives:

1. Describe key concepts in the pathophysiology of severe asthma.
2. Analyze recent clinical data of current and emerging targeted therapies and potential biomarkers for severe asthma.
3. Select personalized treatment approaches for severe asthma best suited to various phenotypes and endotypes.

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Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

Accreditation, Audience and Outcomes Strategy

Accreditation Details: In support of improving patient care, NJH is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians. NJH is also accredited by the Accreditation Council for Pharmacy Education (ACPE) and the California Board of Registered Nursing (CBRN) to provide continuing education for the healthcare team. ***NJH has designated the online program for a maximum of 1.75 AMA PRA Category 1 Credits™.***

Target Audience: Primary Care Physicians, Community Pulmonologists and Allergists are the primary target audience. Allied health professionals involved in the management of severe asthma are the secondary target audience.

Educational Outcomes Strategy: Outcomes will be measured via participation totals, specialty, designation, pre-test, post-test, interactive polling questions, and evaluations. The metrics will demonstrate participation, satisfaction, learning, engagement and change in knowledge, and competency to achieve Moore's Level 4 outcomes.

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Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

Online Metrics Summary

Online Metrics

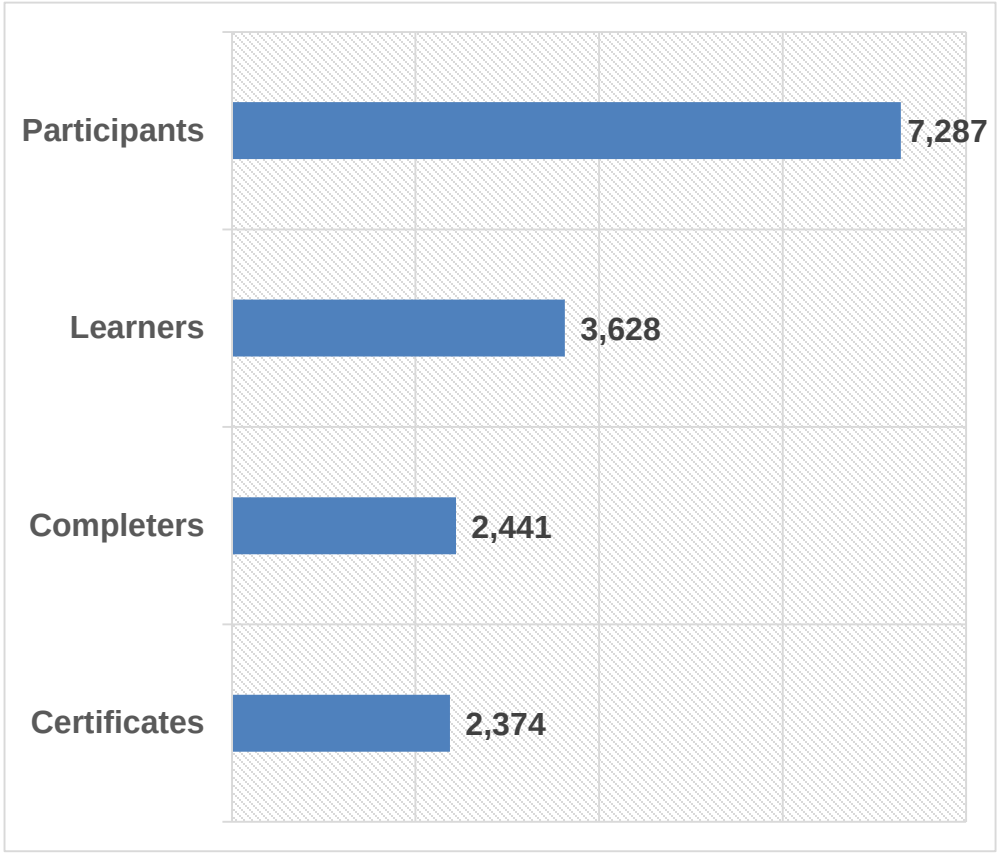
Completers: **2,441**

- 37% MD/DO
- 22% NP/PA

Total Learners: 3,628

Total Participants: 7,287

Total Certificates: 2,374



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Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

Module Dashboard

***Asthma: Symptoms to Pathophysiology* (Module 1):**

✓ Completers: 1,195

Total Learners: 1,929

Total Certificates: 1,162

Completion Rate: 62%

Module 1: Pathophysiology

CME Credit: .50

Learn about the key concepts in the pathophysiology of severe asthma.

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***Data as of 6/28/18**

Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

Module Dashboard

***Current and Emerging Asthma Therapies* (Module 2):**

✓ Completers: 799

Total Learners: 1,077

Total Certificates: 780

Completion Rate: 74%

Module 2: Current and Emerging Asthma Therapies

CME Credit: .50

Learn about recent clinical data of current and emerging therapies and potential biomarkers for severe asthma.

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***Data as of 6/28/18**

Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

Module Dashboard

***Roundtable Discussion on Personalized Treatment Approaches* (Module 3)**

✓ Completers: 447

Total Learners: 622

Total Certificates: 432

Completion Rate: 72%

Module 3: Roundtable Discussion on Personalized Treatment Approaches

CME Credit: .75

We pull together information from the first two modules using a multidisciplinary roundtable discussion with key opinion leaders.

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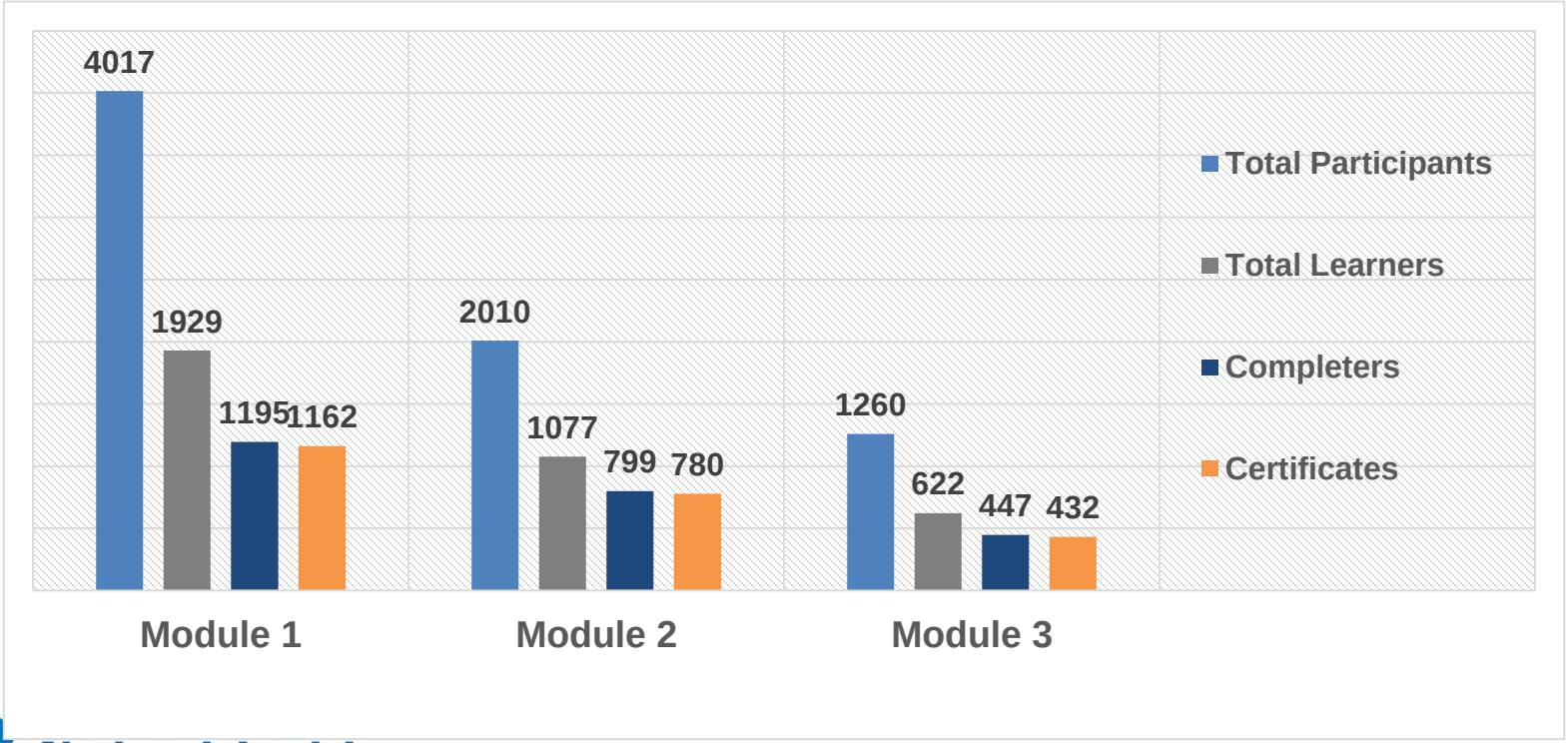
***Data as of 6/28/18**

Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

Participation Breakdown



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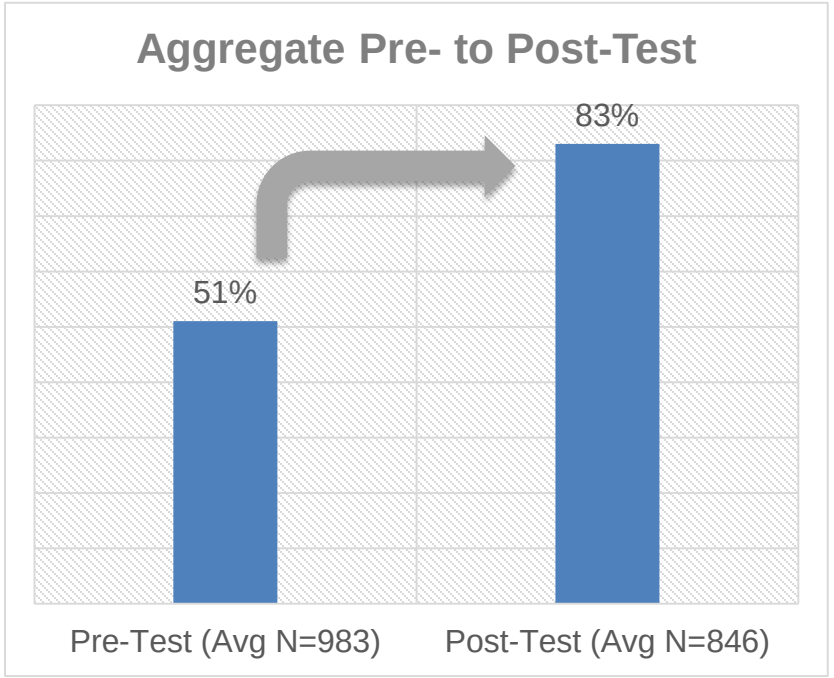
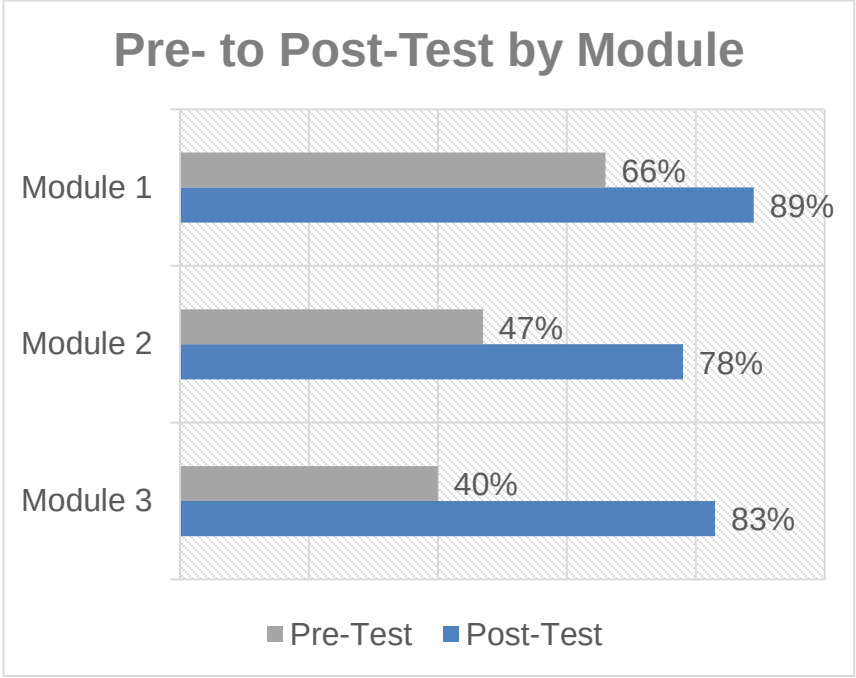
*Data as of 6/28/18

Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

Pre to Post-Test





Gain in Knowledge

Participants demonstrated a **63% relative gain in knowledge and competence** as a result of this activity.

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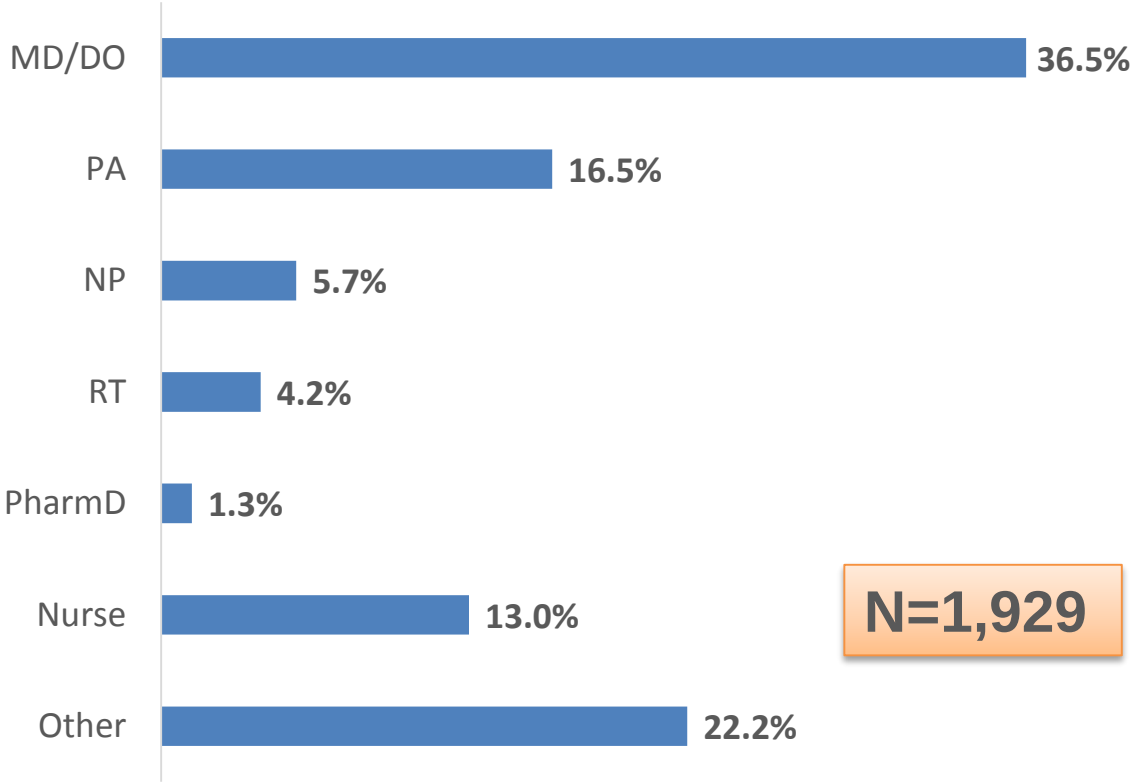
Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

Asthma: Symptoms to Pathophysiology (Module 1): Learners

Module 1 Metrics:
✓ Completed: 1,195
Total Learners: 1,929



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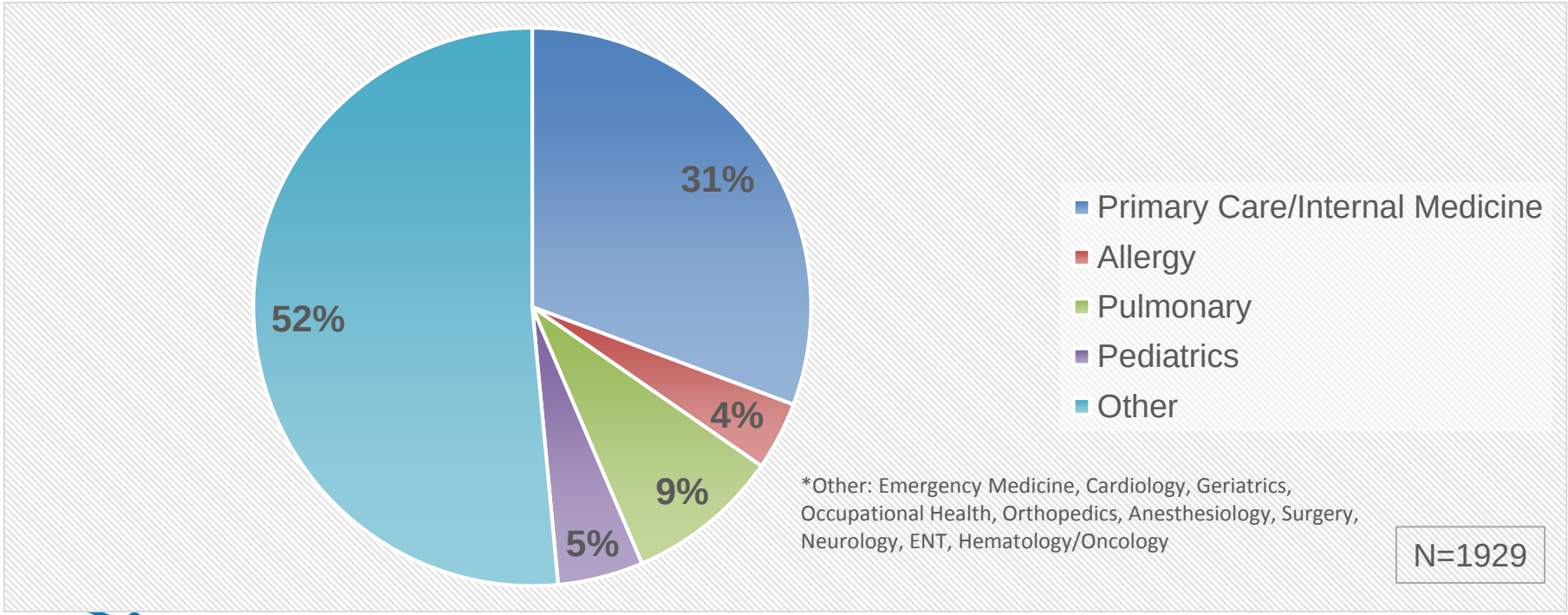
*Other: Researcher, Social Worker/Case Manager, MedTech, Student, Resident, Discharge Planner

Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

Asthma: Symptoms to Pathophysiology (Module 1): Learners



*Other: Emergency Medicine, Cardiology, Geriatrics, Occupational Health, Orthopedics, Anesthesiology, Surgery, Neurology, ENT, Hematology/Oncology

N=1929

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Personalized Medicine in Severe Asthma

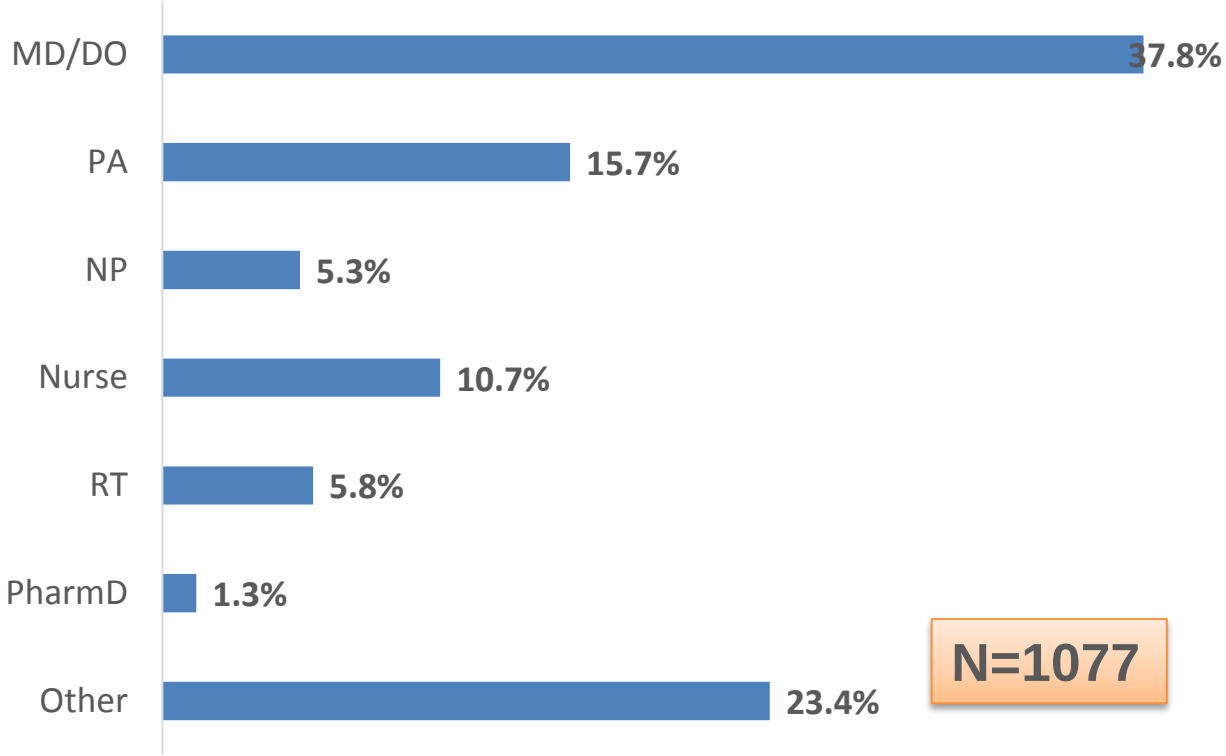
Final Report - **Online Enduring Program – (3) Modules**

Current and Emerging Asthma Therapies (Module 2): Learners

Module 2 Metrics:

✓ Completed: 799

Total Learners: 1,077



*Other: Social Worker/Case Manager, MedTech, Student, Resident, Health Care Administrator

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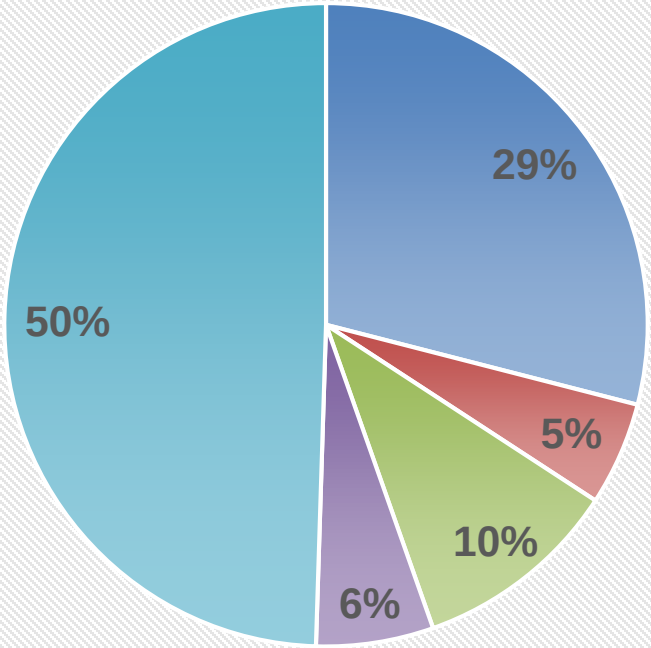
Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

Current and Emerging Asthma Therapies (Module 2): Learners



*Other: Emergency Medicine, ENT, Occupational Health, Cardiology, Surgery, Anesthesiology, Cardiopulmonary Rehab, Critical Care, Radiology

N=1077

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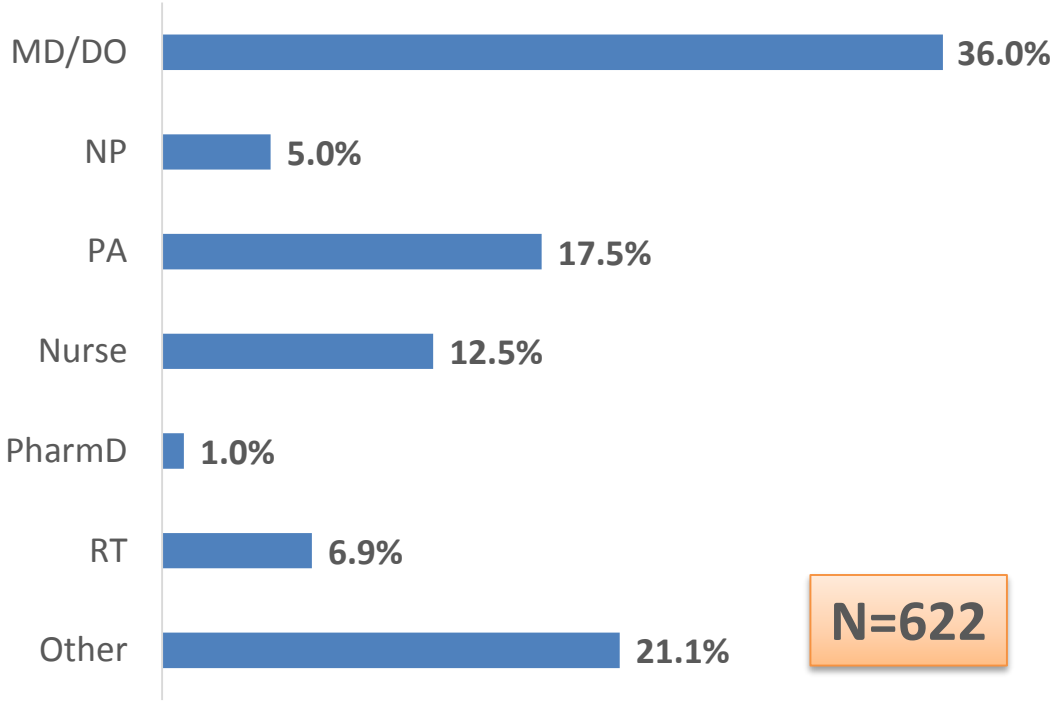
Module 3 Metrics:
✓ Completed: 447
Total Learners: 622



*Other: PT, Technologist, Student, Resident, Faculty/Educator

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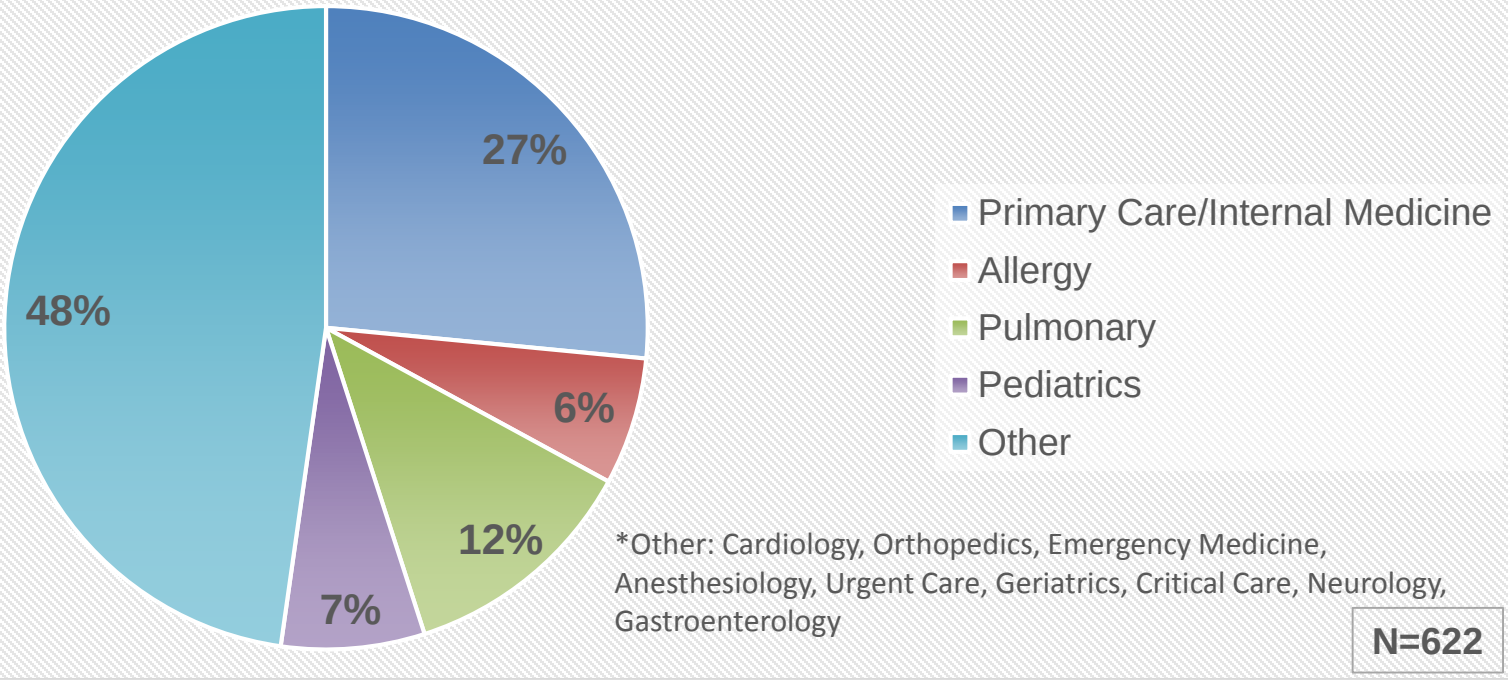

*Other: Cardiology, Orthopedics, Emergency Medicine, Anesthesiology, Urgent Care, Geriatrics, Critical Care, Neurology, Gastroenterology

N=622

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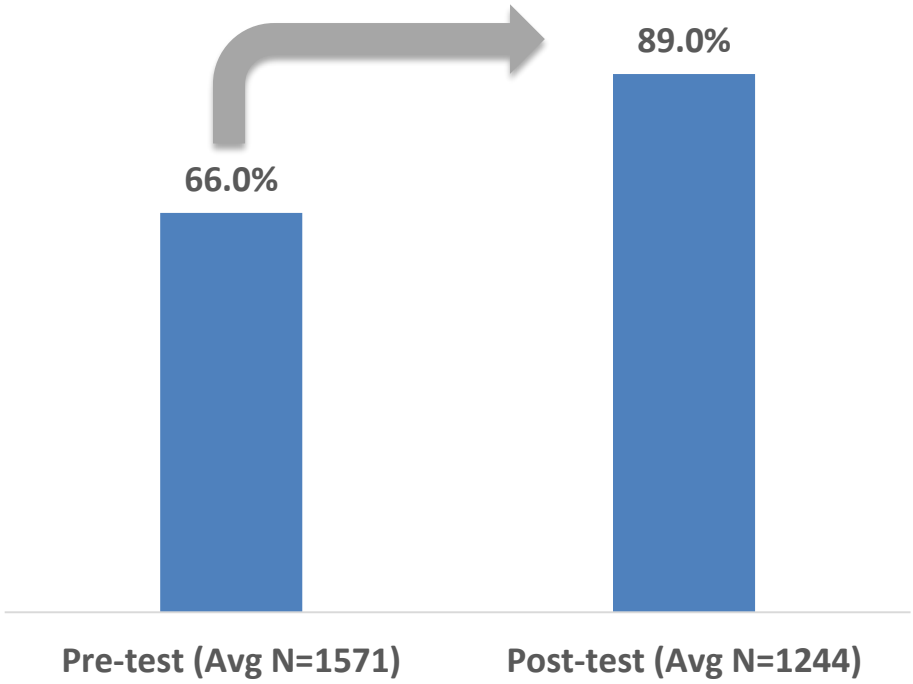
Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

Asthma: Symptoms to Pathophysiology (Module 1): Pre to Post-Test

Module 1

Participants demonstrated a **35% increase in knowledge and competence** from pre-test to post-test.



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Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

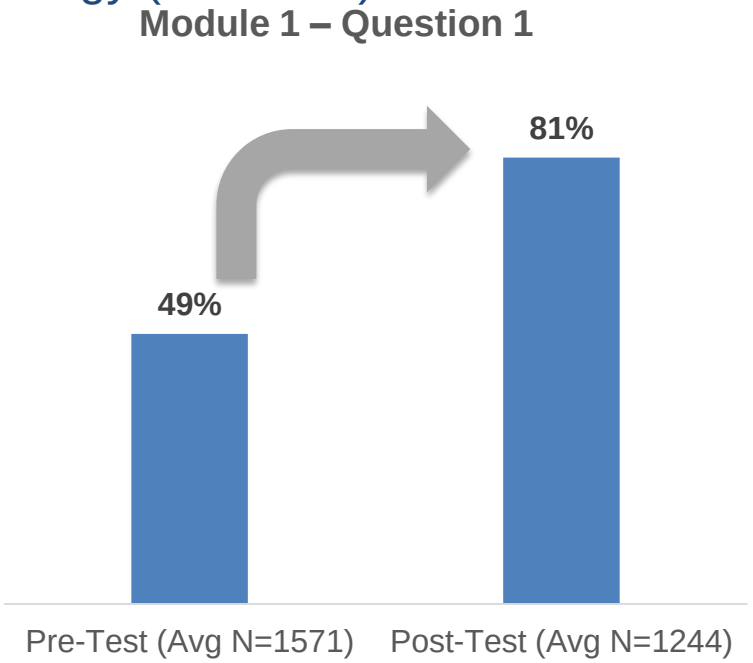
Asthma: Symptoms to Pathophysiology (Module 1): Pre to Post-Test

Module 1 Question 1

Participants demonstrated a **65% relative gain in knowledge and competence** from pre-test to post-test.

Diagnosis of asthma requires which of the following?

A. History of symptoms consistent with intermittent airway obstruction
B. Physiologic testing confirming airway hyperresponsiveness or a response to bronchodilator
C. Peripheral eosinophilia
D. A and B
E. A, B, and C



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Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

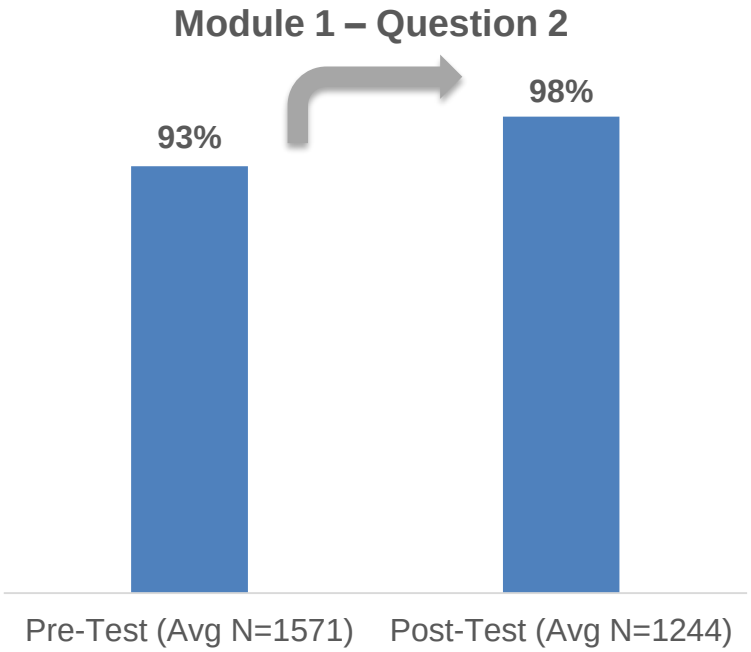
Asthma: Symptoms to Pathophysiology (Module 1): Pre to Post-Test

Module 1 Question 2

Participants demonstrated a **5% relative gain in knowledge and competence** from pre-test to post-test.

2. All patients with asthma have evidence of allergy based on history or lab testing

1) True
2) **False**



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Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

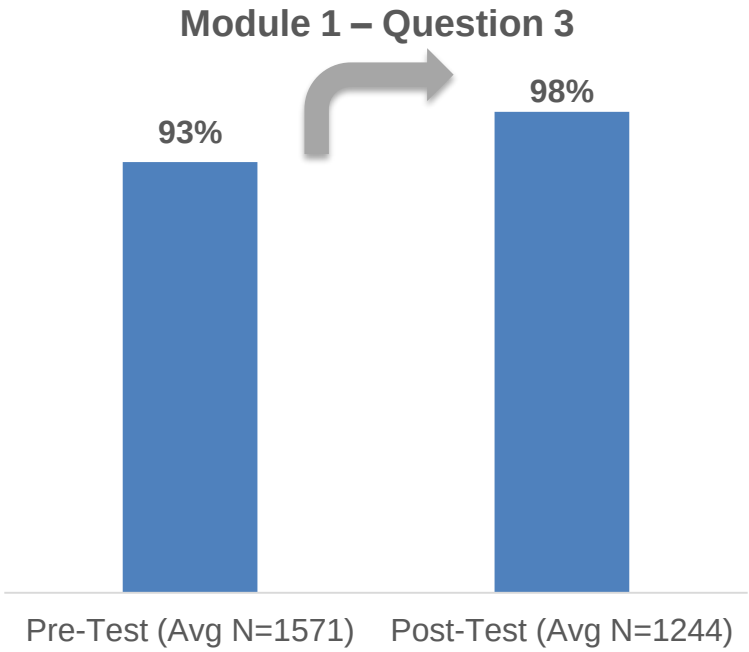
Asthma: Symptoms to Pathophysiology (Module 1): Pre to Post-Test

Module 1 Question 3

Participants demonstrated a **5% relative gain in knowledge and competence** from pre-test to post-test.

3. Which Of The Following Comorbid Conditions Can Make Asthma More Difficult To Treat?

A. Esophageal Reflux
B. Sinusitis
C. Allergic bronchopulmonary aspergillosis
D. A and C
E. All of the above



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Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

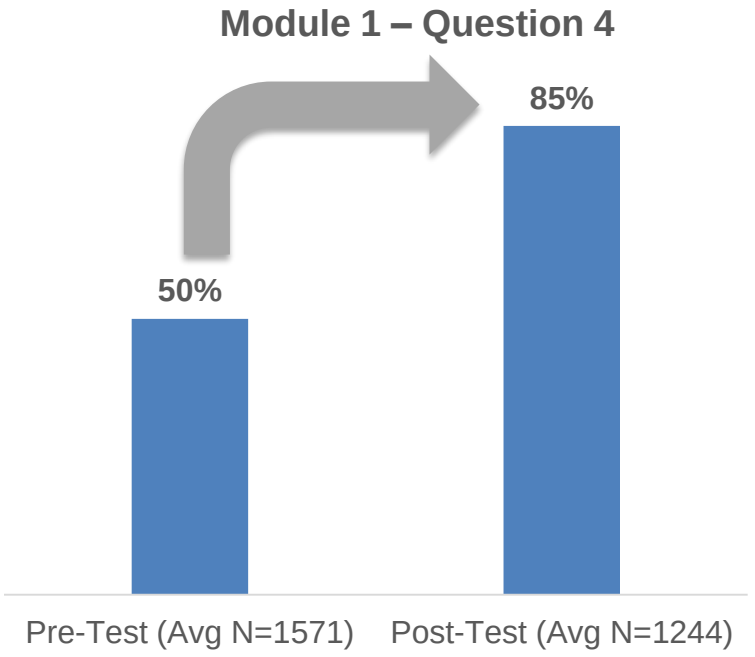
Asthma: Symptoms to Pathophysiology (Module 1): Pre to Post-Test

Module 1 Question 4

Participants demonstrated a **70% relative gain in knowledge and competence** from pre-test to post-test.

4. Airway abnormalities in asthma can include:

A. Increased mucus secretion
B. Thickening of the basement membrane in airways
C. Reduced number and size of airway smooth muscle cells causing “floppy airways”
D. All of the above
E. A and B



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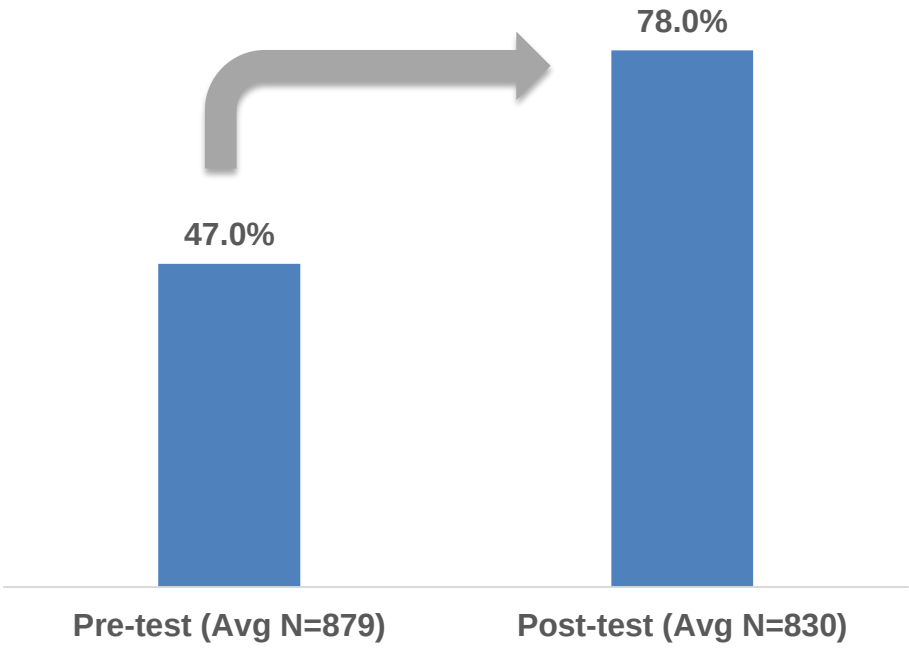
Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

Current and Emerging Asthma Therapies (Module 2): Pre to Post-Test

Module 2

Participants demonstrated a **66% relative increase in knowledge and competence** from pre-test to post-test.



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Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

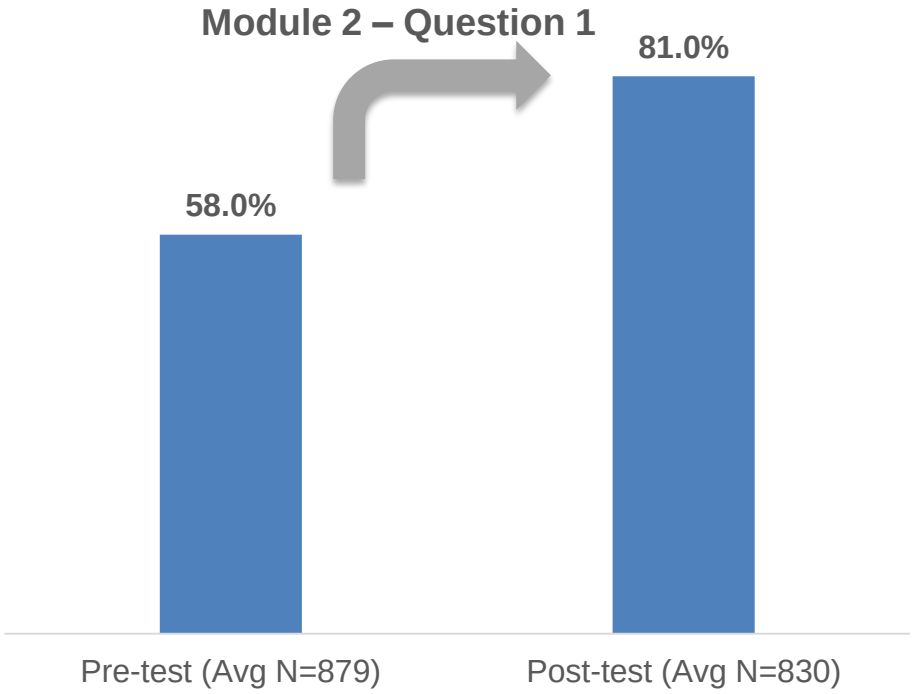
Current and Emerging Asthma Therapies (Module 2): Pre to Post-Test

Module 2 Question 1

Participants demonstrated a **40% relative gain in knowledge and competence** from pre-test to post-test.

1. Which of the following describes an asthma endotype?

A. Asthma in the elderly
B. Obese asthma
C. IL-5 mediated asthma
D. Nocturnal asthma
E. Occupational asthma



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Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

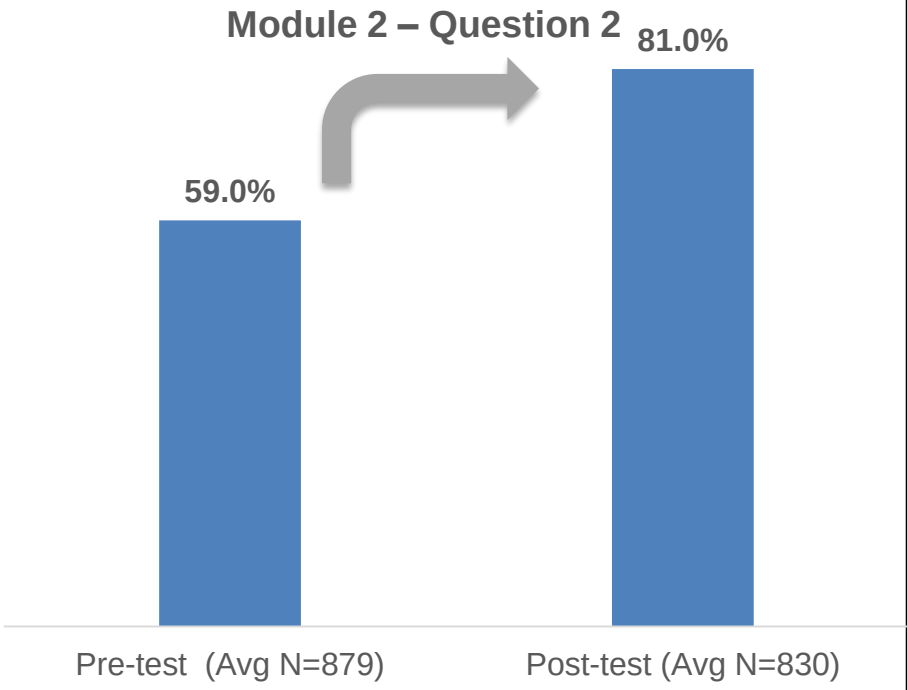
Current and Emerging Asthma Therapies (Module 2): Pre to Post-Test

Module 2 Question 2

Participants demonstrated a **37% relative gain in knowledge and competence** from pre-test to post-test.

2. Which of the following is NOT a FDA approved biologic agent?

A. Omalizumab
B. Mepolizumab
C. Dupilumab
D. Reslizumab
E. Tralokinumab



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Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

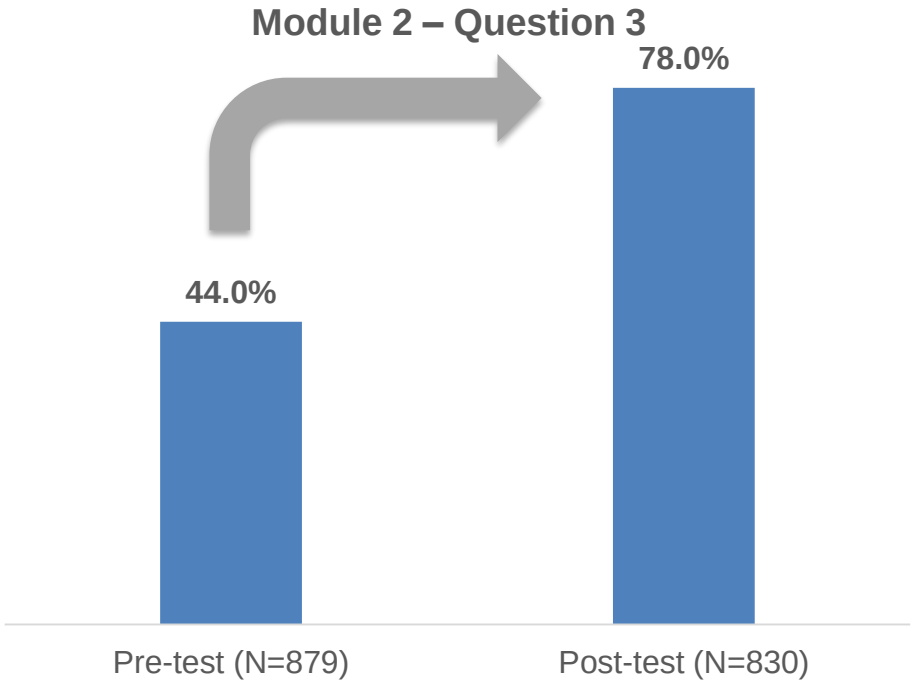
Current and Emerging Asthma Therapies (Module 2): Pre to Post-Test

Module 2 Question 3

Participants demonstrated a **77% relative gain in knowledge and competence** from pre-test to post-test.

3. Which of the following monoclonal antibody targets is incorrect?

A. Tralokinumab IL17
B. Mepolizumab IL5
C. Dupilumab IL4/13
D. Reslizumab IL5
E. Benralizumab IL5R
F. Omalizumab IgE



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Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

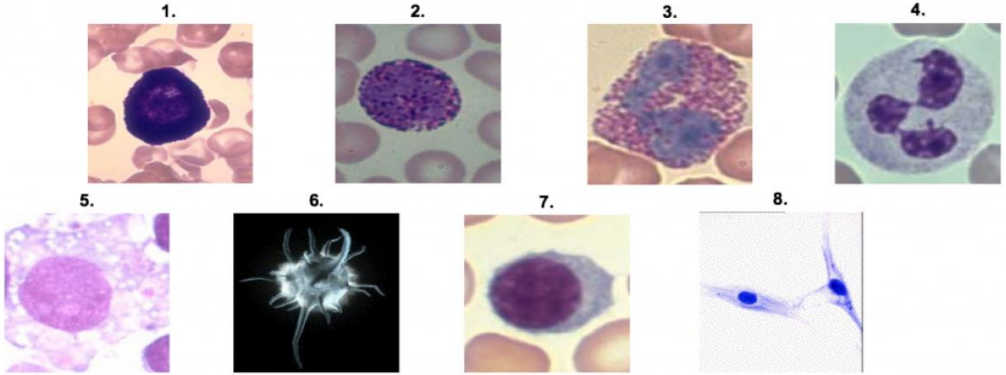
Current and Emerging Asthma Therapies (Module 2): Pre to Post-Test

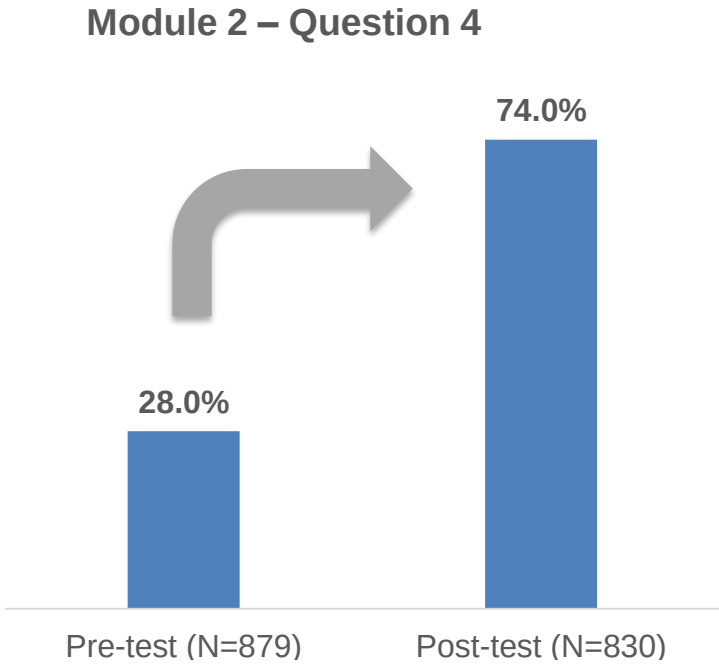
Module 2 Question 4

Participants demonstrated a **164% relative gain in knowledge and competence** from pre-test to post-test.

4. Which of the following is an eosinophil:

1)	Image #1	5)	Image #5
2)	Image #2	6)	Image #6
3)	**Image #3**	7)	Image #7
4)	Image #4	8)	Image #8





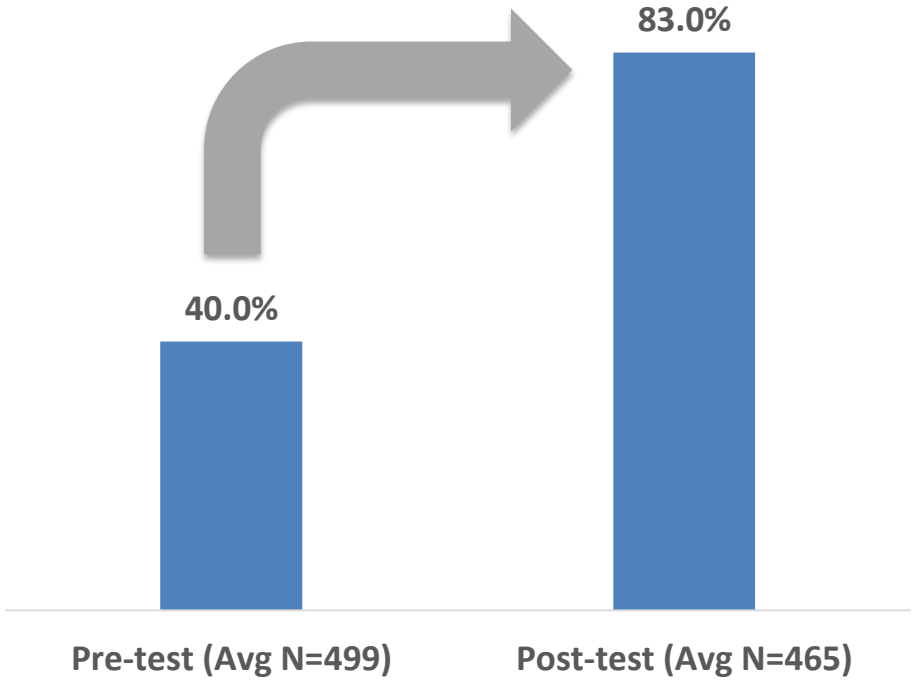
Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

Roundtable Discussion on Personalized Treatment Approaches (Module 3): Pre to Post-Test

Module 3

Participants demonstrated a **107% relative increase in knowledge and competence** from pre-test to post-test.



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Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

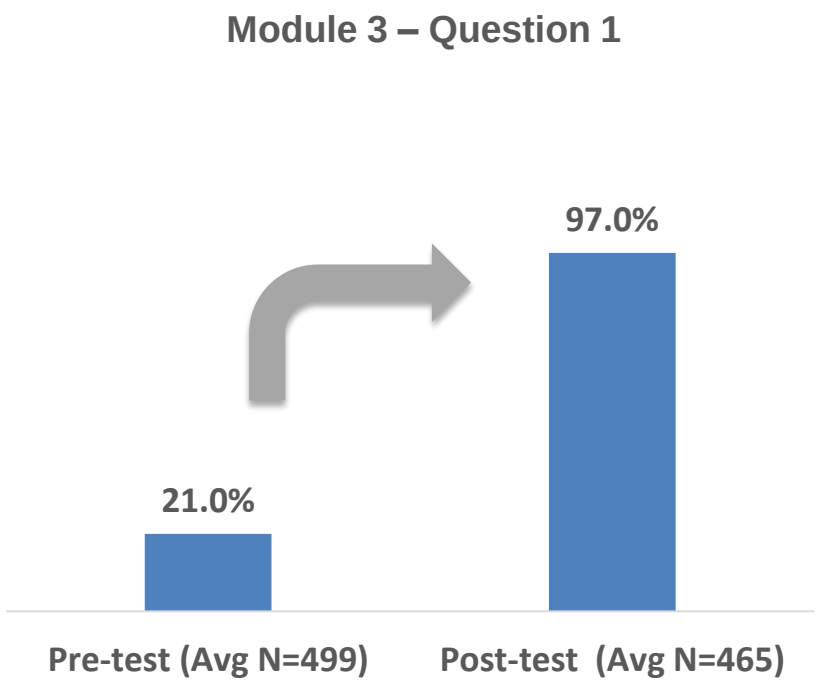
Roundtable Discussion on Personalized Treatment Approaches (Module 3): Pre to Post-Test

Module 3 Question 1

Participants demonstrated a **362% relative gain in knowledge and competence** from pre-test to post-test.

1) How Would You Classify The Patient's Asthma Using EPR-3?

A. Mild Intermittent
B. Mild Persistent
C. Moderate Persistent
D. Severe Persistent



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Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

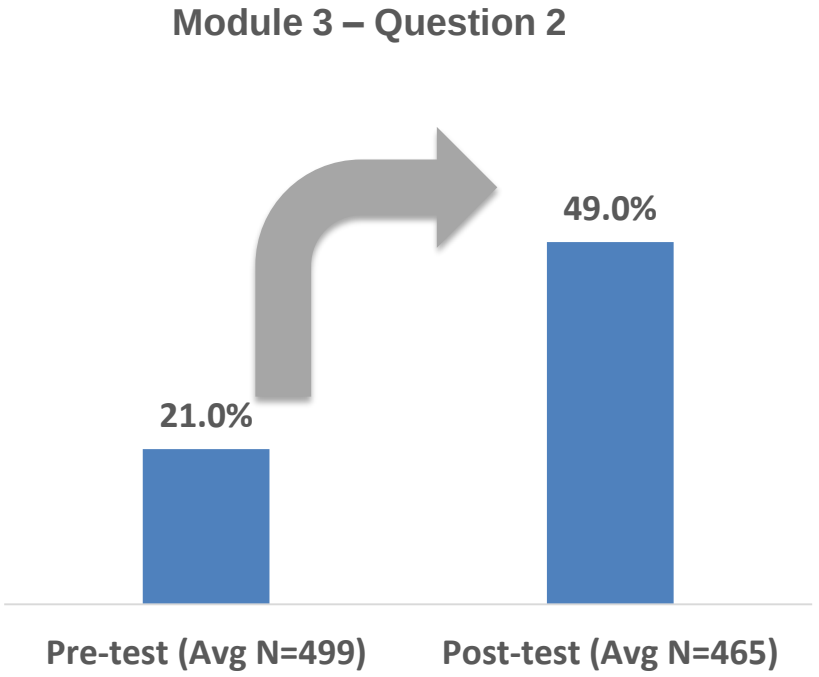
Roundtable Discussion on Personalized Treatment Approaches (Module 3): Pre to Post-Test

Module 3 Question 2

Participants demonstrated a **133% relative gain in knowledge and competence** from pre-test to post-test.

2) Which Of The Following Clinical Criteria Factor Into The "Risk" Aspect Of Classifying Asthma Control?

A. Asthma Control Test (ACT) score
B. Number of prednisone bursts in the past year
C. Frequency of nighttime awakenings
D. Frequency of albuterol use
E. Assessment of lung function (%predicted FEV1 or %personal best peak flow)



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Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

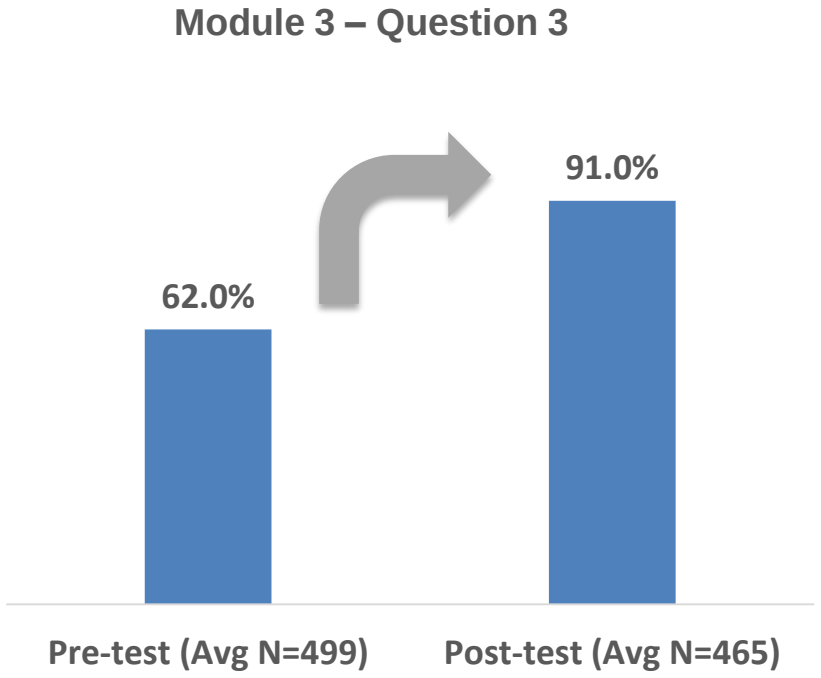
Roundtable Discussion on Personalized Treatment Approaches (Module 3): Pre to Post-Test

Module 3 Question 3

Participants demonstrated a **47% relative gain in knowledge and competence** from pre-test to post-test.

3) Which Of The Following Blood Tests Is A Commercially Available Biomarker That Is Helpful In Determining Asthma Phenotype/Endotype?

A. Absolute lymphocyte count
B. Periostin level
C. Total IgE level
D. DPP4 (dipeptidyl peptidase 4)
E. Exhaled nitric oxide



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Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

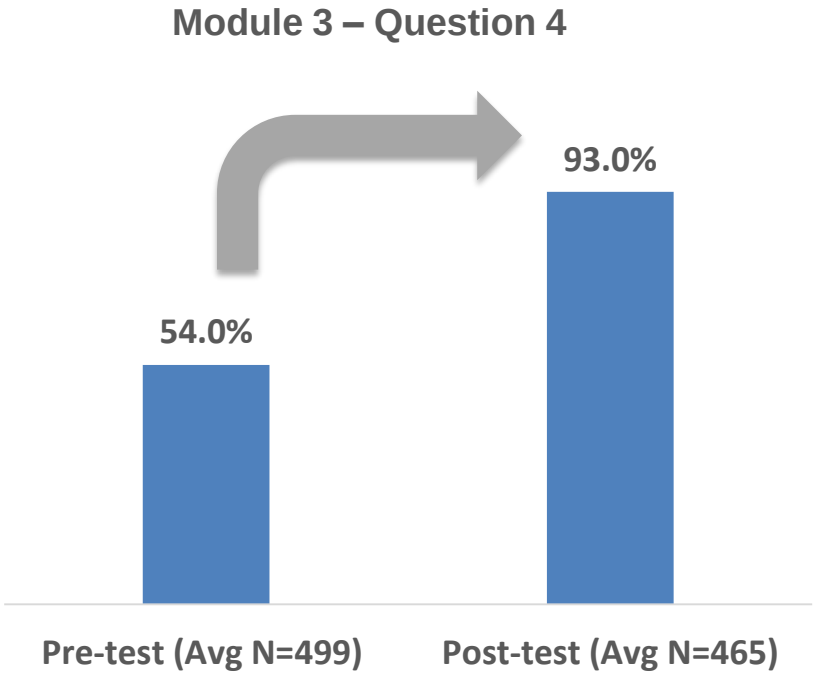
Roundtable Discussion on Personalized Treatment Approaches (Module 3): Pre to Post-Test

Module 3 Question 4

Participants demonstrated a **72% relative gain in knowledge and competence** from pre-test to post-test.

4) Based On What You Know Of Our Patient, Which Endotype Of Phenotype Would Best Characterize Our Patient?

1) Late-onset asthma
2) **Th2 high**
3) Th2 low
4) Neutrophilic asthma



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Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

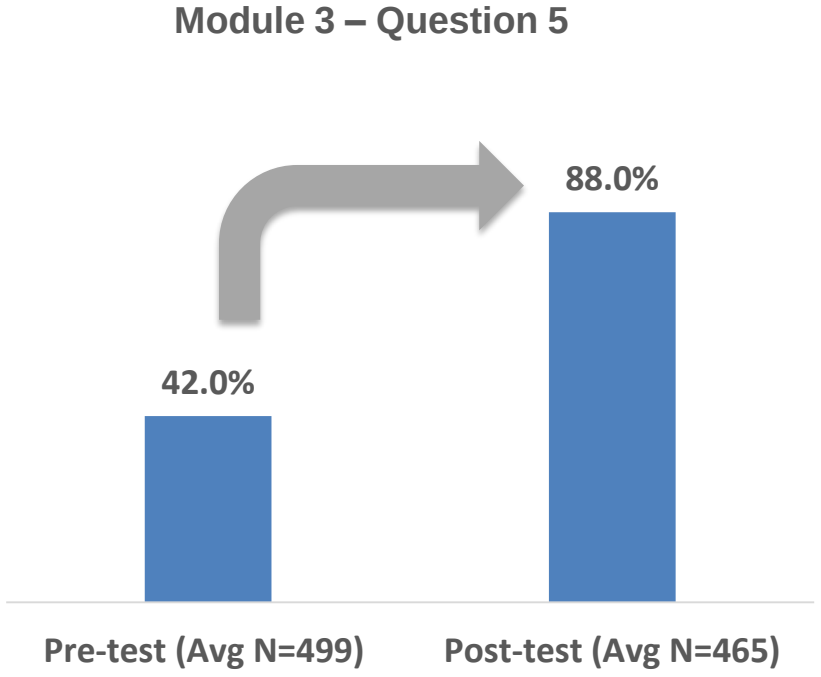
Roundtable Discussion on Personalized Treatment Approaches (Module 3): Pre to Post-Test

Module 3 Question 5

Participants demonstrated a **109% relative gain in knowledge and competence** from pre-test to post-test.

5) Which Of The Following Biologic Agents Are Approved For The Treatment Of Severe Persistent Asthma Characterized As Th2 High?

1) Mepolizumab
2) Lebrikizumab
3) Dupilumab
4) Benralizumab
5) Tralokinumab



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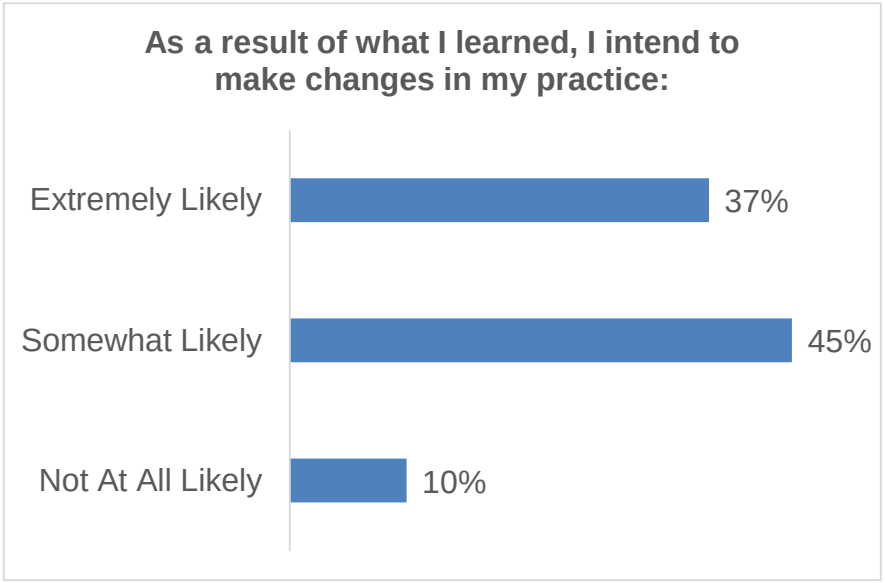
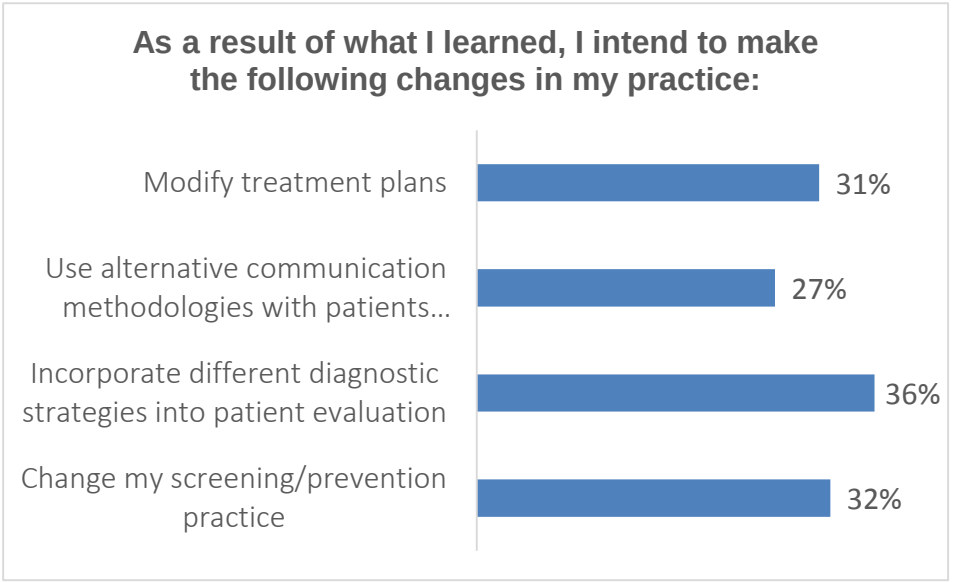
Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

Asthma: Symptoms to Pathophysiology (Module 1) – Online Evaluations





Module 1: 82% of Participants reported that they were somewhat or extremely likely to make a change in their practice (average N= 1107)

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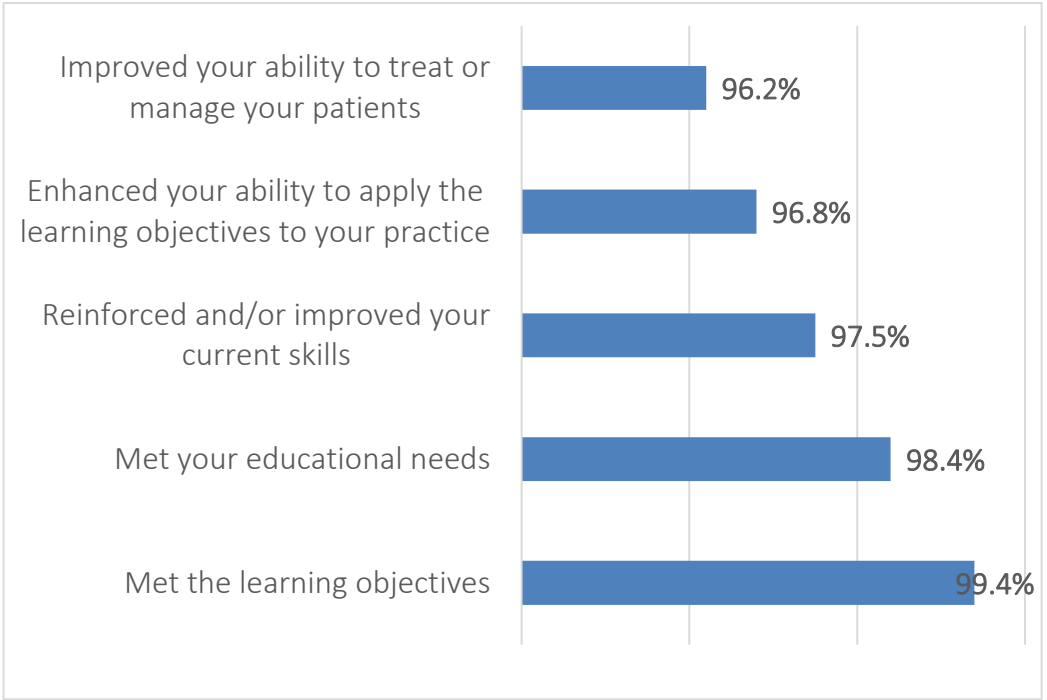
Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

Asthma: Symptoms to Pathophysiology (Module 1) – Online Evaluations

Participants report that the activity was 'Excellent' to 'Good' at:



Average n=1107

Evaluation (Module 1)

- ✓ **99% of participants report the activity was presented without commercial bias**
- ✓ **99% of participants report the activity was evidence-based and clinically relevant**
- ✓ **92% of participants report the activity addressed strategies for overcoming barriers to optimal patient care**

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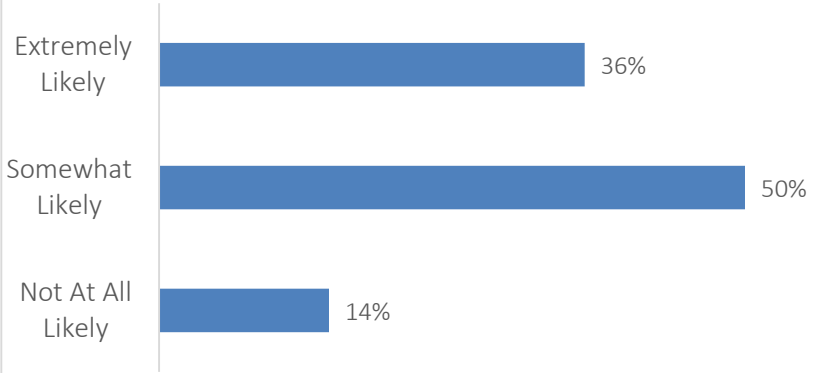
Personalized Medicine in Severe Asthma

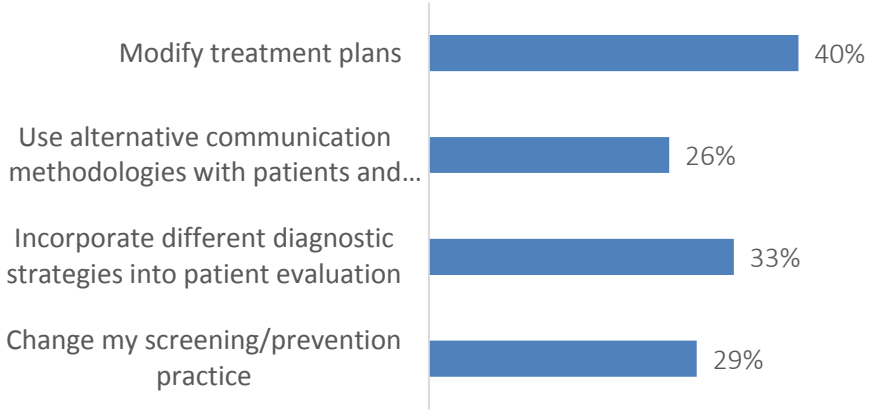
Final Report - **Online Enduring Program – (3) Modules**

Current and Emerging Asthma Therapies (Module 2): Online Evaluations

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



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



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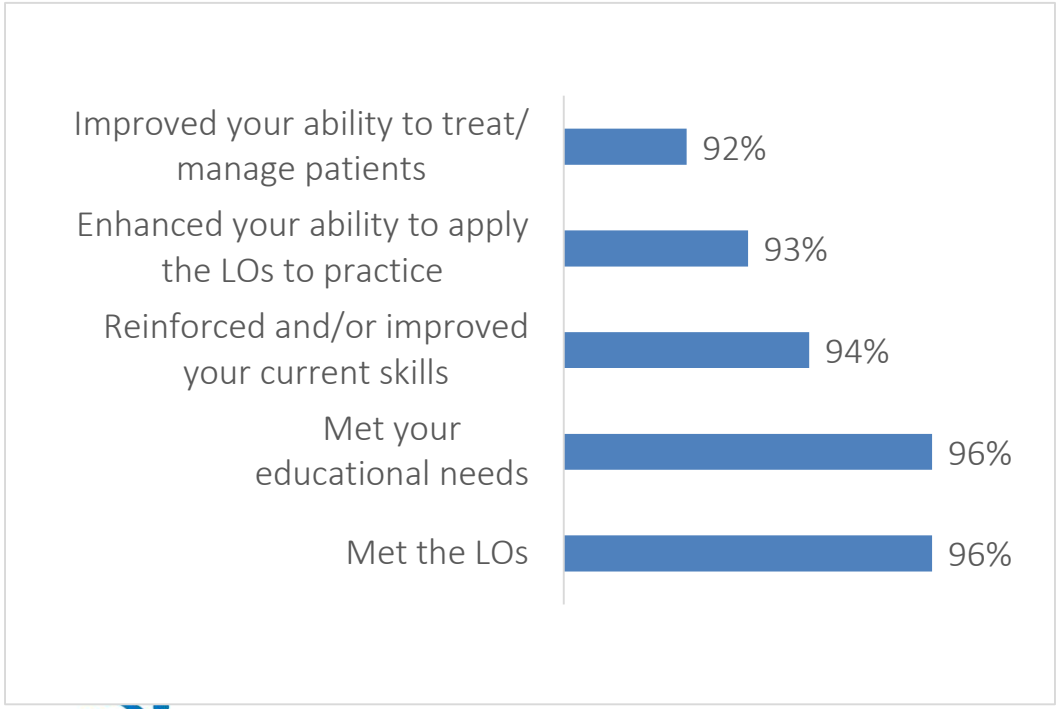
Module 2: 86% of Participants reported that they were somewhat or extremely likely to make a change in their practice (average N=790)

Personalized Medicine in Severe Asthma

Final Report – **Online Enduring Program** – (3) Modules

Current and Emerging Asthma Therapies (Module 2): Online Evaluations

Participants report that the activity was 'Excellent' to 'Good' at:



Average n=790

Evaluation (Module 2)

- ✓ **99% of participants report the activity was presented without commercial bias**
- ✓ **99% of participants report the activity was evidence-based and clinically relevant**
- ✓ **93% of participants report the activity addressed strategies for overcoming barriers to optimal patient care**

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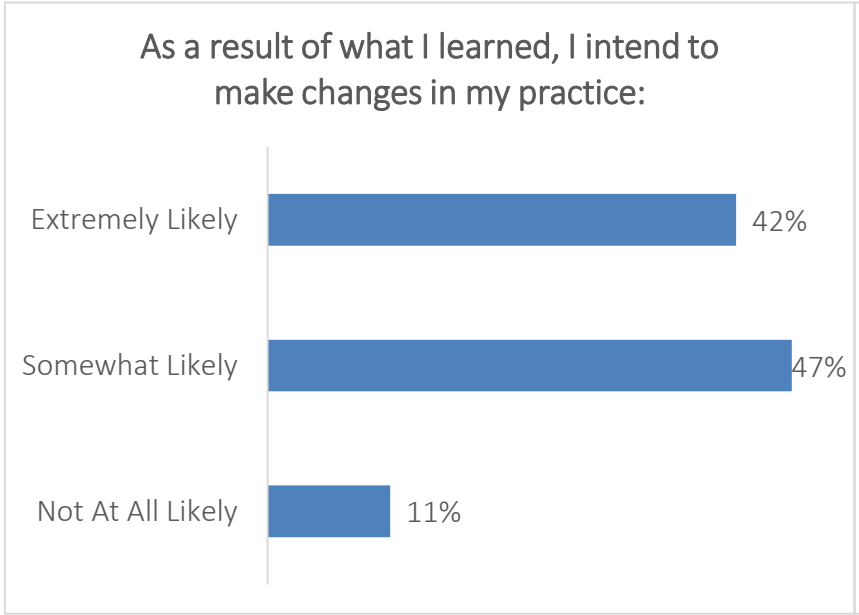
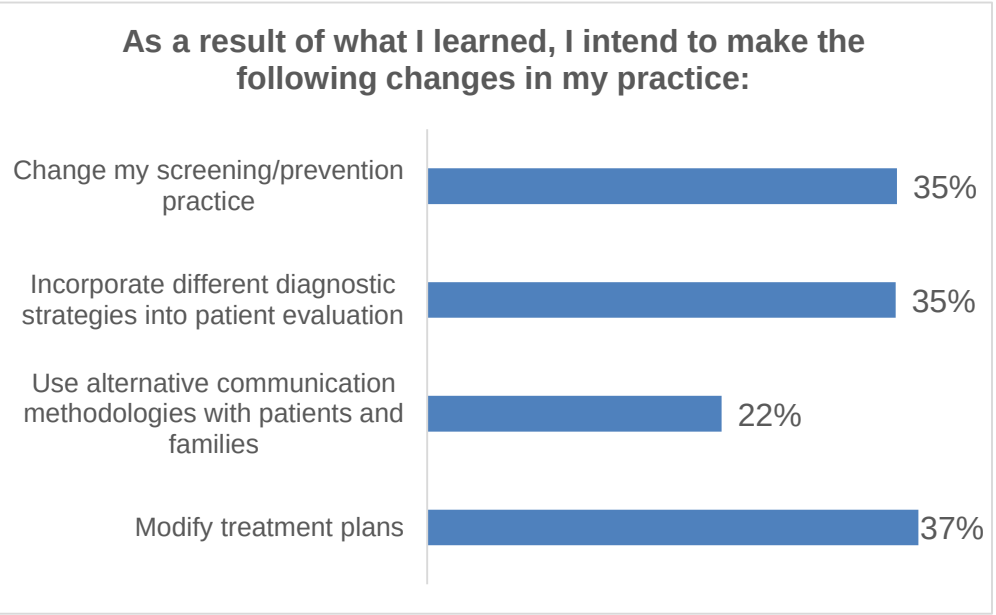
Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

Roundtable Discussion on Personalized Treatment Approaches (Module 3): Online Evaluations





Module 3: 89% of Participants reported that they were somewhat or extremely likely to make a change in their practice (average N= 425)

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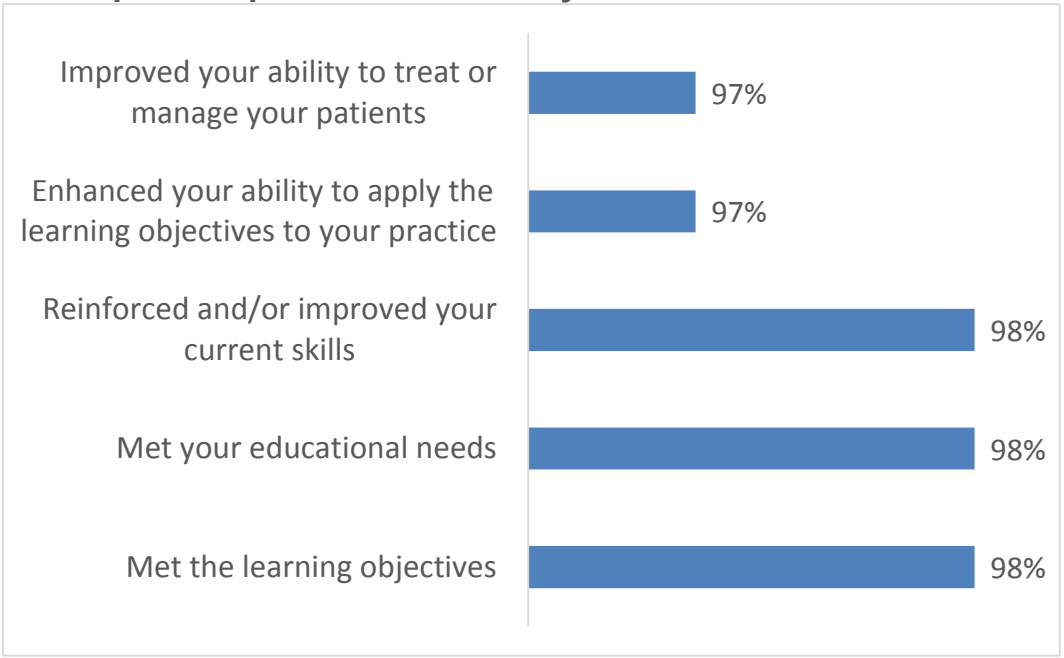
Personalized Medicine in Severe Asthma

Final Report - **Online Enduring Program – (3) Modules**

Roundtable Discussion on Personalized Treatment Approaches (Module 3): Online Evaluations

Participants report that the activity was 'Excellent' to 'Good' at:



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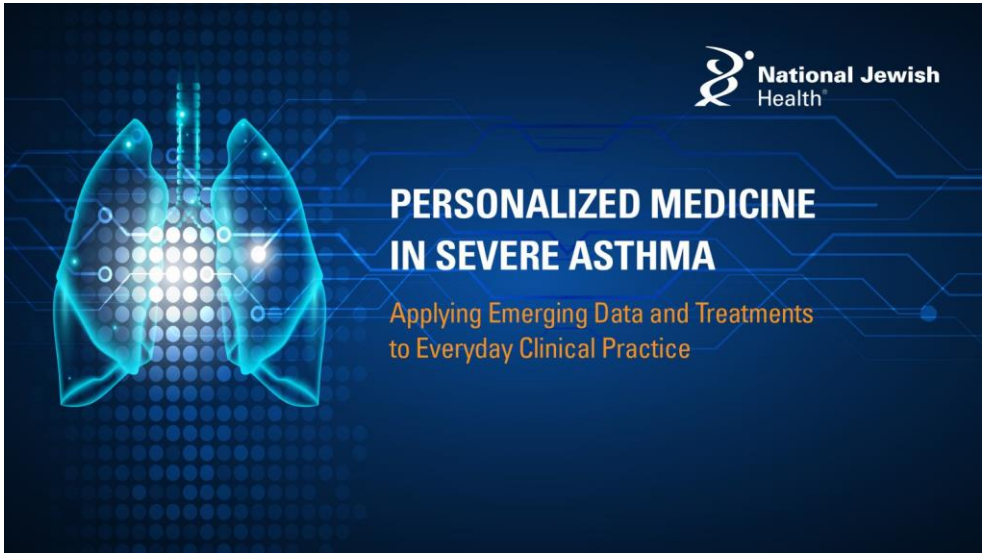
Average N=425

Evaluation (Module 3)

- ✓ **99% of participants report the activity was presented without commercial bias**
- ✓ **99% of participants report the activity was evidence-based and clinically relevant**
- ✓ **96% of participants report the activity addressed strategies for overcoming barriers to optimal patient care**

Thank you for your support of this educational initiative!



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