



Severe Asthma and the Role of the Upper Airway

A Comprehensive Approach to Chronic Inflammatory Airway Diseases

OUTCOMES ANALYZED BY:



Grant ID 91159139 - Final Outcomes Report (March 29, 2024 – March 29, 2025)

Supported by an educational grant from AstraZeneca Pharmaceuticals LP

ACTIVITY OVERVIEW AND OUTCOMES METHODOLOGY

Chronic inflammatory conditions of the upper and lower airways share a complex and interconnected relationship often referred to as the unified airway concept. This activity focused on common underlying inflammatory processes and the way they frequently coexist in affected individuals to support a more comprehensive management approach that addresses both upper and lower airway disease. Led by experts in allergy and pulmonology, this activity featured case discussions, patient perspective videos, a downloadable clinical reference aid, and 3D animation clips to illustrate the pathophysiology of upper and lower airway disease and the relationship between the upper and lower airway.

This program used a mixed methods (quantitative + qualitative) approach to collect outcomes data from Moore’s levels 1 (Participation) to 5 (Performance):

SURVEYS



A pre-post survey provided information on learner demographics, satisfaction with the education, and an assessment on knowledge/competence improvements from pre- to post-education. Additional questions focused on intended practice change and most important take-aways. Overall percentages and mean scores for each question are provided as well as a summative effect size.

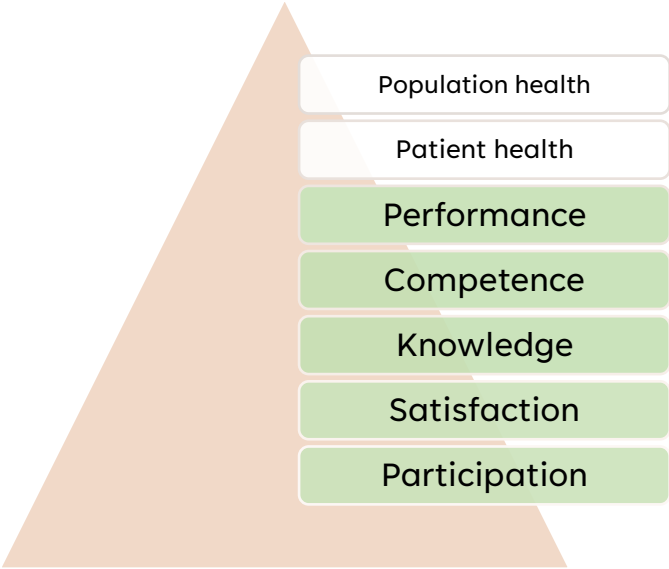
INTERVIEWS



Qualitative interviews were conducted with 10 program participants at least one month following their educational engagement to understand current practices and use of education. These interviews focused on:

- Experience with the education
- Current management approach
- Ongoing barriers to care
- Topics for future initiatives

Quotes from the interviews were coded by theme and interspersed through the outcomes report to provide additional context to the quantitative results.



National Jewish Health designated this enduring material for a maximum of 1.25 AMA PRA Category 1 Credit™.

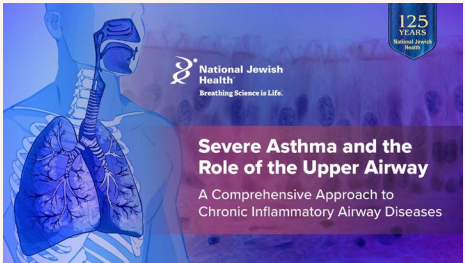


LEARNING OBJECTIVES

- 1 Describe the similarities and differences in the pathophysiology of the upper and lower airway
- 2 Assess the role of epithelial cytokines in the inflammatory pathways in severe asthma and upper airway disease
- 3 Identify appropriate biomarkers to guide treatment selection for severe asthma and upper airway chronic inflammatory disease
- 4 Incorporate an understanding of the impact of comorbid upper airway diseases to personalize treatment strategies for severe asthma

Category	Medscape Definition
Learner	Progressed past front-matter (unique)
Test-taker	Completed at least one question of the pre-test
Completer	Completed activity, post-test and evaluation and claimed credit on Medscape

SEVERE ASTHMA AND THE ROLE OF THE UPPER AIRWAY



Hosted on Medscape
March 29, 2024 – March 29, 2025

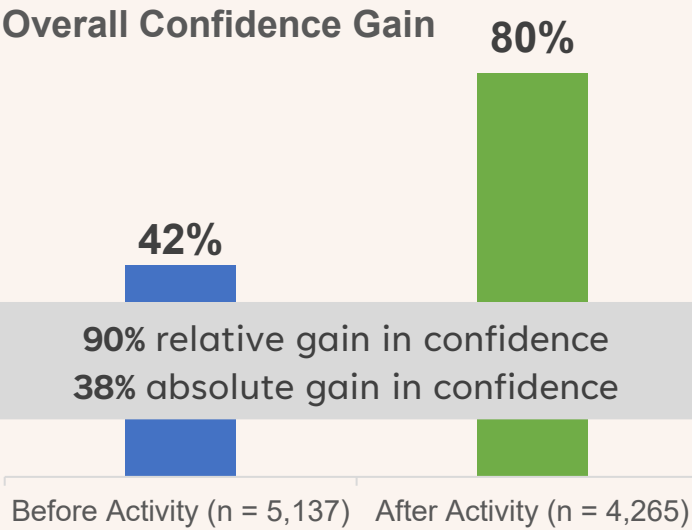
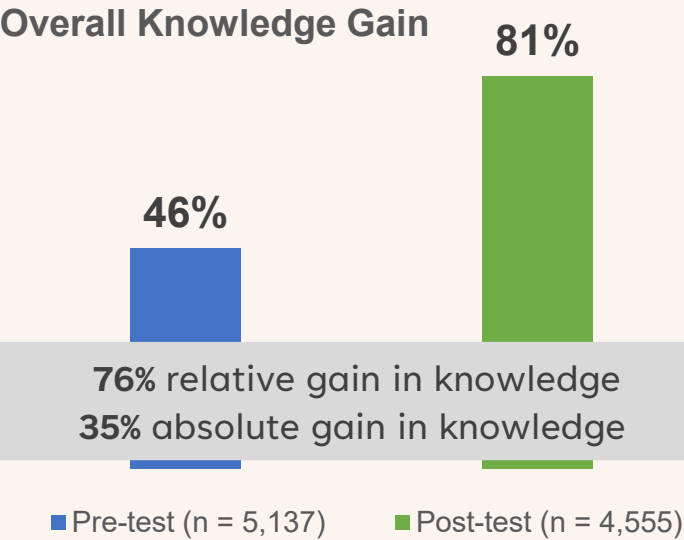
Physician Learner Guarantee	Physician Learner Actual
1,000	7,079
Pulmonologists	1329
Allergists and Immunologists	262
Primary Care	2766
Other Physicians	2722

“Participating in CME programs ... **keeps us up to date** and **up to speed** with what's currently going on. We ...take what we learned ... back into the office and ... apply it towards **patient care quality.**”

Potential Impact to Over
1,533,168
Patient Touchpoints This Year

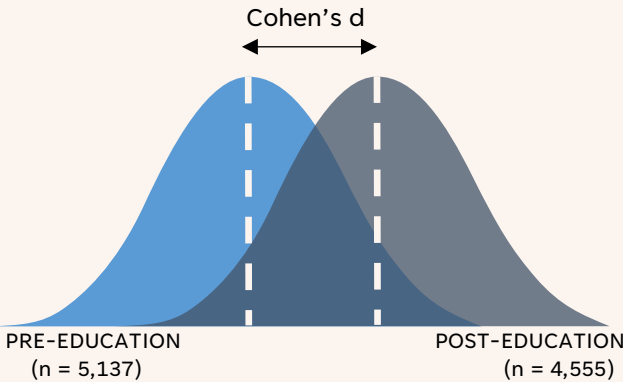
“I felt I got **more educated**, a **better understanding**, **better advocacy** and improvement.”

KNOWLEDGE AND CONFIDENCE IMPROVEMENTS



OVERALL EFFECT

Overall, comparing pre-activity to post, this activity led to an effect size of 1.53, indicating an **86%** [probability of superiority](#) in knowledge/competence change.



INTERPRETATION OF COHEN'S D EFFECT SIZE

Assessment researchers often use general guidelines to help interpret Cohen's d – small (0.2), medium (0.5), and large (0.8). For more information on interpreting Cohen's d, refer to <https://rpsychologist.com/cohend/>

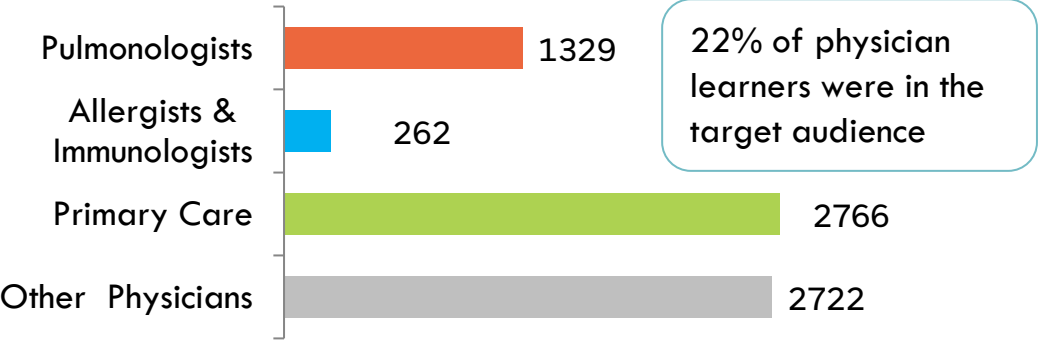


OVERALL PARTICIPATION

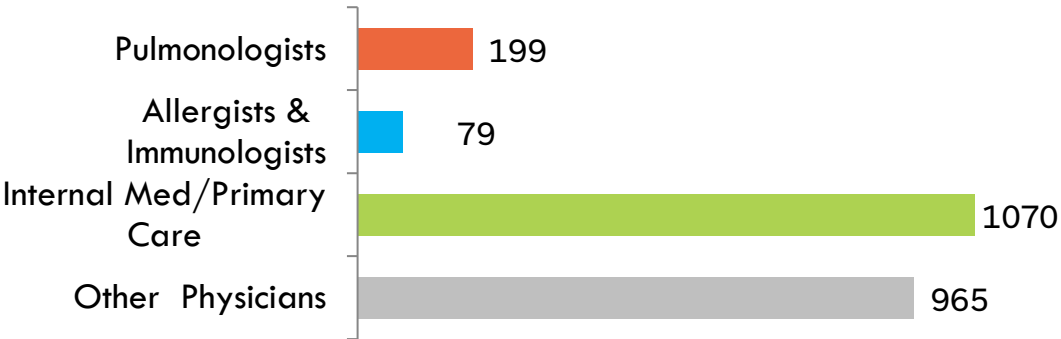
Learners (n = 14,607)

Test-takers (n = 5,203)

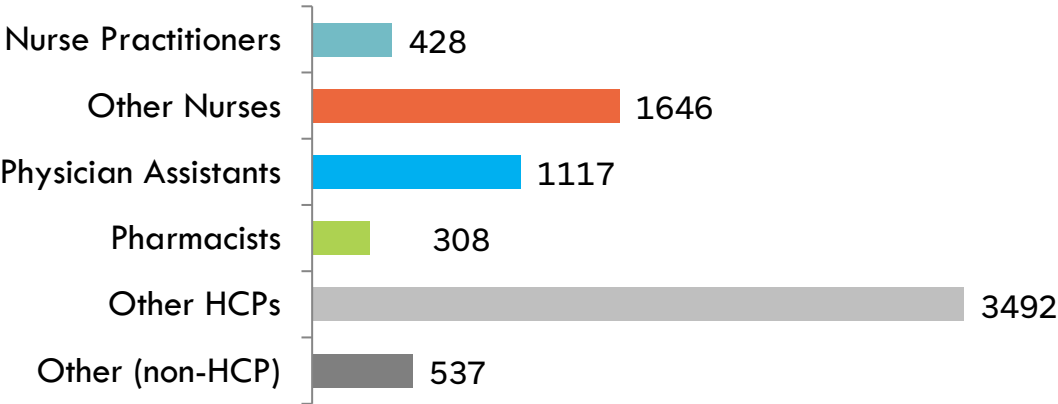
Physicians (n = 7,079)



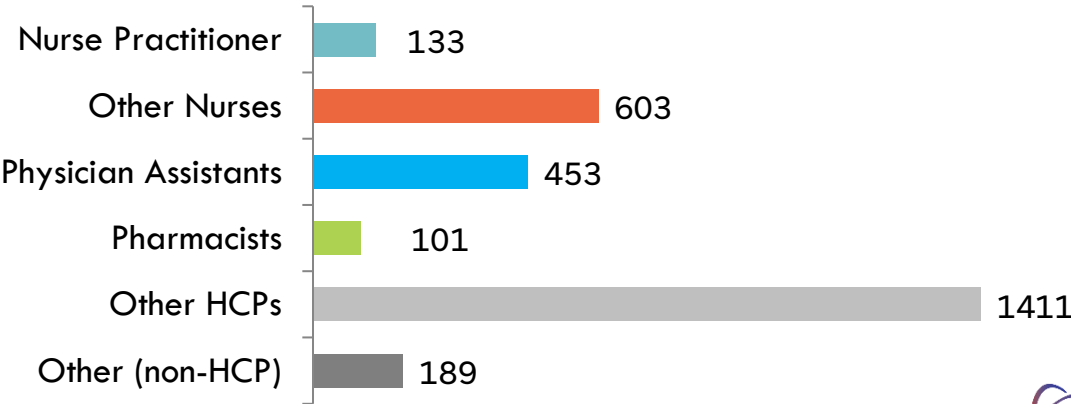
Physicians (n = 2,313)



Other HCPs (n = 7,528)

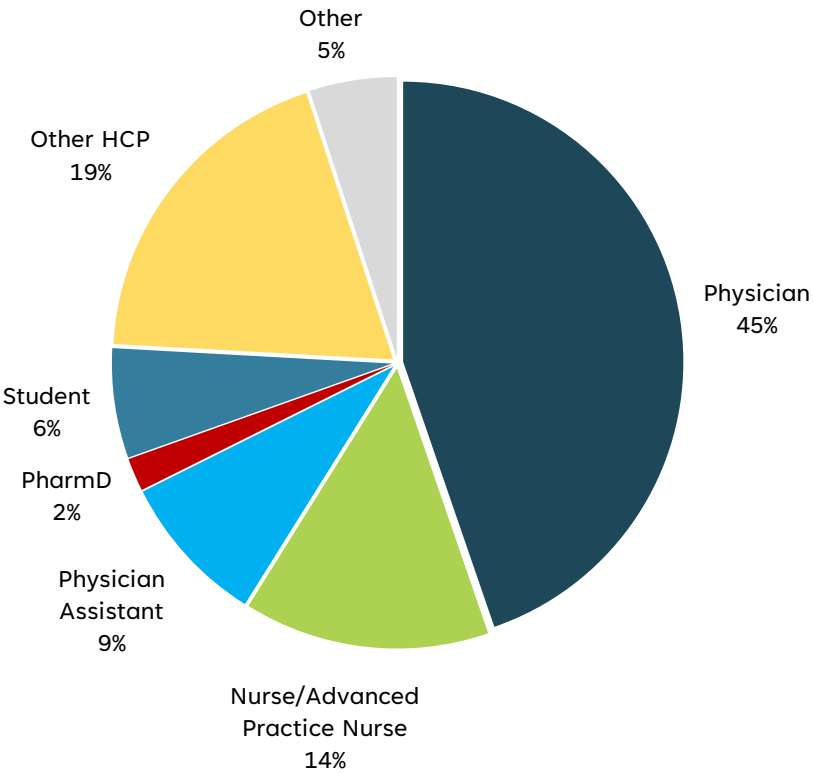


Other HCPs (n = 2,890)

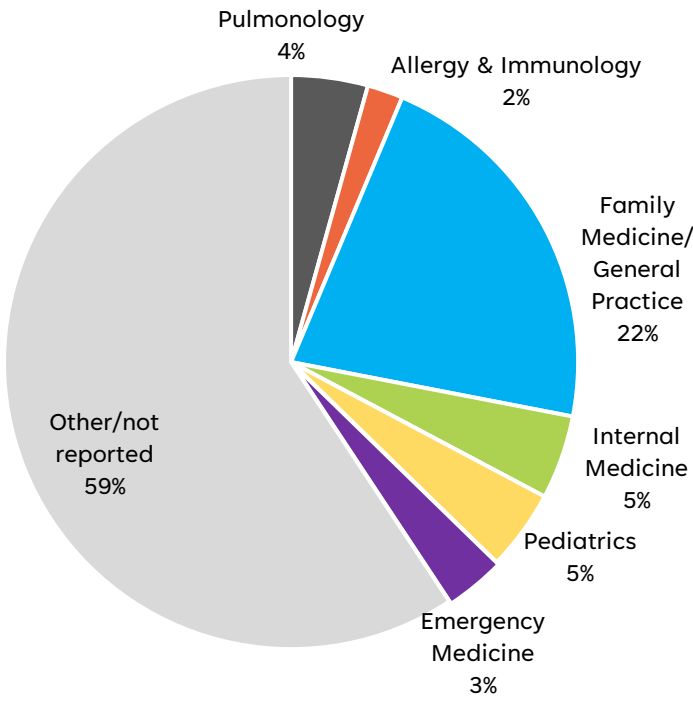


PARTICIPATION – TOTAL HCP TEST TAKERS (N = 5,203)

Profession

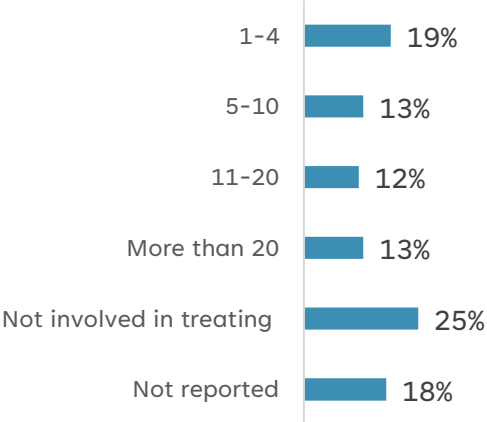


Specialty

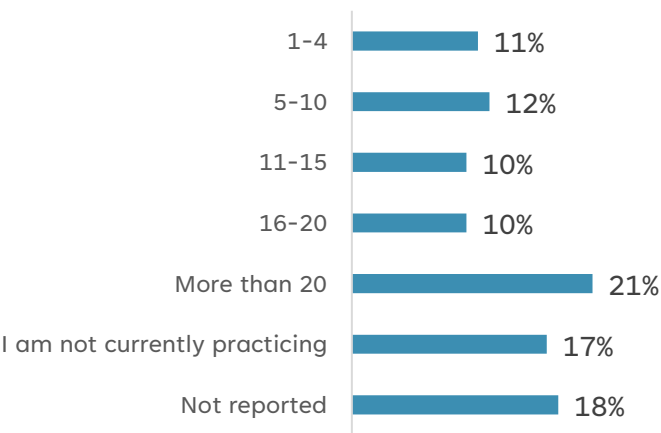


Other includes critical care, otolaryngology, radiology, surgery, public health, cardiology and more.

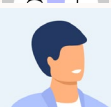
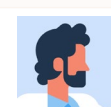
Patients with severe asthma and upper airway disease treated per week



Years in practice



Interviewees (N = 10)

	HD	Allergy/immunology physician, in private group community practice with an ENT. Practicing 32 years. Sees approximately 40-60 patients per week, 40-60% with severe asthma/upper airway disease (UAD).
	PZ	Internal medicine physician in a primary rural practice setting. Has been in practice over 20 years. Sees 125 patients per week and about 1/3 have severe asthma/UAD.
	JK	Pulmonology physician practicing in a suburban academic large health system. Practicing 30 years, seeing 250-260 patients per week with 35-40% having severe asthma/UAD.
	JB	Internal medicine physician practicing in a suburban community group practice. Has been in practice approximately 25 years and sees over 100 patients per week; 10% have severe asthma/UAD.
	AK	Allergy/Immunology physician practicing in a community private solo practice urban and suburban offices. Has been in practice 23 years. Sees 50-60 patients per week with 40% having severe asthma/UAD.
	ES	Family medicine physician in a suburban, multi-specialty, community private practice. Has been practicing 17 years and sees 150 patients per week with 10-15% having severe asthma and/or UAD.
	VR	Allergist physician in a suburban solo practice. Has been practicing for 25 years and sees approximately 25 patients per week. Of those, 60% have severe asthma/UAD.
	MA	Internal medicine physician in a group private practice in an urban setting. Has been practicing for 29 years. Sees 30-50 patients per week with 35% of those having severe asthma/UAD.
	PD	Internal medicine physician practicing locum tenens as a hospitalist in a rural community hospital. Has been practicing 30 years and currently sees about 50 patients per week, with about half with severe asthma/UAD.
	EZ	Allergy/Asthma physician assistant in an urban, community practice for adults/peds. Has been practicing over 24 years and sees about 80 patients per week. Approximately 20% of those have severe asthma/UAD.



What prompted you to participate in the CME activity?

While some clinicians engaged in the CME activity for credit, most wanted to keep up with current science in the management of patients with upper and lower airway diseases.



“...looking at the data or looking at **therapeutic choices which target the upper airway and the lower airway** is something obviously is very attractive to me. That was probably the reason that I looked for this particular program.” HD



“**I like to be on the forefront of utilization** of whatever resources that will...enhance patients’ quality life, improve their overall care.” JK



“Actually, I was doing my CME hours for my state license, so I was doing some research, and also to find some **good CME programs to enhance my knowledge** in terms of upper and lower respiratory tract infections and diseases.” MA



“What prompted me in this particular case...once we get **beyond some of the basic therapies** that are available in a treatment of upper and lower airway inflammatory disease, **what other options do we have available?** And what this particular CME program addressed was that there are agents that are currently available and have the approval and indication for the specific targeted treatment of the inflammatory process and pathways that occur in not just the lower airway, the asthmatic portion of the overall condition, but also in the upper airway portion which is the chronic rhinosinusitis with nasal polyposis, which is what they had covered.” PZ



“The interesting topic, **coming from National Jewish** and the **quality of the program**, improving my knowledge, and education.” JB



“...let me get some credits while, I have some time available, and of course that's something that I always want to kind of keep up with what I see, as much as possible, **just so I'm current on everything.**” EZ



Were there particular issues about the topic of severe asthma and upper airway disease you were hoping to learn about? Any specific patient types?

Clinicians were looking for many different things when seeking out education: improving patient outcomes, new medications/indications, preventing exacerbations, and managing patients with comorbidities.



“One is that **comorbidities** that are not being treated properly, which is why the asthma is severe. Or is it simply that everything's really bad we need to add something...so there's a diagnostic element and there is a treatment element as well...as I recall that this particular program did have elements in it, not just treatment, but also regarding the diagnostic aspects of it as well.” HD



“Those patients who have **moderate to severe [asthma]** and can potentially only worsen if they're not careful to be able to manage **both components**, as this particular program addressed, then one will potentially feed into the other and only make the situation worse.” PZ



“I wanted to learn more about the different IL5 antagonists. I had not administered them yet. I had other allergists/immunologists and even a pulmonologist that had prescribed them. So I was trying to get more comfortable with, you know, starting to administer those, **understanding the prior authorization process**... more for my pediatric patients. I wanted to know if there is any indication to use if there was a severe asthmatic that had been hospitalized, if there was pediatric options available...it was more of the **younger population** I was trying to learn more about and feel more comfortable with.” ES



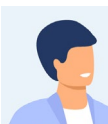
“I was looking to see if there's any **new techniques**, new ways that we can really pick up inflammation in these patients to see what areas are untapped, untreated and what needs to be addressed.” JK



“Yes, nowadays because of the **seasonal exacerbations** I have some increase in patients who have asthma which is not well controlled.” MA



“Yes, how to **improve care**, how to **improve patient outcomes** and **prevent complications**. For the patients with severe asthma, frequent attacks, frequent emergency room visits, frequent hospitalizations and the patient whose quality of life is impaired.” JB



“Yeah, whether or not there were any **new indications** for new meds, new medications, and also some **new clinical data** on current meds. Mainly [for] severe asthmatics.” AK



“...the **use of different biologics in different settings** was what drew me to that article...very frequently we get people in as acute admissions with severe asthma who have not been introduced to the biologics and it's how to sort of begin to...I know they're not used for the acute phase and you know it's not much use in the ICU but...there's a lot of patients who are not being managed with the biologics who fit definitely the criteria for consideration...” PD

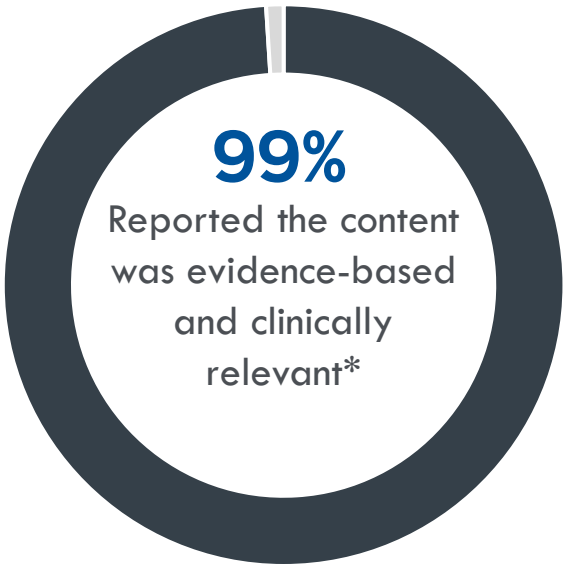
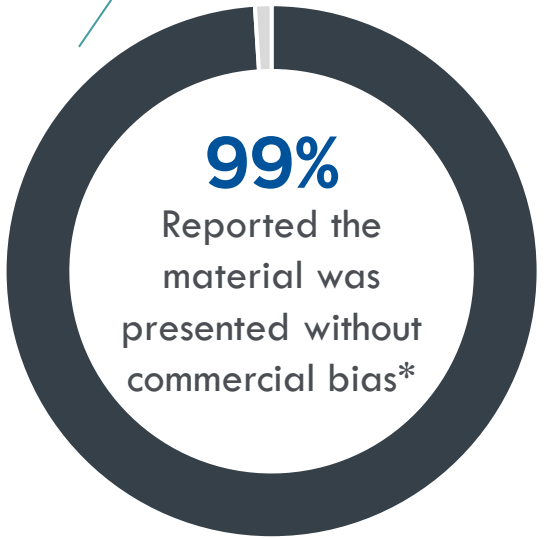
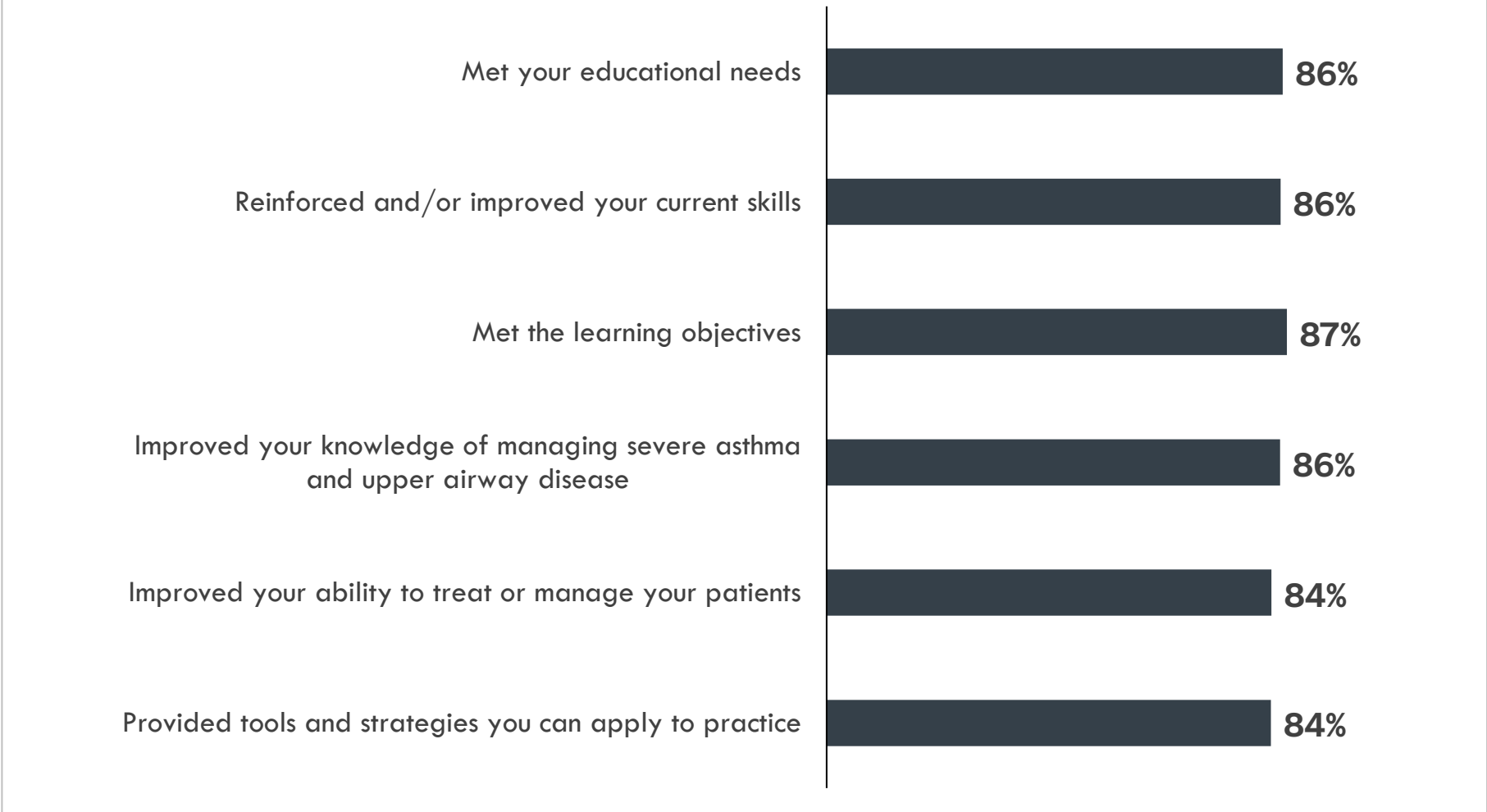


“I have a good chunk of VA patients, so they're **severe by nature** and sometimes we're still trying to figure out what exposure did they have that set them off... So when they come, they have this long slew of medicines that they've tried. National Jewish is the standard in allergy care...so [I] **wanted to see what National Jewish had to say**, if it would change anything about what I was practicing.” VR



EVALUATION - SATISFACTION

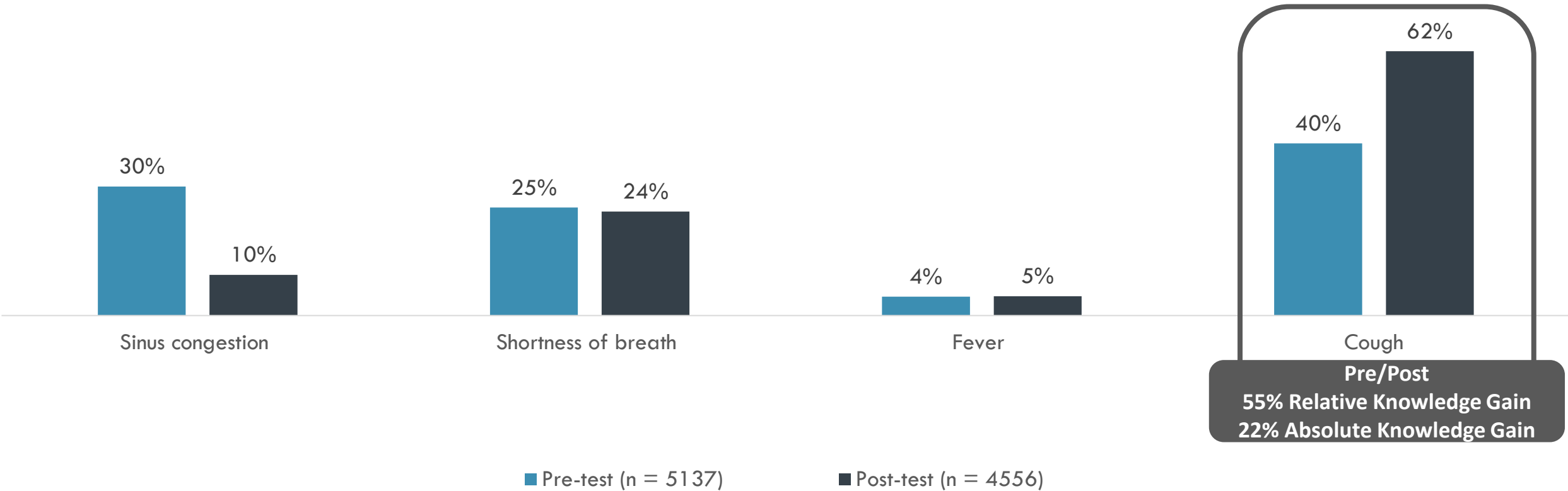
Evaluation respondents agreed with the following statements about the activity: (agree, strongly agree)



(N = 4,266)

OUTCOMES ASSESSMENT – KNOWLEDGE

A shared symptom from mucus produced in either the lower or upper airways in response to allergens is:



LOs Addressed:

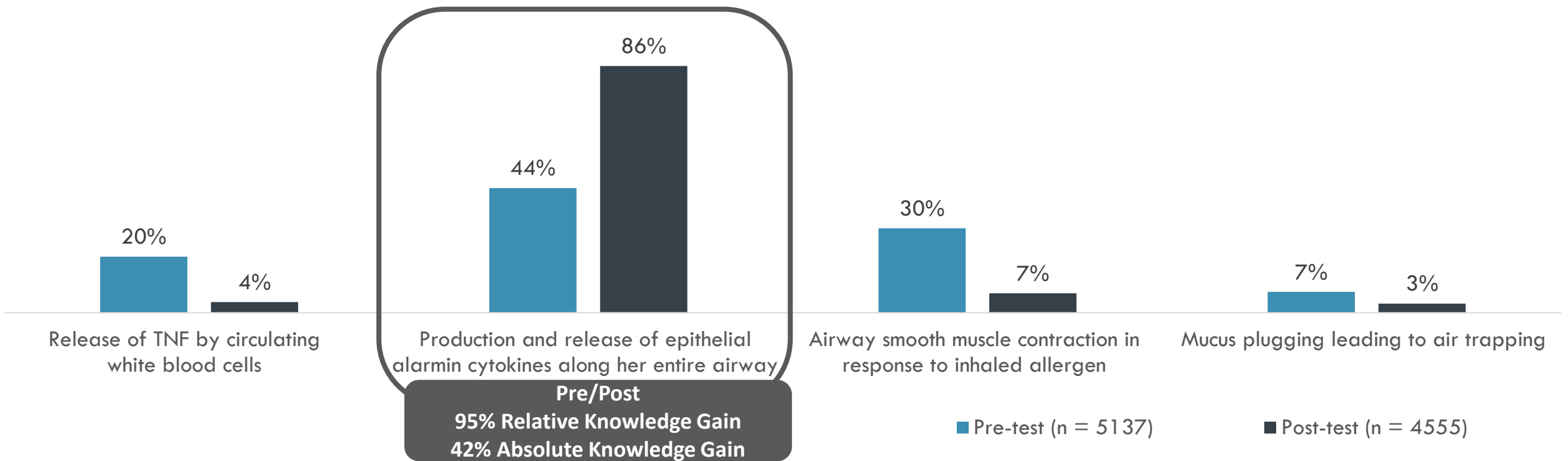
1

Mucus from the upper airway drains to the vocal cords, causing cough -- and mucus in the lower airways stimulates bronchial cough receptors, causing cough. In contrast, only upper airway mucus causes sinus congestion, and only lower airway mucus causes shortness of breath. Learners showed significant knowledge improvement in this area post-education; however, there still may be room for improvement in understand the cause of shortness of breath.

PRE to POST	P < .001
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OUTCOMES ASSESSMENT – KNOWLEDGE

A 24-year-old female patient with a history of asthma and hay fever presents with sinus congestion, daily shortness of breath, cough, and nighttime awakenings 4 times a week that are worse since her roommate acquired two cats. She just signed a one-year lease and cannot move, and her roommate can't relocate the cats. **A unifying mechanism underlying all of the patient's symptoms is likely to include?**



LOs Addressed:

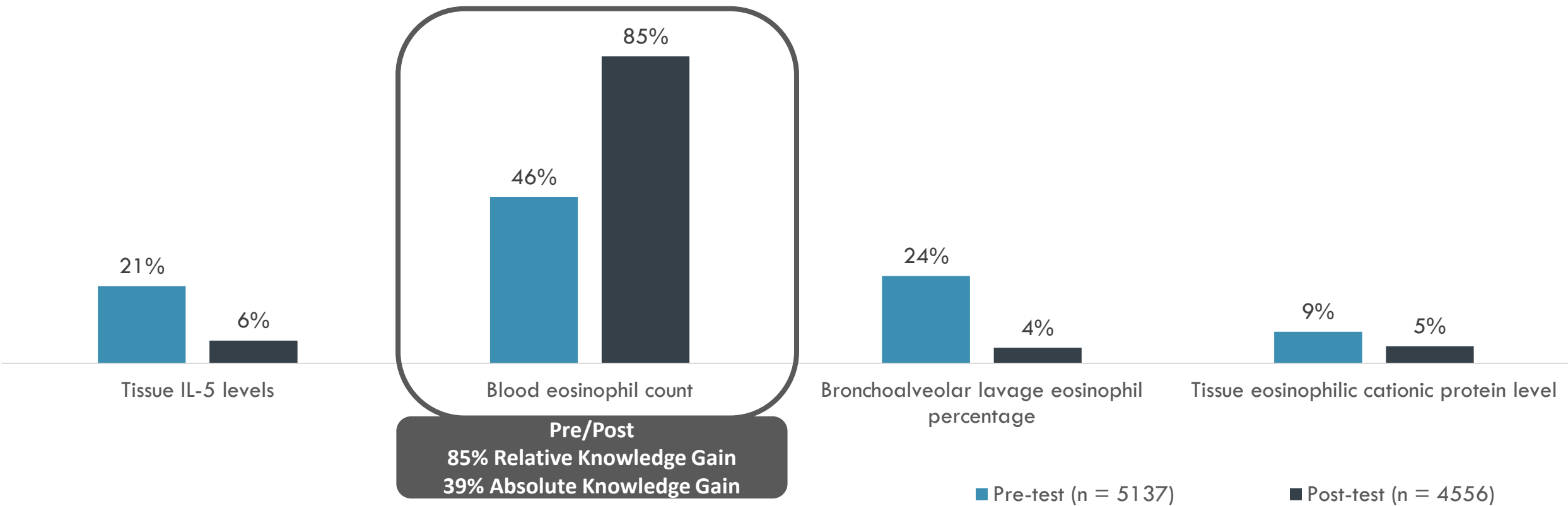
2

Both the upper and lower airway harbor similar pattern recognition systems that initiate alarmin release in response to inhaled allergens. Neither TNF, airway smooth muscle contraction, or mucus plugging fit these criteria. Learners showed significant knowledge improvement in this area post-education, nearly doubling their selection of the evidence-based answer.

PRE to POST P < .001

OUTCOMES ASSESSMENT – KNOWLEDGE

Which of the following readily available biomarkers are helpful in endotyping patients with both upper and lower airway inflammation?



LOs Addressed:

3

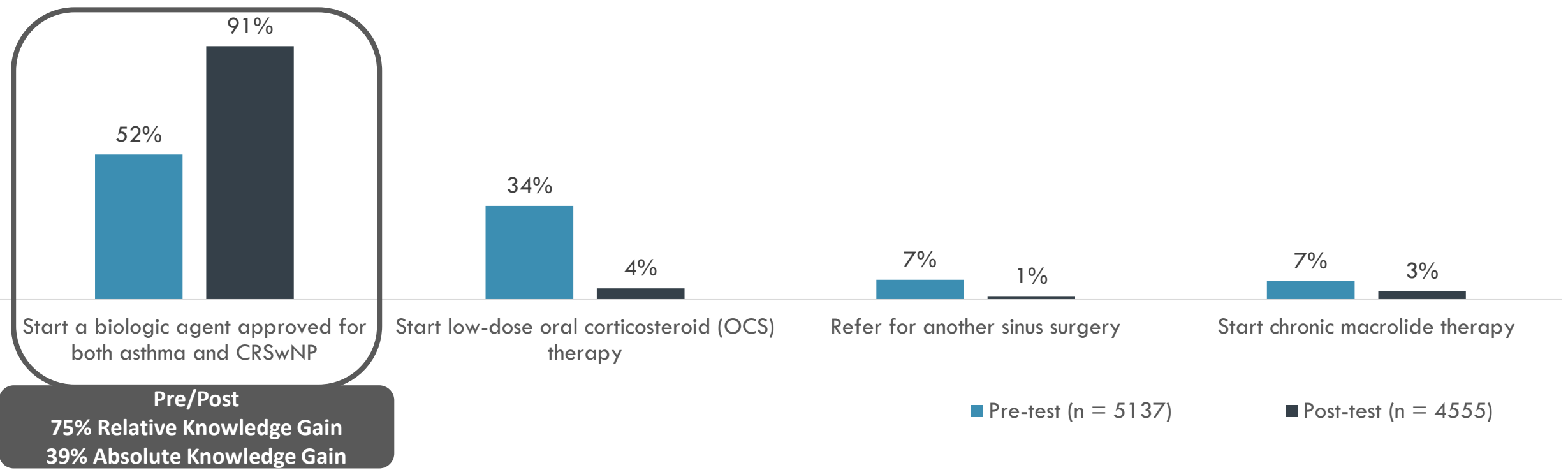
Blood eosinophil count is more likely to represent systemic inflammation relevant for both the upper and lower airways. Although tissue IL-5 and eosinophilic cationic protein levels correlate with eosinophilic inflammation, and eosinophil percentage in bronchoalveolar lavage can help endotype patients with asthma, these tests are not readily available. Learners showed significant knowledge improvement in this area post-education.

PRE to POST

P < .001

OUTCOMES ASSESSMENT – COMPETENCE

A 45-year-old male with history of asthma and CRSwNP has needed oral steroids 3 times in the past year for asthma exacerbations and continues to be symptomatic despite being on daily nasal irrigations, daily nasal steroids, and ICS/LABA/LAMA therapy for his asthma. He has had 4 endoscopic sinus surgeries, the most recent of which was last year. His testing demonstrates a FeNO of 99 ppb, circulating eosinophils count of 300, and an IgE level of 200. **Which is the most appropriate next step in management?**



LOs Addressed:

4

This patient has a type 2 phenotype based on elevated FeNO, cEos, and IgE level. Both his asthma and CRSwNP are poorly controlled as evidenced by continued symptoms and need for recurrent oral steroids. Starting a biologic agent gives him the best chance at feeling better and having less oral steroid-requiring exacerbations. Post-education, learner competence in choosing the right approach improved significantly, as nearly all learners would now consider a biologic for this patient.

PRE to POST	P < .001
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PERFORMANCE ASSESSMENT – CONFIDENCE

How confident are you in your ability to:

Describe the similarities and differences in the pathophysiology of the upper and lower airways

3.4

4.2

Assess the role of epithelial cytokines in the inflammatory pathways in severe asthma and upper airway diseases

3.2

4.2

Identify appropriate biomarkers to guide treatment selection for severe asthma and upper airway chronic inflammatory disease

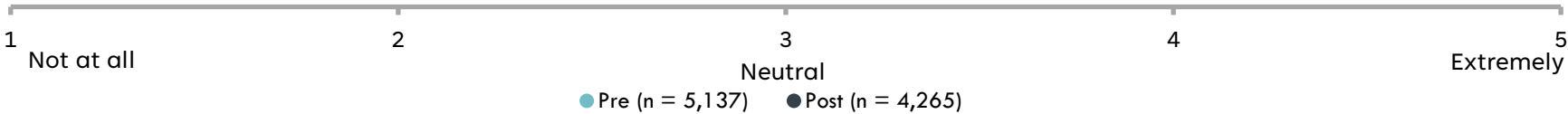
3.2

4.2

Incorporate an understanding of the impact of comorbid upper airway diseases to personalize treatment strategies for severe asthma

3.2

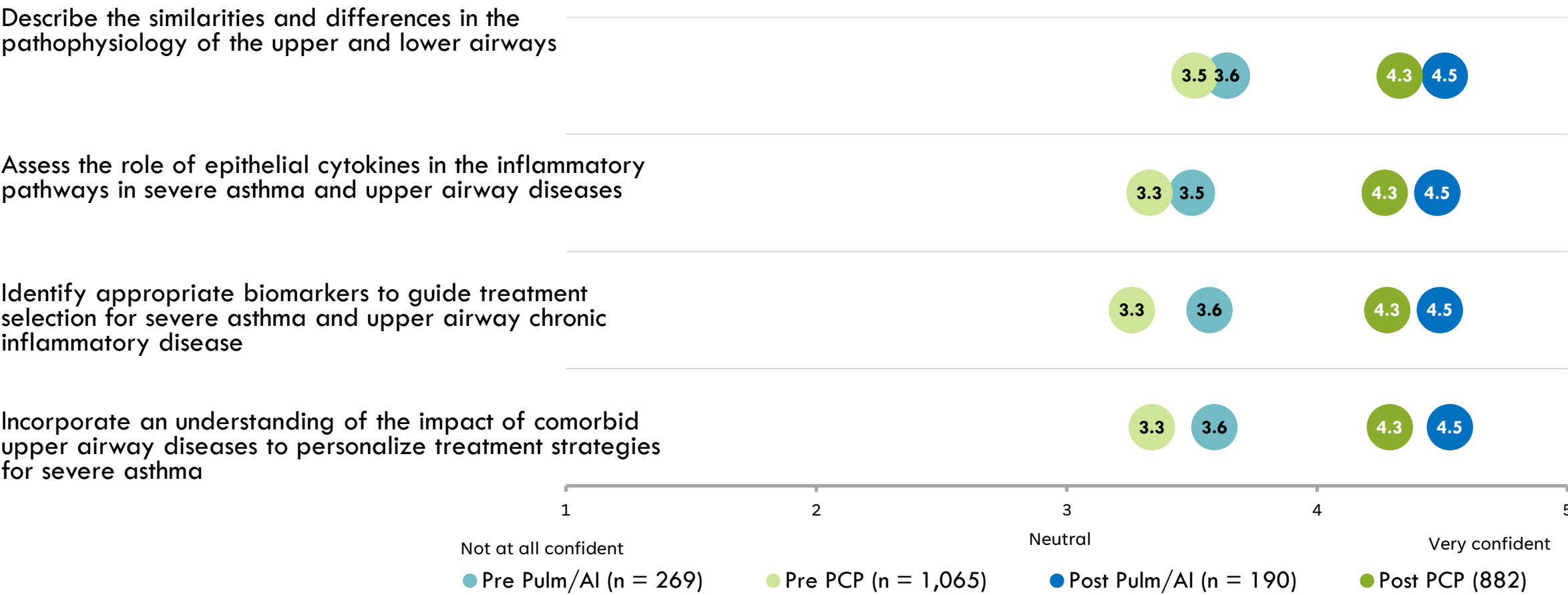
4.2



Following education, learners have improved confidence in their abilities to enact each of the program learning objectives. However, confidence is not correlated with the knowledge scores, pre- or post-education.

PERFORMANCE ASSESSMENT – CONFIDENCE

How confident are you in your ability to:



When looking specifically at PCPs and specialist physicians (allergists/immunologists + pulmonologists), confidence improves dramatically, as much as the PCPs are more confident in each of these components post-education than the specialists were pre-education.



After the education, do you feel more confident in your approach to managing patients with severe asthma and comorbid upper airway disease?



“Oh yeah, 100%... when you see **experts in the field that are doing what you are doing**, or what you want to do, I can explain that to my patients... ‘Why now? Or why not before and is this something we should be thinking about?’” JK



“Definitely. The information was, I would say from **50 to 70% was new for me** and it was **very informative** for me to use some **new approaches** and to look forward for new advance treatments. Especially with biologics.” MA



“I think I’m **more comfortable** and I’m **more educated** and I feel that [biologics are] - I don't wanna say a safer drug - but I just feel like [they are] **a safer option for patients** and can be easily be [used] in outpatient and compliance is excellent with these types of drugs because they're monthly or you know every two months or so...Well, just the long term side effects of steroids and you know there are risks associated with that so I think that these drugs are more targeted treatments for the specific inflammatory processes.” ES



“I think I'll feel more comfortable **once we have additional biomarkers and other tests that will make us more comfortable using these agents**. Patients, when they hear biologic agents, they don't usually link it to something that will be beneficial to them. It would be nice to see the pharmaceutical companies be able to provide ... leaflets that the patients could take home and be able to review on their own time to learn more about these medications and feel comfortable about them. Knowing that we have these medications available that we didn't have years ago, it gives us a comfort level that we can take better care of our patients and offer them other options that don't require them to go into surgery.” PZ



“I genuinely did. **It was very helpful**. How to follow up with them to see if there's a response.” PD





Did you learn anything in the program about severe asthma and/or upper airway disease that was new and/or surprising?

Some clinicians mentioned that the education mostly reinforced that what they were doing was correct, but others appreciated its in-depth coverage of new biologics that are available for their patients and how they can help patients with asthma/UAD.



"I read the literature a lot and I keep in touch so **it really confirmed that biologics...really are effective** for not just nasal polyps and asthma...but now the question is 'well can we give it for people who've got upper airway disease and no nasal polyps?' ...you treat the nose, you improve the asthma, you treat the asthma, you improve the nose. So that's a very important concept especially if you're dealing with biologics or you're having some reluctance encouraging patients to accept a prescription for a biologic." HD



"Yes, of course. All these new things ... like **allergies**, the **epithelial release of alarmin** and also **cytokines** which are contributory factors to lower airway disease, or the severity of asthma. These are all new and also the use of biologics in terms of management." MA



"It just kind of **reinforced** what I already had experience with before, just to know, "OK, this is what you should be looking for" as far as that subtype of asthma on the severe end, to see exactly what is the right fit for a specific patient contingent on what blood work shows or skin testing....These little nuggets of information that makes it more easy where you can say, 'OK, I think this would be the right fit,' steer you [toward] the right path." EZ



"What was surprising and new was that **we do have additional treatment options that we can go to and offer and provide to our patients** who are not anxious in going into surgery and these treatment options, which are **the biologic agents**, can target these specific inflammatory pathways and conceivably make the patient feel better without having to go into surgery ..." PZ



"**it reinforces what I do on a daily basis**, which also makes me feel good as well." JK



"The **unity between the two**, rather than regarding them as two separate systems." PD



"The **newer treatment choices** are really what I was learning about. I am still very aware it's an inflammatory condition and multiple things can cause asthma. I liked learning more about the different treatment options that were available." ES



"The **anti-TSLP**, I wanted more information about that. The older biologics... not old comparatively, but old now that it's been out several years for asthma. Yeah, it was the anti-TSLP that was most interested in." VR





Was there anything that you felt was not relevant to your current practice?

A major challenge with this type of education is that not all clinicians, particularly those in primary care, are set up to use biologics and newer medications in their practices. However, few interviewed clinicians indicated that this was a major problem, as it had been a primary reason for them wanting to engage in the education.



“Well, my practice is a little unusual in that I have to do everything myself so I'm kind of limited in what I can prescribe, basically because if I wanted to give biologics for instance... **I just don't have the capability to do all the prior authorization and set up the home delivery and everything else.** We see people whose asthma is out of control, so we look in the nose, we see if they have nasal disease, but we also look and see if they have sinus disease, and this is what I also do very closely with my ENT colleague. I'll refer them to him.” HD



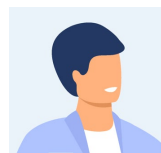
“No, I think the [discussion] of the immunological basis for asthma - if they hadn't gone in so much into depth with that, then I really wouldn't have got the unified...upper and lower airway, but there's a lot of unity in the immune responses that are in common between the two and these drugs ... can treat in unity, not just asthma. So it was refreshing overall. In the beginning I was fairly familiar with everything up **until we started dealing with specific biologic medications.** [The education was relevant] at least to understand why I'm doing what I'm doing.” PD



“No, **actually I felt it was [all relevant].** I'm the lead clinical attending within my health network...so I work a little differently. I'm also the only physician that has been allowed to have a scribe so that's how it allows me to really focus and really take and spend more time with the patients. So even though I'm seeing a lot of patients my time is uninterrupted and I'm able to do more in that period...it's so much more effective, efficient.” JK



“I was a little bit **hesitant** to start people with severe asthma on biologics without consultation with a pulmonologist or ENT specialist, but otherwise I was very comfortable and it was very informative for me.” MA



“I did not.” AK

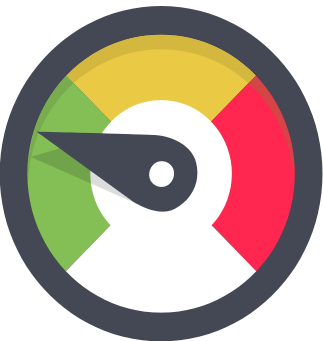


“Not at all.” JB

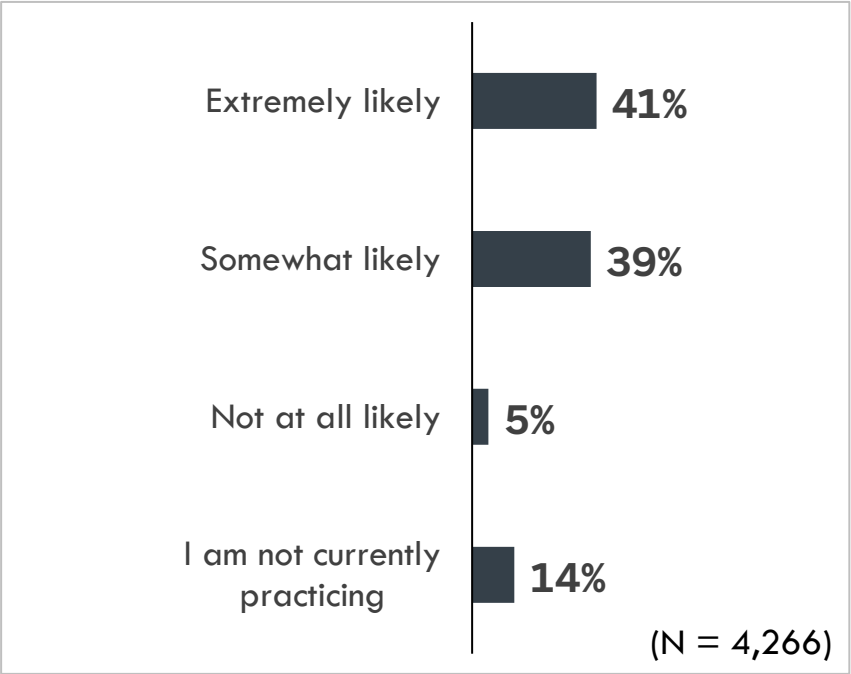


EVALUATION – PRACTICE CHANGE

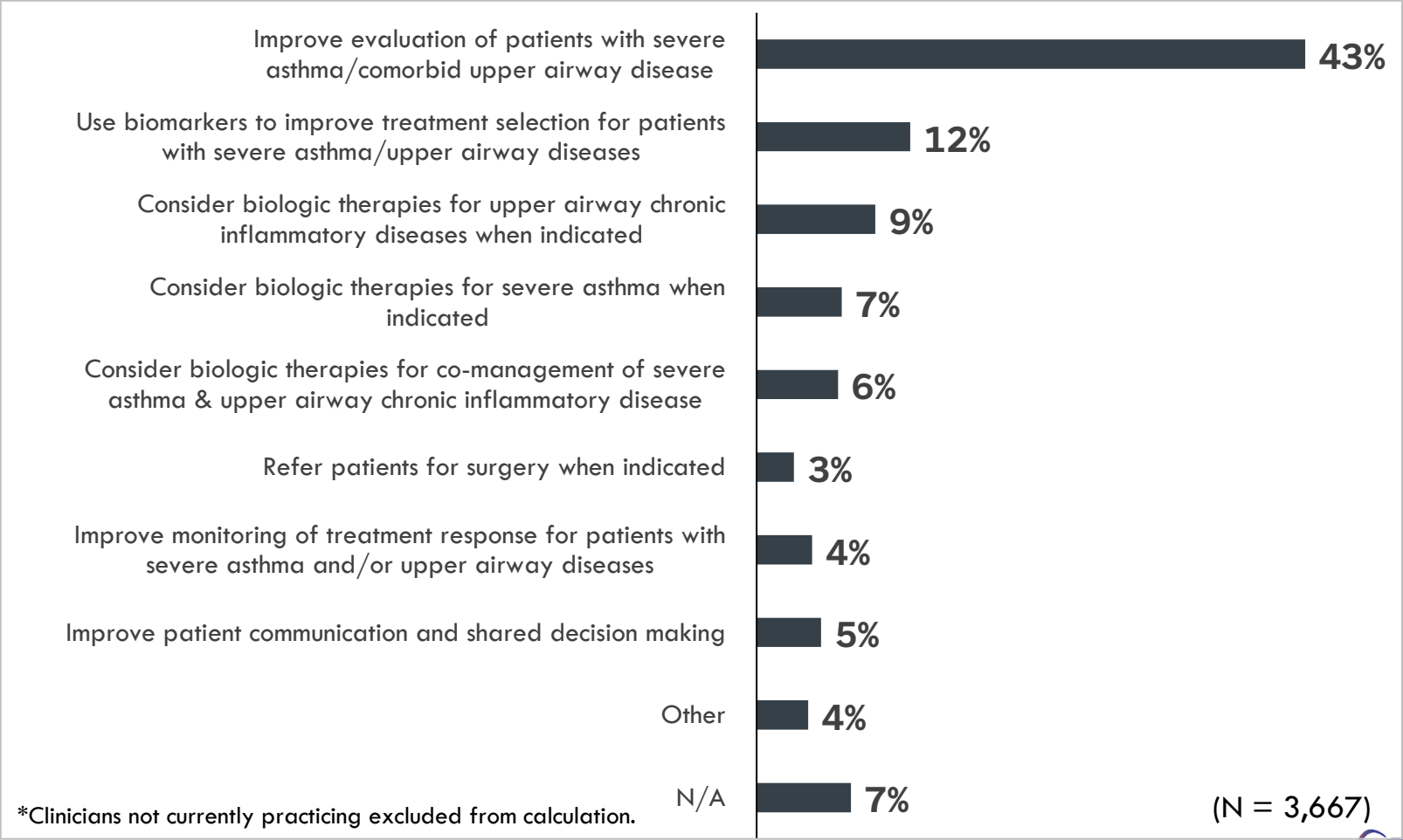
Most learners report that they are likely to make practice changes as a result of this activity; most notably, improved patient evaluation.



How likely are you to make changes in your practice as a result of what you learned in this activity?



What is the top change you will incorporate into your practice as a result of what you learned in this activity?



Intended changes to practice (open-ended, categorized by theme)

Use of Biomarkers

- Use biomarkers such as FeNO, blood eosinophils, and IgE to guide treatment decisions for patients with CRSwNP
- Biomarkers to improve treatment selection and monitor treatment response

Biologic Therapies

- Considering biologic therapies for patients with severe asthma and CRSwNP who remain symptomatic despite standard treatments
- Initiate discussions about biologic therapy earlier in patients with frequent exacerbations or persistent symptoms

Patient Communication and Education

- Improving patient communication and shared decision-making is a key focus
- Educating patients about available therapies and the importance of adherence to treatment plans is also highlighted

Multidisciplinary Approach

- Involving other specialists such as pulmonologists, allergists, and ENT specialists to provide comprehensive care for patients with severe asthma and CRSwNP
- Referring patients for surgery when indicated and considering biologic therapies for co-management of chronic upper airway inflammatory disease and severe asthma

Monitoring and Evaluation

- Improve the monitoring of treatment response and evaluation of patients with severe asthma and upper airway diseases
- Regular follow-ups and reassessment of treatment effectiveness are emphasized

Diagnostic and Treatment Strategies

- Using a more comprehensive approach to diagnose and treat patients with severe asthma and chronic sinus issues
- Incorporating new diagnostic tools and treatment modalities to improve patient outcomes



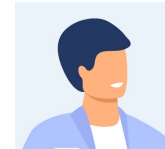


Do you recall another piece of information from this education that you have included in your current management of severe asthma and/or upper airway disease? Has that information had an impact on your practice?

While many clinicians mentioned the education improved their understanding of severe asthma and UAD, which positively affected their practice, one hospitalist indicated that she started a patient with severe asthma on a biologic prior to discharge from an ICU stay.



"I felt I got **more educated**, a **better understanding**, **better advocacy** and improvement." JB



"Well, just some of **the knowledge that I might have gained** in trying to convey new therapies to patients basically. Not significant [effect on practice yet], but enough for me to be able to be a little bit **more confident** in my explanations." AK



"It was **very informative** regarding the chronic rhinosinusitis with nasal polyposis and without nasal polyposis and eosinophilic asthma, NSAID and aspirin related sensitivities, AERD triad and the role of allergens, the release of all these different cytokines. Yes it did [have an effect on my practice]." MA



"Well, I had a patient who was **successfully extubated on high dose steroids** and kept a couple of days within the ICU, but once they were moved out to the regular medical floor I **actually started a biologic on them prior to discharge** because ... it seemed from my impression it's something that has never been brought up to them, even though they've suffered for over 20 years with pretty severe asthma, more than two severe exacerbations a year and primary care was just kind of letting it go by...hopefully their primary care doctor would see it there and pick up on that and.... not not be intimidated by it." PD





Thinking about your practice since participating in the education, has there been a patient encounter that you've been able to use this information?

Other clinicians mentioned specific instances where they used the education in managing patients with severe disease in multiple aspects of care: discussing the disease, suggesting medications, getting insurance approval, and starting newer agents.



"Yeah for sure...it's important to **communicate to the patient that we're trying to treat both elements, not just the the asthma but the upper airway**, when we treat the upper airway we treat the asthma and vice versa and whether it's because of the...they don't care really about the mechanism of the drug,... 'I wanna feel better and if you can make me feel better with one drug or one prescription...then that that's fine, that's better.' So the whole concept of the unified airway...it's something that people really respond to. And combining the two types of therapy and telling them that, **this is something that's coming out of institutions like National Jewish** etcetera, you know, that's what people want to hear." HD



"...a female patient who was taking her medications but not responding well. She was hesitant to have any kind of sinus surgery done. She had a CAT scan of her head and her nasal sinuses, and we also knew that she also had asthma. And knowing that the two work together and could potentially worsen each other's condition, she was happy to hear that there were **other options available now**, and we discussed the ones that are currently available and that there are a variety of different indications and approvals for certain of these monoclonal antibody biologic agents. So we prescribed her one that she felt comfortable with and that her insurance would cover and ... she's responding well to it and is **happier now than she was prior to all of this... she could breathe better**. She doesn't have to worry about taking her oral corticosteroids or inhaled corticosteroids to the same degree as she had taken them in the past. **So it's improved her lifestyle. It's made it less complicated**. The beauty of having a CME program that draws your attention to what's currently going on is it makes you aware of the current available treatment, approaches, options that are available, guidelines that go along with it. They provide you with an opportunity to be able to learn in a format that you can review and do at your own time and then take back to your clinical practice and extend to your patients." PZ



"Yeah, definitely. I had a 50-something year old lady who had chronic asthma for a long time ever since she was a kid basically, but she was coming in with severe allergies, severe exacerbation of her asthma, she'd gone to the ER 2 times. She did get hospitalized once within less than a two-month period. And I ran blood markers on her. I looked at her eosinophils that were high. I looked at her IL-5 numbers and then I told her, 'you know, this is kind of coming to a point where it's so severe -- you've already been on systemic steroids, you're maxed out on inhalers, you're maxed out on nebulizers. **Would you be interested in these different types of drugs?**' And you know, so far, it's working." ES



"Well, yeah, there was a patient that failed therapy and then I implemented some of the knowledge that I learned by describing some new medications that, with biomarker testing, allowed the patient to understand that we might need to do a little bit more in terms of blood draws, a CT scan, a methacholine challenge -- **providing all that information for their insurance company to be able to prescribe it.**" AK



"I'm really **using it every day** so...so I feel like I'm kind of mirroring exactly what was presented." JK



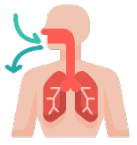
"Yes. I gave [a patient] biologics and modified [their] treatments. Educated them more. And **[got] more cooperation from the patients** to get better." JB



EVALUATION – TAKE-AWAYS



What is your most important take-away from this activity? (open-ended)



Unified Airway Concept

Understanding the Unified Airway Concept, which highlights the interconnectedness of upper and lower airway diseases

“Ways to explain the unified airway hypothesis to patients, particularly in the context of the availability of biologics.”



Role of Biologics and Biomarkers

Utilizing biomarkers such as blood eosinophil count and FeNO to guide treatment decisions and personalize therapy

“I will consider biologics earlier in patients with recurrent OCS use, persistent nasal symptoms, and high biomarkers of T2 inflammation.”



Comprehensive and Personalized Treatment

Emphasizing a comprehensive and personalized approach to treatment, including early referral to specialists, regular monitoring of treatment response, and considering both upper and lower airway symptoms

“That some cases with asthma can be very difficult you just have to get together as a team and evaluate and assess what type of treatment is best necessary for the patient.”



Patient Education and Adherence

Educating patients about their conditions and treatment options to improve adherence to therapy

“Assessing patients' compliance on treatment is as important as stepping up the treatment.”



Advances in Treatment Options

Noting the advances in treatment options for severe asthma and upper airway diseases, including the availability of new biologic therapies and the use of biomarkers to guide treatment decision

“The use of new treatments such as biologic ones and to not “cling” to old ones.”





Barriers: What aspects of managing patients with severe asthma and comorbid upper airway disease do you have the most trouble with?

Primary barriers to ongoing management include insurance issues and patient adherence to therapies.



“The **nonadherent patients**...if the patients are taking their medications as they're supposed to then if they're not doing as well as as you would expect, then it's nice to be able to tell them that there are a new class of medications. I think the key there is being able to afford the medications and monoclonal antibodies, biologic agents are not inexpensive...” PZ



“I would say that #1 is **insurance approval**. #2 would be **patients not understanding what to do** when they have symptoms and waiting too long, thereby decreasing our ability to help them quickly and/or effectively. The 3rd is **primary care education** - when to send the patients to us, and that includes emergency room patients. Being sent home on steroids is not the answer. So having them follow up with either an allergist or a pulmonologist is important. I believe that [the education] touched upon it.” AK



“Probably just **specialty help**, I do have referrals that I can send to, but the referrals process is long, there are delays in treatment so I kind of feel as a primary care physician, I'm out here on my own learning these more progressive, newer, more targeted type drugs. **I don't feel like I have enough knowledge or familiarity with them.** That's why, I mean, I've heard of them and I've had other patients come in and say, ‘I saw my, you know, pulmonologist and they put me on this,’ and then I'd have to look it up and go, ‘whoa, what's that?’ But I haven't had any information or dinners, presentations, programs where I can learn about it besides this. So I think that's really the biggest issue is getting more experience, more exposure, more comfortable with using these types of drugs. And then definitely the learning process of the **prior auth and insurance approval.**” ES



“Most trouble is the **insurance companies** and for their formularies, which are really complicated, and they are consistently and frequently changing. And then getting the prior authorizations for these patients is complicated and time consuming despite having biologic coordinators in place.” JK



“**The trouble is getting the patient better** so... it's mostly compliance, but [also] if the patients are able to afford the medications, the barriers from the insurance company and the patient cooperation. The whole situation is variable from patient to patient and the difficult patients I try to take the challenge and try to help them as much as I can. [The program was] highly educational and very informative and very useful.” JB



“Other than the adherence, I would say **the technique**. How do they use their inhalers? How do they manage their symptoms? How to get in touch with their providers and refer for the surgery, along with the use of biologics? The patient who might be very reluctant to use the biologics when you discuss it with them due to the mode of application ...The [education] described in detail about how to approach the patient, have a team approach, and to discuss with them about the different causes of the disease process and the relationship between the the diseases of upper respiratory and lower respiratory, any comorbidity, comorbidities which can affect the severity of their asthma. And all all those things were **very, very useful and helpful** for me.” MA





Is there anything that you feel that future education could do to address your most pressing barriers to co-managing severe asthma and upper airway diseases?

Interviewed clinicians are looking for more information on new medications, specifically biologics, and more assistance with prior authorization/pharmaceutical company programs.



“...I think it's **encouraging the partnership between the pharmaceutical industry and medicine**...there are options that you have to partner with them to get your patients the quality of care and these medications approved. I mean, you need to know what programs are available within each company for getting these patients meds and continuing on it because every year you have to do paperwork again, every single year. So there is often a lapse from December, let's say to January as insurance has changed, yours changes, etcetera. So how do you get out of the pothole? [Education is] giving you the **tools to maintain your patients on optimal care** and getting them on **optimal care sooner**.” JK



“The **new medications** and new ways of handling and taking the challenges [of] patients.” JB



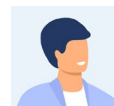
“[Pharmaceutical drug reps] need to reach out to primary care and really put [treatments] in their hands and suggest it to them because the patients, some are well read, and they'll come in asking for it. **This is groundbreaking therapy**. I think the younger doctors graduating out of medical school now will be much more familiar with this drug group, because it's only appeared over the past few years.” PD



“Yes. I think in addition to what they have already done -- and they did an excellent job -- bringing [us] up to speed with the current treatment guidelines and approaches and what's currently available. **When a CME program is able to do that, it reinforces not only what a pharmaceutical representative for a particular company says to you, but it gives you a more comfortable understanding that this is not pharmaceutically driven, that this is a an unbiased objective, evidence-based group of individuals who [are] conducting research [and] putting together information for the sole purpose of educating physicians to apply it to the care of their patients day in and day out.**” PZ



“The latest information about the **the use of all these biologics – I mean the names and their mechanism of action – is confusing**. All those studies going on. So if you can summarize and get to one very specific treatment plan, which of the biologics are currently recommended. I know that there are different processes like people with upper airway disease, lower airway disease.. but still **which are more recommended?**” MA



“Maybe **outlining the exact requirements for prior approval and each type of therapy**. For example, what's necessary documentation for ICS and then for biologics and that might help quite a bit.” AK



What topics related to upper and lower airway chronic inflammatory diseases would you like to learn more about in future educational activities?

Biologic Therapies

- Pharmacology of newer medications
- Use, withdrawal, and adverse effects of biologics
- Long-term effects and management strategies

Treatment and Management

- Use of steroids, inhalers, and other medications
- Role of immunotherapy and biologics in treatment
- Surgical indications and management protocols

Disease Differentiation and Mimicry

- Differentiating conditions and their symptoms
- Conditions mimicking upper and lower airway diseases

Specific Conditions

- Asthma management based on allergic causes
- Role of microbiome in airway inflammation
- Specific diseases like COPD, CRSwNP, and pneumonia

Other Topics

- Impact of vaping and viral respiratory infections
- Use of PFTs and spirometry
- Patient adherence and follow-up care strategies



What educational topics related to severe asthma and/or upper airway disease would you like to see more of in the future?

Learners are looking for more information directly comparing medications, methods for discussing asthma care with patients, and how different diseases affect asthma/upper airway disease.



“How additional diseases like gastroesophageal reflux and sleep apnea affect asthma. Things of that nature, I think are very important. How the gastrointestinal issues affect the sinuses... people say, ‘I don't know, my nose is congested,’ but what happens when you treat your reflux while the nose gets less congested?” JK



“I don't know that they would do this -- a head-to-head of this biologic against that biologic for the polyps, for similar patients, similar age groups. An academic center can get medicines that we in the trenches can't get. Even though they might be able to do a study with such and such biologic it, we might know that it's really hard to get approval for that one in my area. Primary care isn't gonna refer for basic stuff that they could do a [combination budesonide/glycopyrrolate/formoterol] or a [fluticasone propionate/salmeterol] or something.” VR



“I know [biologics are] not for the acute management of asthma which virtually takes out all of my interaction with the patient but I'd like to follow through, maybe send a letter to the doctor and suggest and hopefully they're familiar with it. I have some recent literature available for the patients regarding the new biologics and what they can mean to them and reduction, quality of health improvements.” PD



“...how to manage the patients with new information along with these treatment plans for surgery and the biologics...” MA



“Medication education. And the reinforcement and helping the patients.” JB



“Directing the conversation to a level where a primary care would find the information interesting and applicable would probably be the best bet for moving on towards that level. There's patients that don't have doctors trying to get that education out there. ...a national effort to increase education just to the general public would be very helpful. I'm sure that there's probably movements that allow the downloading of apps or online type of education videos with, let's say, thought leaders or even pharmaceutical companies and then allowing free apps to be delivered so that for example, it will teach patients how to monitor and track their symptoms. That would be a great way.” AK



“Something that you can give the patient...a little paper instructional cheat sheet saying, ‘OK this is your controller, this is your rescue. This is how often I wanna see you. This is where your lung capacity is at...’ It's a useful tool for the patient, but that tool has to be of course demonstrated to the provider in some capacity. You know where they're at and control wise...you have to have that close follow up to kind of know exactly where they're falling as far as control of their maintenance medications. And you can see they actually are using their maintenance medications or not.” EZ





What do you feel clinicians should know about severe asthma and/or upper airway disease that you don't think is often taught?

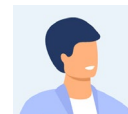
Learners, coming from different practice settings and specialties, have different perspectives on what clinicians should be taught about asthma and upper airway disease: the roles of different healthcare providers, definitions, treatment of triggers/polyps, biomarkers, and physical examinations.



"The question is **whether they don't know or they don't think about it at the time**. I think one of the challenges that people [think] that doctors know all about polyps. I'm sure pulmonologists know about polyps [and] upper airway disease, but they don't think about it when they've got the patient in front of them. My ENT colleague will think about postnasal drip and sinusitis, but he doesn't worry about the asthma. That's my department. So the question really is, **who's the integrator?** A lot of the time it will end up being the primary care doctor...but then are they thinking about it? If you're targeting the education at a mixed group like pulmonologists, then you may have some of the specialist knowledge, but **who is going to integrate that knowledge** for you that will translate into a prescription ...when you've got that one minute at the end of the consultation. **What really translates into action?**" HD



"I think that people forget [that] it's one airway...the anatomy in the upper airway is similar to the anatomy in the lower airway. If you did a biopsy of the upper airway and looked at the cells that are underlying it, it's the same inflammatory cells on the top is they are on the bottom." JK



"Well, I think that one aspect of asthma is [by] **treating triggers of asthma**, you **may circumvent the need for any further therapies**. For example, like ICS or biologics, I mean if they have allergies that trigger their asthma, you treat their allergies [and] they might just be completely fine, so that's another part of education I think would be is important." AK



"...We are reluctant - these polyposis we are tending to treat them separately from the asthma...all these are interrelated and if we control one appropriately, it will significantly benefit the severity of the disease of the lower airway like asthma." MA



"Medication education and reinforcement [to help] patients. Make sure you **cover all the basics** and make sure you **investigate further**. Make sure you are not ...missing any diagnosis differentials and continue looking into the patient. Investigate further and if you have a problem, get a second opinion, get a consultation." JB



"Definitely think **you need to speak more in education about the biomarkers...** I think more education to say this is a common lab. This is something that could be added on to your asthma patients or your allergy patient with recurrent sinusitis and polyps...I think there needs to be **more education to the primary care physician** versus the specialties." ES



"not the most advanced technology, but the oldest technology: **you need to clinically examine a patient to know they're in distress**. Basic physical exam and knowing when to refer to the hospital." PD





The program offered a downloadable reference aid that covered many of the themes addressed in the education. Do you recall this? Have you had an opportunity to refer back to it for patient management?

While not everyone recalls downloading the slides for future reference, those that did mention the utility, including how they may use the resources with their colleagues and patients. Future activities may consider adapting the education for downloadable material specifically to aid in patient conversations, potentially improving adherence to therapy.



"I made some notes just to refresh my memory and ...on Medscape they had downloadable slides of the presentation, so those are very useful and that I can certainly use from an academic standpoint and also from an educational standpoint, **when discussing this type of condition with our patients** and when I go over the new medications that they're not as familiar with, it's nice to have some kind of resource that you can go to that will help **better explain** to them what it is that they're gonna be taking and **how they actually work** so that the patients feel comfortable taking it as prescribed."
PZ



"I downloaded the slides that came with the [education]...**I went through those after** the [activity] because there there is a problem [with the site]. For that reason, it was actually very good that you had the slides to download and go over on your own time." PD



"I don't remember seeing it. I'm sure there was a button to click and download, I would imagine." EZ



"I downloaded it...and I actually **gave it to my nurse practitioners and my nurses as an educational tool**...they were thrilled because they weren't part of it, but it just is a **quick reference guide** to allowing them...not a cheat sheet but I think it just helps them to kind of focus better. Those are the kind of things that allows them to be more effective, which actually cuts down on some of the traction that I get are things that are kind of potholes during my day. So, they're able to answer more questions and go over things for the patients **using that reference**, that **cuts down on additional questions that I need to answer**...having that reference tool has really helped them be able to **explain better** what I am actually referring to." JK



"Yes, I did download some of those but I didn't have time to go through all of them." MA



"I did. I do think I downloaded. I don't think I've looked back at it though, since." ES

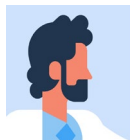




Any final thoughts for the supporters or developers of this education?



"It keeps us licensed ...but through participating in CME programs more importantly, **it just keeps us up to date** and **up to speed** with what's currently going on. And so that ultimately, we could take what we learned through CME programs back into the office and clinically apply it towards patient care quality ... and that's the key thing here." PZ



"It's important to get to keep refreshers of, 'this is where you may know this but hey, maybe you didn't realize this.' Maybe a little nugget of information, 'I just didn't realize that for all this many years I've been doing this,' so **refreshers...[are] always helpful**...that's always one of the nice things about CME is you may realize, 'hey, I hadn't considered that or thought about that in a long time.'" EZ



"I found it pretty comprehensive and **I was very pleased with it**. I thought both of the presenters did an excellent job. The CME portion...was presented very even handedly. And pros and cons were listed for each... I enjoyed it." PD



"**The most important aspect is delivering education**. There are a lot of people that may not understand the triggers, what triggers mean for their asthma, how to control their triggers or prevent being exposed to them ...being able to administer that level of education or information in a very easy and digestible way, for example an app or routine emails that are sent out... or informational post that provides links to downloadable apps and things like that would be the most important thing. I don't see it enough." AK



"I thought **the program was very well done** and I'd like to see more ... to look at things like pulmonary fibrosis, the overlap of COPD and biologics, I think that's another area of great interest." JK



"I think **they're doing a great job** and keep continuing doing the same. New information and better education." JB



"I think just **continue to have your educational programs that are available** and have someone that the physicians can ask questions to and talk to. That's gonna be most helpful." ES



EVALUATION – OTHER COMMENTS

Is there anything else you would like to communicate to us about this activity?

“Very highly informative and clinically relevant, with a strong focus on biologic selection, precision medicine, and the impact of upper airway disease on asthma control.”

“The activity helped a lot with communicating how type 2 inflammation affects asthma.”

“The educational content was up to the mark. It was valuable.”

“Fantastic and thorough presentation! One of the best I've seen.”

“Very well done and timely information.”

“This activity provided valuable insights into optimizing treatment strategies for patients with type 2 inflammation driven diseases. Case based learning and practical application of biomarkers were especially helpful.”

“Good presentations , please continue the same.”

“Extremely well presented technically and regarding content. Just a super talk.”

“A summary with interactive notes and some mind map and/or diagrams, would have been nice; with some take away notes.”



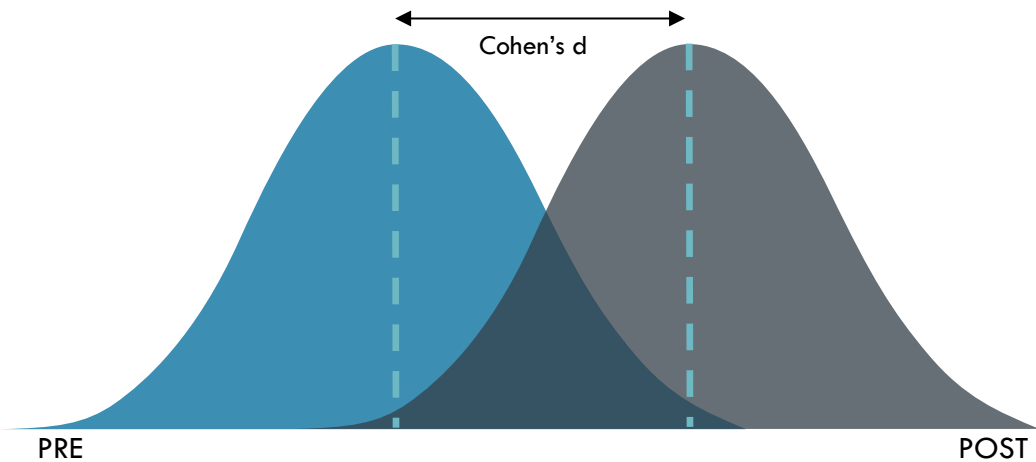
OVERALL EDUCATIONAL IMPACT

This education had a Cohen's d effect size of **1.53** comparing the knowledge and competence questions of the pre- and post-education groups.

INTERPRETATION OF COHEN'S D EFFECT SIZE

Assessment researchers often use general guidelines to help interpret Cohen's d – small (0.2), medium (0.5), and large (0.8).

With a Cohen's d of 1.53, there is an 86% chance that a person picked at random from the "post-education" group will have a higher score than a person picked at random from the "pre-education" group (probability of superiority). For more information on interpreting Cohen's d, refer to <https://rpsychologist.com/cohend/>



KNOWLEDGE/COMPETENCE HIGHLIGHTS	PRACTICE CHANGE	FUTURE EDUCATION
- Post-education, learners showed significant improvements in confidence and competence in managing severe asthma and upper airway diseases. - Learners showed significant knowledge improvement in identifying blood eosinophils as a useful biomarker. - Nearly all learners would now consider a biologic for a patient with asthma and CRSwNP, indicating a shift towards more advanced and targeted treatments, improving patient outcomes without the need for surgery.	- Post-education, learners indicate likelihood to use biomarkers, incorporate biologics, improve monitoring, and develop a multidisciplinary approach to provide comprehensive care for patients. - Interview results show a high level of satisfaction and utility of the education, especially in helping them navigate patient discussions about escalating therapy. - Interviewees listed specific patient management opportunities they have had to use the education.	Future educational interventions should focus on: - Continuing to elucidate novel research and medications to better manage patients with severe asthma and UAD. - Developing resources and tools to help educate patients about available therapies and the importance of adherence to treatment plans. - Key barriers to care, including managing insurance and prior authorizations.



CE OUTCOMES, LLC

CE Outcomes, LLC is an independent healthcare assessment service company. CE Outcomes collaborates with providers of continuing medical education to demonstrate outcomes associated with participation in medical educational interventions congruent with ACCME essentials and standards. Established in 2001, CE Outcomes is dedicated to providing high-quality, objective assessments of healthcare professional practice. CE Outcomes has experience partnering with healthcare services companies, such as medical education providers, to consult on services related to the assessment of performance level outcomes (as defined by Moore's 7 levels of CME outcomes measurement) and to assist with components of outcomes assessment. Additional information on CE Outcomes is available at www.ceoutcomes.com.

Please contact CE Outcomes with any questions or to request further analyses of this educational activity.



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