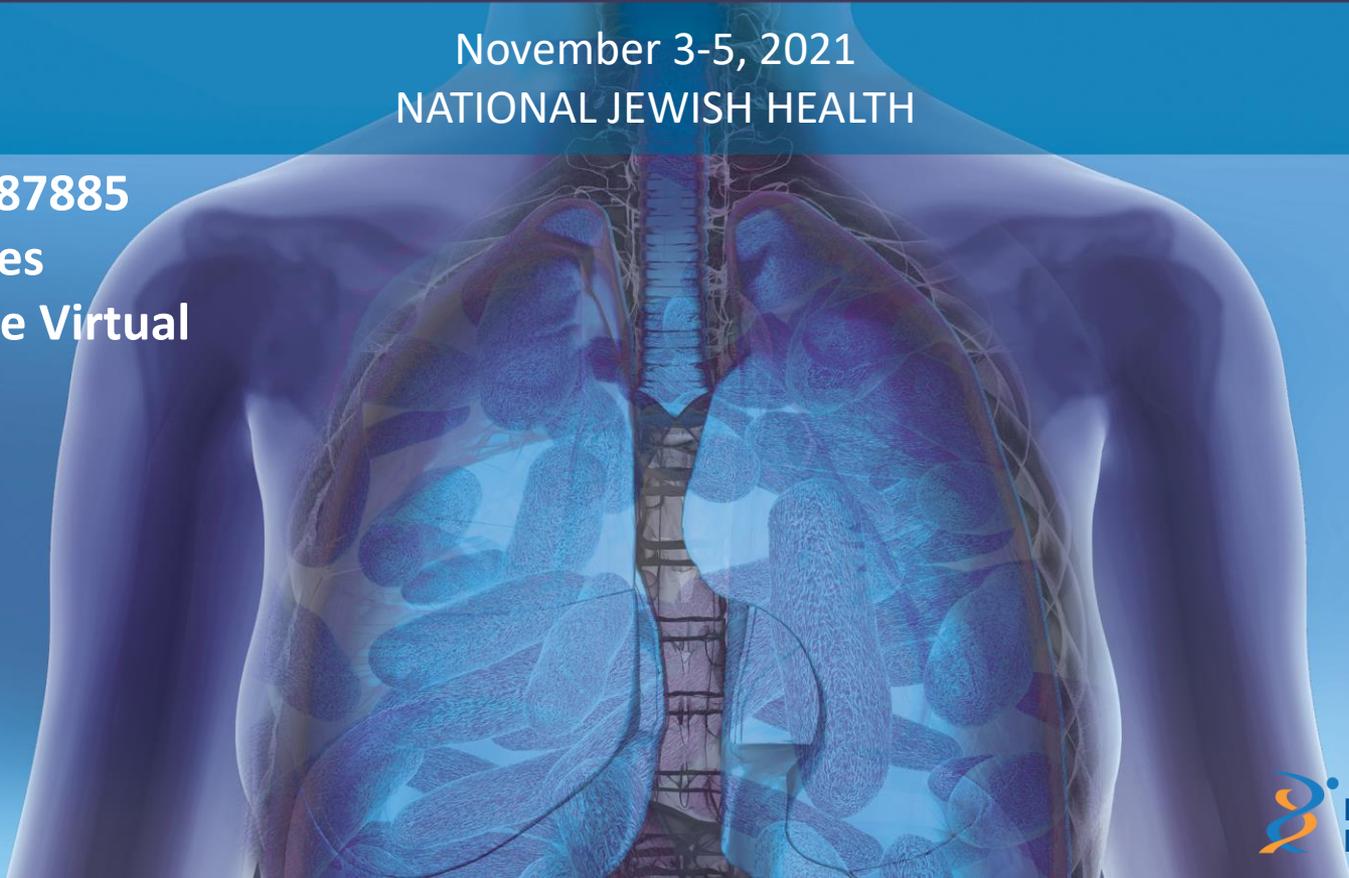


# NTM Lecture Series for Providers

November 3-5, 2021  
NATIONAL JEWISH HEALTH

Grant ID: 69387885  
Final Outcomes  
Summary: Live Virtual  
Activity





# Executive Summary: Activity Details

The 2021 Annual NTM Lecture Series for Providers and Patients was a four-day interactive live virtual conference. The first three days of the conference was focused on education for providers, and the final day educated patients and their families. Faculty included key opinion leaders from across the U.S. who delivered lectures with opportunity for question and answer after each presentation. Both components of the conference were recorded and endured online for paid registrants.

## Learning Objectives: Provider Course

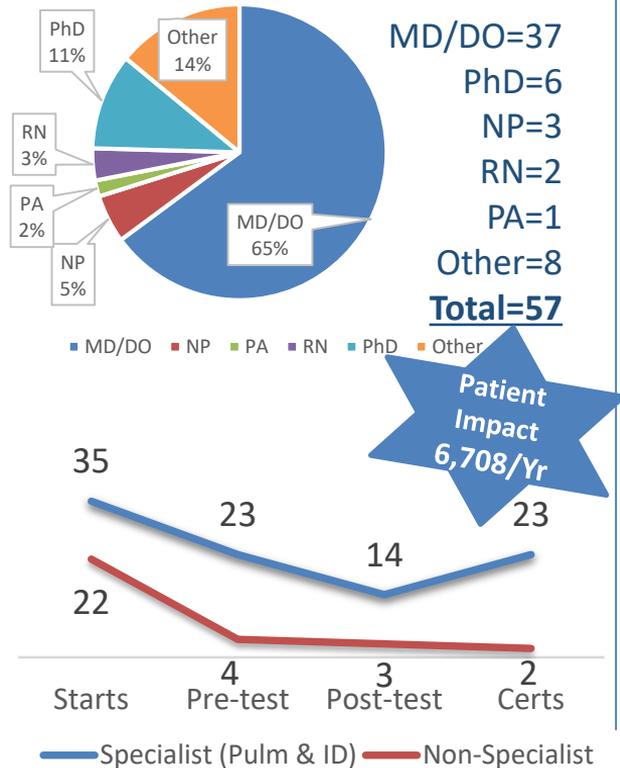
- Describe the guidelines for the diagnosis and treatment of NTM infections
- Differentiate the various types of NTM infections
- Identify the clinical manifestations of NTM disease
- Recognize the incidence and distribution of NTM disease
- Apply the latest evidence to make decisions about pharmacologic and non-pharmacologic management of NTM

## Learning Objectives: Patient Course

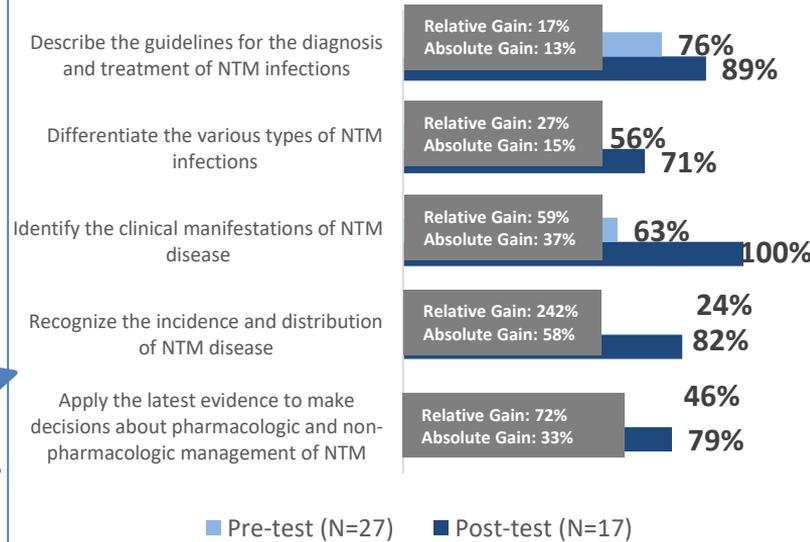
- Summarize the incidence, prevalence and clinical manifestations of NTM and bronchiectasis
- Review current and emerging treatment options for NTM and associated comorbidities
- Identify strategies to embrace a healthy lifestyle and minimize side effects
- Discuss available resources and support networks to enhance overall quality of life for NTM patients and their families

# Quantitative Educational Impact Summary: Live Virtual Program

## Participation: Learner/ Completers



## Learning Gain Across Objectives



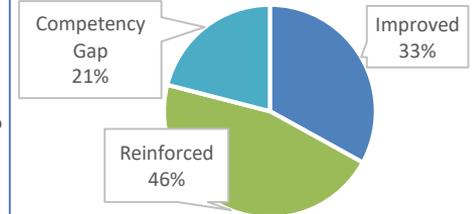
## Confidence @ Post-Test



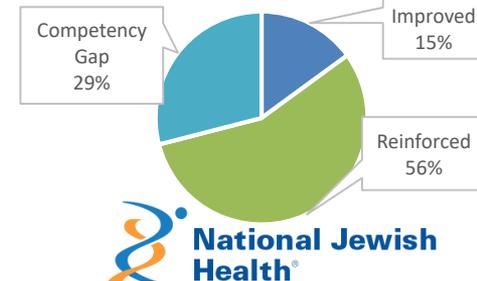
## Persistent Learning

### Gaps/Needs

21% of learners remained unable to apply latest evidence to make decisions about pharmacotherapy



29% of learners remained unable to differentiate the various types of NTM infections



# Qualitative Educational Impact Summary: Live Virtual Program

## Patient Impact

**25**

Evaluation  
respondents

Who see

**129**

NTM Patients Weekly

Which translates to

**6,708**

Patient Visits Annually

## Educational Impact

### Knowledge and Competence Change by Learning Objective

- ✓ Recognition of the incidence and distribution of NTM disease increased by **242%** [N=17]
- ✓ Ability to identify the clinical manifestations of NTM disease increased by **59%** [N=17]
- ✓ Differentiation of the various types of NTM infections increased by **27%** [N=17]
- ✓ Describing the guidelines for the diagnosis and treatment of NTM infections increased by **17%** [N=17]
- ✓ Application of latest evidence to make decisions about pharmacologic and non-pharmacologic management of NTM increased by **72%** [N=17]

## Practice Change

**83%**

Reported changing their  
practice [N=6]

**32**

NTM patients will benefit  
from improved practice

Which translates to

**1,664**

interventions annually  
impacted

## Thank you to all the faculty who make this program possible!

**Charles Daley, MD (Program Co-Director)**

Chief, Division of Mycobacterial and Respiratory Infections  
Professor of Medicine  
National Jewish Health

**Shannon H. Kasperbauer, MD (Program Co-Director)**

Associate Professor of Medicine  
Division of Mycobacterial and Respiratory Infections  
National Jewish Health

**Edward D. Chan, MD**

Staff Physician  
Pulmonary Section  
Denver Veterans Affairs Medical Center  
Professor of Medicine  
Division of Pulmonary Sciences and Critical Care Medicine  
University of Colorado Denver Anschutz Medical Campus

**Keira A. Cohen, MD**

Assistant Professor of Medicine  
Director, The Johns Hopkins Center for Nontuberculous  
Mycobacteria and Bronchiectasis  
Johns Hopkins Medicine

**Jared J. Eddy, MD**

Assistant Professor of Medicine  
Director of Infection Prevention & Antimicrobial Stewardship  
Division of Mycobacterial & Respiratory Infections  
Department of Medicine

**David E. Griffith, MD**

Professor of Medicine  
Division of Mycobacterial & Respiratory Infections  
National Jewish Health

**Jennifer R. Honda, PhD**

Assistant Professor  
Center for Genes, Environment & Health  
Department of Immunology and Genomic Medicine  
National Jewish Health

**Gwen Huitt, MD, MS**

Professor of Medicine  
Division of Mycobacterial and Respiratory Infections  
National Jewish Health

*"I learned something new from every lecture."*

- Live virtual provider conference attendee

## Thank you to all the faculty who make this program possible!

**Reeti Khare, PhD, D(ABMM)**

Director, Infectious Disease Laboratory  
Advanced Diagnostic Laboratories  
National Jewish Health

**Jeff King, MD**

Chief, Division of Gastroenterology  
Medical Director, GI Procedures Unit  
National Jewish Health

**Tilman L. Koelsch, MD**

Assistant Professor of Radiology  
National Jewish Health

**Amy Leitman, JD**

President of Policy & Advocacy  
NTM Info & Research (NTMir)

**Steven E. Lommatzsch, MD**

Associate Professor of Medicine  
Adult Site Co-Director, PCD Foundation  
Division of Pulmonary, Critical Care & Sleep Medicine  
National Jewish Health

**Michelle MacDonald, MS, RDN, CDE**

Clinical Dietitian Supervisor  
Certified Diabetes Educator  
Clinical Nutrition Services  
National Jewish Health

**Stacey Martiniano, MD**

Associate Professor of Pediatrics  
University of Colorado School of Medicine

**John D. Mitchell, MD**

Courtenay C. and Lucy Patten Davis Endowed Chair in Thoracic Surgery  
Professor and Chief, General Thoracic Surgery  
University of Colorado School of Medicine

*"I really appreciated this activity. All the presentations were very well synthesized. You did a very good job of covering all the important topics."*

- Live virtual provider conference attendee

## Thank you to all the faculty who make this program possible!

### D Rebecca Prevots, PhD, MPH

Chief, Epidemiology and Population Studies Unit  
Laboratory of Clinical Immunology and Microbiology  
Division of Intramural Research  
NIAID, NIH

### Elizabeth Devon Smith, PhD

Assistant Professor of Medicine  
Division of Pulmonary, Critical Care & Sleep Medicine  
National Jewish Health

### Michael Strong, PhD

Associate Professor  
Office of Academic Affairs  
Center for Genes, Environment and Health  
National Jewish Health

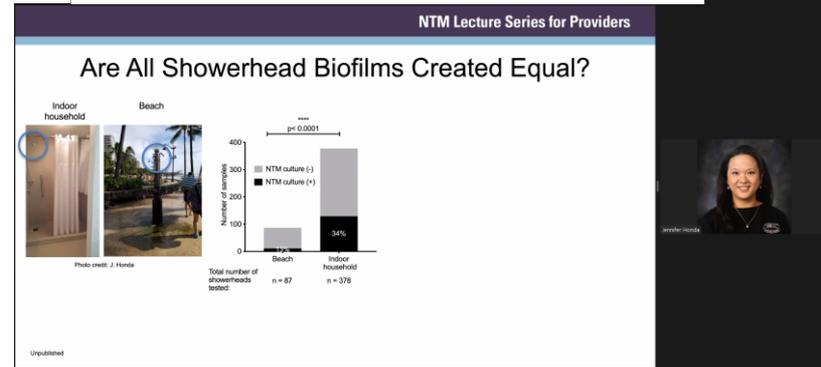
### Cheryl Torres, RRT

Respiratory Therapist  
National Jewish Health

### Lymphadenitis

<sup>1</sup>Tuber Lung Dis 1995;76:300-310  
<sup>2</sup>Pediatr Infect Dis J. 2008;27(10):920

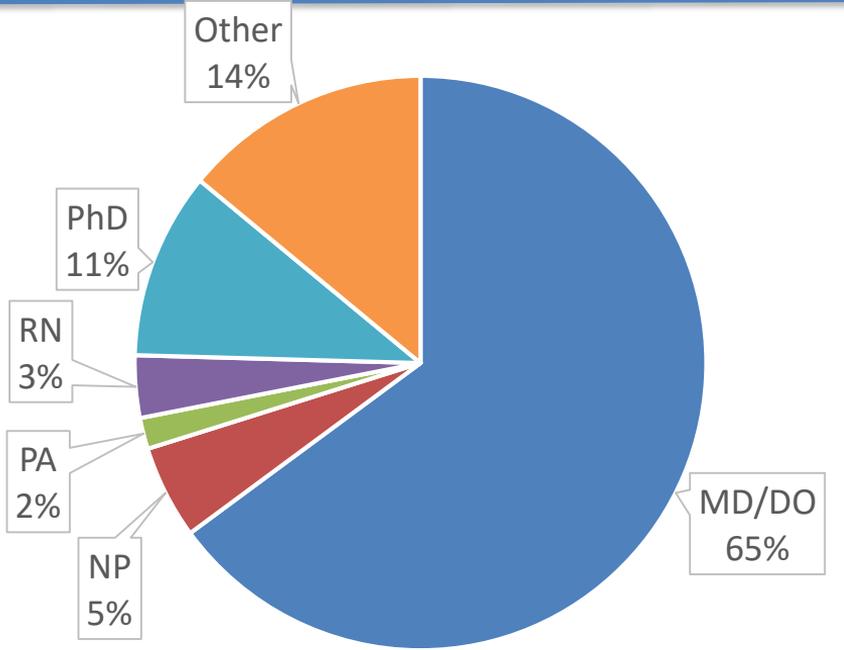
- Sub-acute/chronic unilateral cervical nontender lymphadenitis in children (< 5 years old)
- *M. avium* complex, *M. scrofulaceum*, *M. malmoense*, *M. haemophilum*
- ~300 cases/year in US
- Risk factors
  - Children
  - Immunocompromised
  - Protective effect of BCG vaccination?<sup>1</sup>
- Diagnosis: LN biopsy
- Treatment:
  - surgical excision (95% cure)
  - Observation<sup>2</sup>



*"Truly excellent! I learned a great deal and really enjoyed the conference."*

- Live virtual provider conference attendee

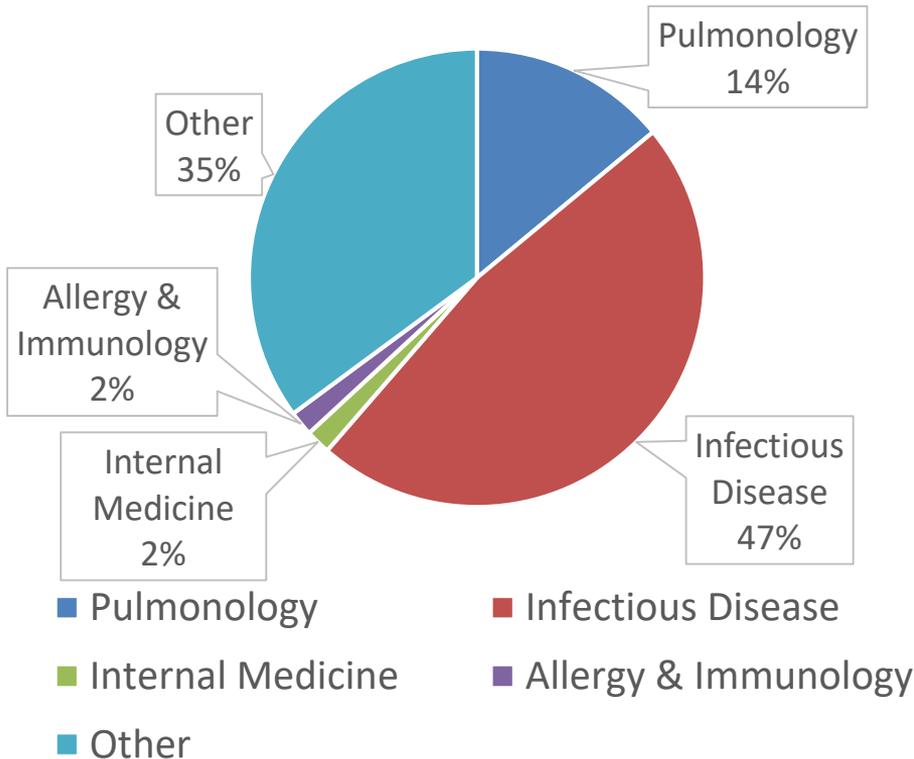
# Level 1 Outcomes: Participation (Learner/completers) by Degree – Live Virtual Program



MD/DO	37
PhD	6
NP	3
RN	2
PA	1
Other	8
	<b>57</b>

■ MD/DO ■ NP ■ PA ■ RN ■ PhD ■ Other

# Level 1 Outcomes: Participation by Specialty (Learner/completers) – Live Virtual Program



Infectious Disease	27
Pulmonology	8
Internal Medicine	1
Allergy & Immunology	1
Other (no specialty specified; microbiology; biomedical engineering; project management; clinical dietician)	20
	57

## Marketing Strategies – National Jewish Health Marketing



NJH Website

2021 NTM Lecture Series for Providers (Online)



For more information, please contact:  
The Office of Professional Education  
at National Jewish Health  
800.844.2305

Register below to access the recorded virtual sessions and earn CME/CC credits. These recordings will be available until 12/31/2021. For more information or if you have questions, please contact The Office of Professional Education at National Jewish Health at [ProEd@njh.org](mailto:ProEd@njh.org).

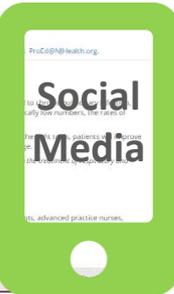
**Purpose:**

Non-tuberculous mycobacteria (NTM) are ubiquitous in our environment. The clinical manifestations include but are not limited to lymphadenitis, disseminated disease or skin and soft tissue infection. As we watch the incidence of tuberculosis drop, infections due to NTM are increasing. These infections are under recognized and cause significant morbidity and mortality. Treatment options are arduous to clinically. During the live virtual program, we had experts from across the country here to discuss this growing medical issue. National Jewish Health has a 120 year history as the leading respiratory hospital in the nation and is the only hospital devoted to the study and treatment of respiratory diseases.

**Who Should Register:**

Family physicians and internal medicine physicians, along with pulmonologists, infectious disease physicians, physician assistants, registered nurses, and other health care professionals who diagnose and treat patients with Nontuberculous Mycobacteria.

Description Schedule & Location Registration



Social Media



National Jewish Health Medical Education @NJHealthMe... · Oct 27 ... Did you enjoy the #NTMtwitterC tonight? Then join us for the NTM Lecture Series for Providers 11/3 - 11/5 on Zoom! Registered attendees will receive access to the recordings. Learn more here: [#IDTwitter #MedTwitter #pulmonary](http://nationaljewish.org/2021ntmprovide...)

**NTM Lecture Series for Providers**




**PRESENTATION TOPICS**

- Epidemiology of NTM
- Treatment of Slow Growing Mycobacteria
- Treatment of Rapidly Growing Mycobacteria
- Surgical Management
- Drug Side Effects
- Bronchiectasis
- Emerging Therapies in NTM Pulmonary Disease
- Cystic Fibrosis Related NTM Infections
- Extrapulmonary NTM
- Mycobacterial Lab

National Jewish Health



National Jewish Health  
7,646 followers  
1mo · 🌐

Join program co-chairs Drs. Daley and Kasperbauer with other NTM experts from National Jewish Health and around the United States to learn the latest research updates and treatment options for nontuberculous mycob...see more

**NTM Lecture Series for Providers**




**PRESENTATION TOPICS**

- Epidemiology of NTM
- Treatment of Slow Growing Mycobacteria
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- Drug Side Effects
- Bronchiectasis
- Emerging Therapies in NTM Pulmonary Disease
- Cystic Fibrosis Related NTM Infections
- Extrapulmonary NTM
- Mycobacterial Lab

National Jewish Health



Targeted Emails to NJH Database, & AMA list

National Jewish Health  
Breathing Science Is Life.



**NTM Lecture Series for Providers**

Learn the latest updates and treatment options for your patients with Nontuberculous Mycobacteria (NTM)

<https://www.nationaljewish.org/2021ntmproviders>

**November 3-5, 2021 (Virtual)**

- Wednesday, November 3 (4:15 – 7:15 pm MT)
- Thursday, November 4 (4:15 – 7:30 pm MT)
- Friday, November 5 (7:45 am – 4:15 pm MT)

[Register Now!](#)

**Can't attend the whole conference live?**

Registered attendees will have access to the recordings with credit claiming.

**Who should attend?**

Family physicians and internal medicine physicians, along with pulmonologists, infectious disease physicians, physician assistants, advanced practice nurses, registered nurses, and other health care

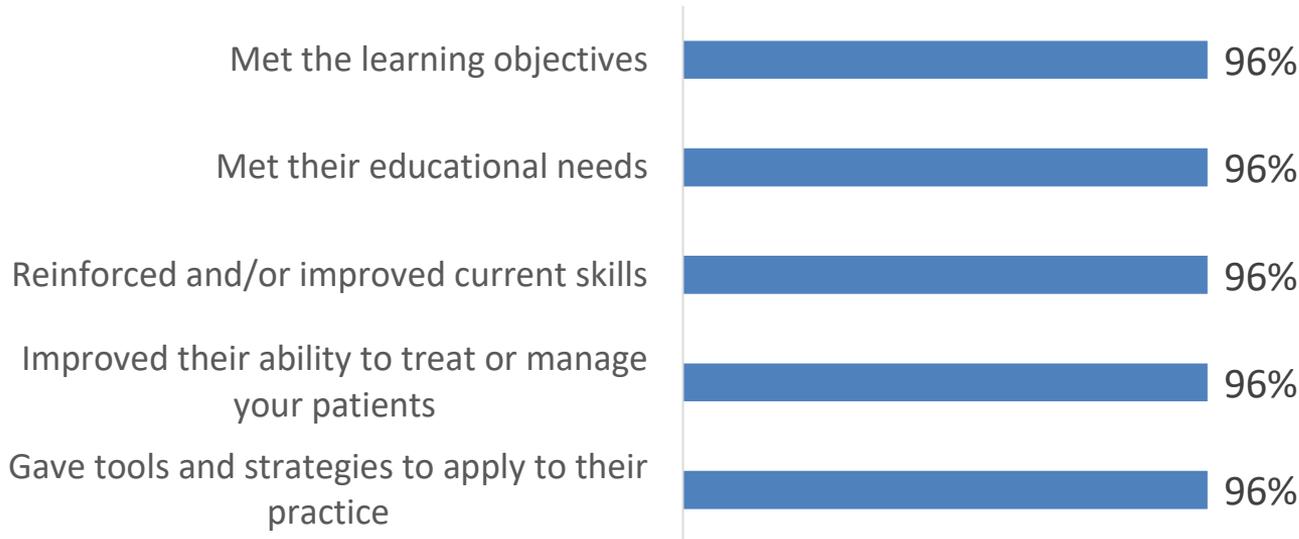
**Opportunity for Patients:**

Please tell your patients about the **NTM Lecture Series for Patients and Their Families** on Saturday, November 6, 2021. For more information, call 800.844.2305 or visit: <http://njhealth.org/2021117NTMseries>



## Level 2 Outcomes: Learning & Satisfaction – Live Virtual Program

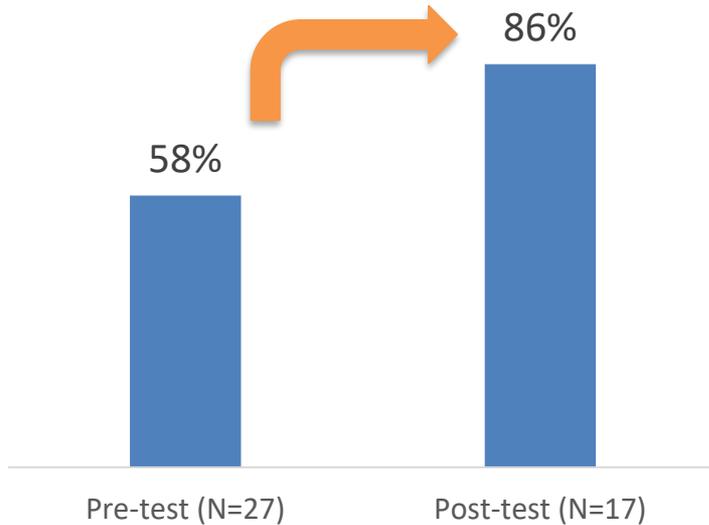
*Analysis of participant responses related to educational needs*  
Participants rated “good to excellent” for how well the activity:



Learners reported high levels of satisfaction related to the ability of the activity to impact practical applications

N=25

## Level 3/4 Outcomes: Overall Learning (Knowledge/Competence): Live Virtual Program



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

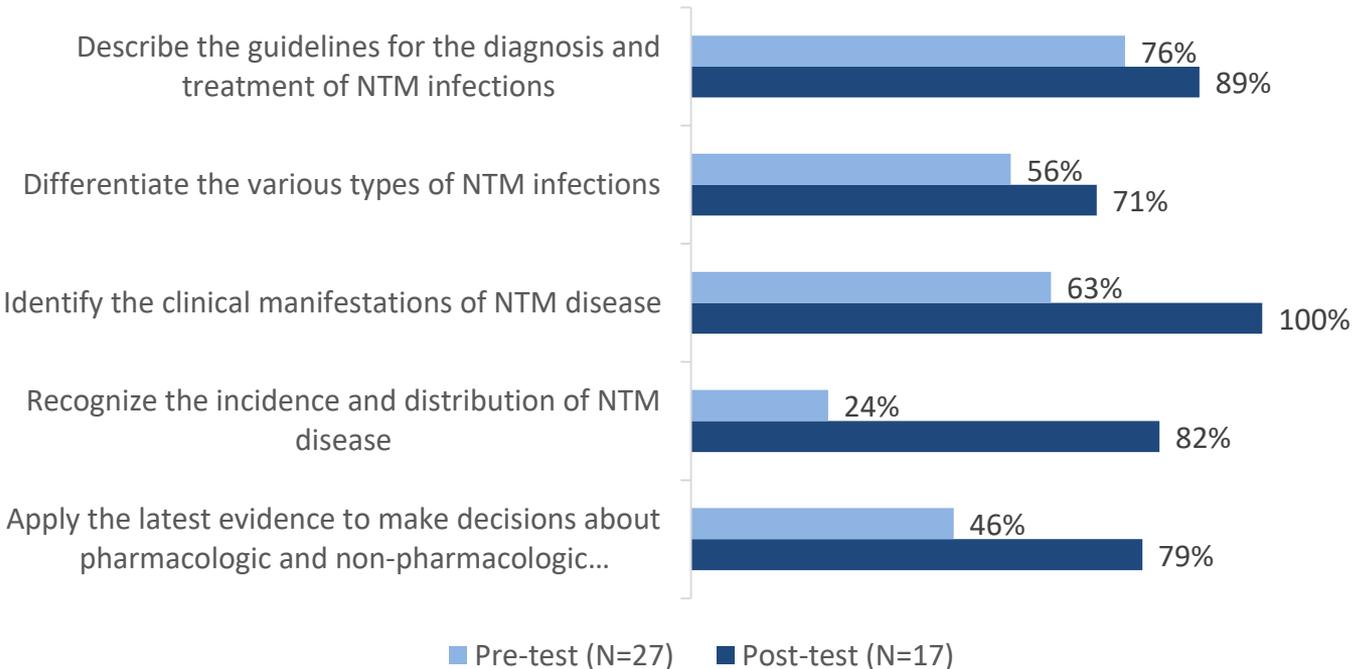
A blue box containing two statistics. The top statistic is 'Overall relative knowledge gain by question from pre- to post-activity' with a value of '48%' and an orange arrow pointing upwards. The bottom statistic is 'Overall absolute knowledge gain by question from pre- to post-activity' with a value of '28%'.

Overall relative knowledge gain by question from pre- to post-activity  
**48%**

Overall absolute knowledge gain by question from pre- to post-activity  
**28%**

# Level 3&4 Outcomes: Learning by Objective (Knowledge/Competence) – Live Virtual Program

## Learning Objective Knowledge Gain



Relative Gain in Knowledge by LO: **58%**

Absolute Gain in Knowledge by LO: **31%**



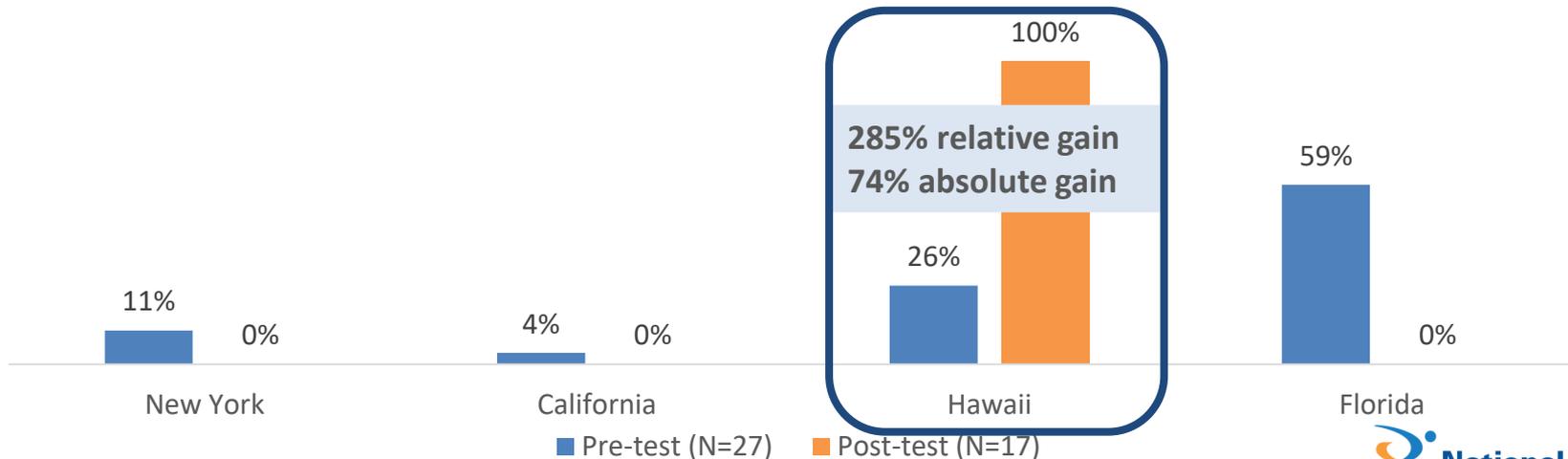
Note: Knowledge gain by learning objective is calculated using a weighted average. Therefore, it differs from the knowledge gain by question shown in the previous slide.

# Level 3/4 Outcomes: Question 1 (Pre/Post-Test) – Live Virtual Program

**Learning Objective:** *Recognize the incidence and distribution of NTM disease.*

**Q1: Which state in the US has the highest rate of NTM infection?**

Question 1 (Pre/Post-Test)

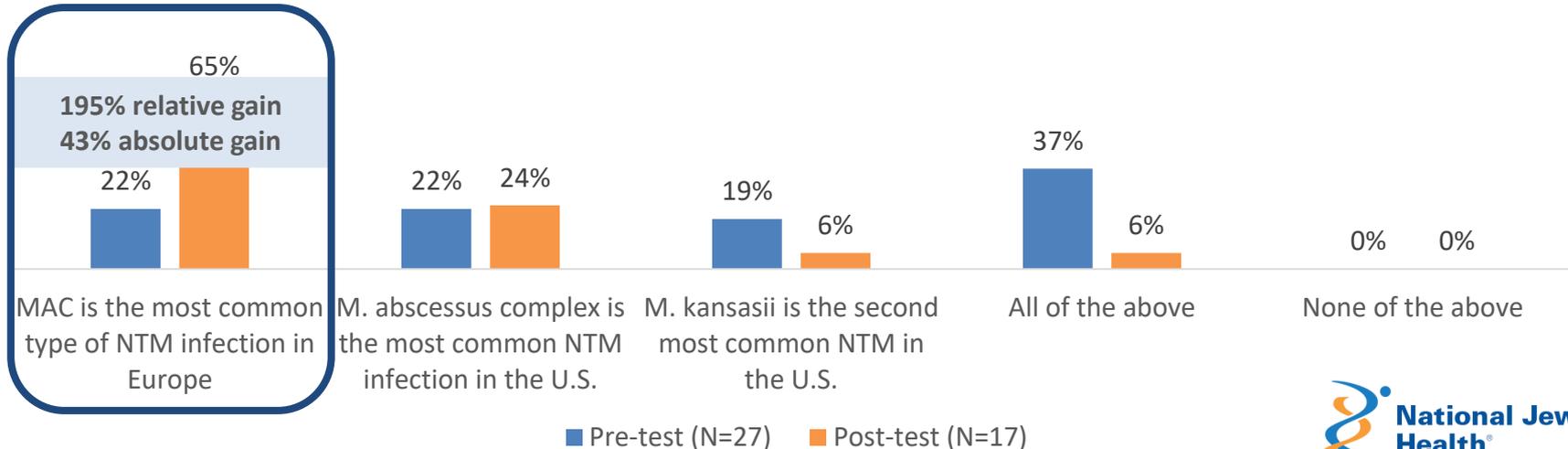


## Level 3/4 Outcomes: Question 2 (Pre/Post-Test) – Live Virtual Program

**Learning Objective:** *Recognize the incidence and distribution of NTM disease*

**Q2:** Within the cystic fibrosis population, which of the following is true?

### Question 2 (Pre/Post-Test)

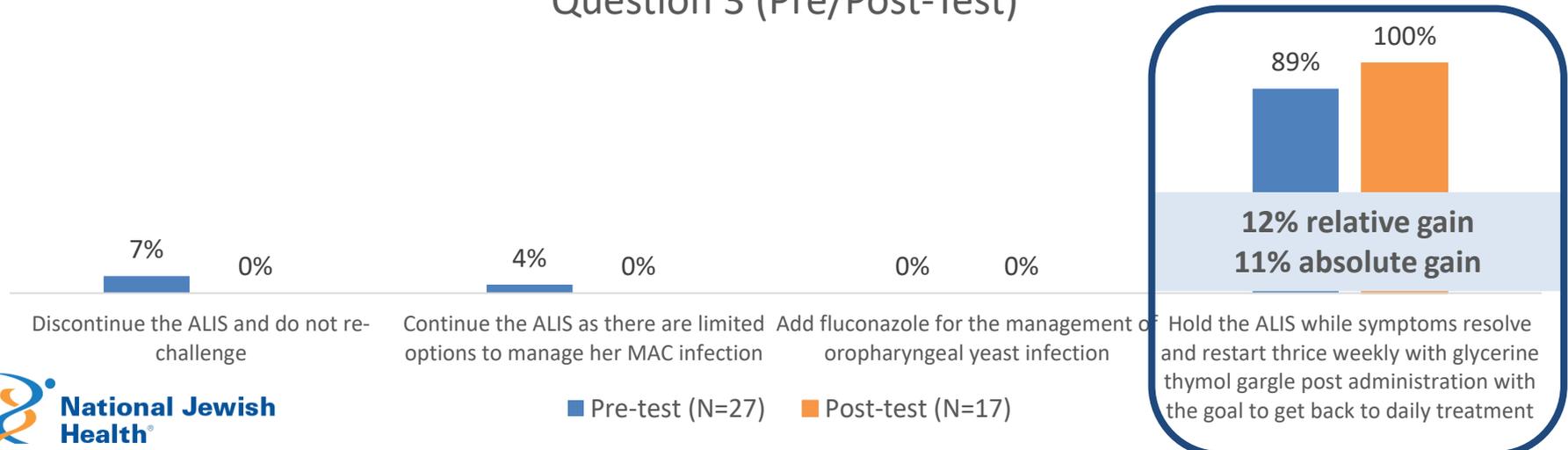


# Level 3/4 Outcomes: Question 3 (Pre/Post-Test) – Live Virtual Program

**Learning Objective:** Describe the guidelines for the diagnosis and treatment of NTM infections

**Q3:** A patient is started on amikacin liposomal inhalation suspension (ALIS) in addition to her azithromycin and ethambutol that she has been taking for a year. She is allergic to rifampin and rifabutin. After 2 weeks she calls complaining of hoarseness and sore throat. What is the appropriate next step?

## Question 3 (Pre/Post-Test)

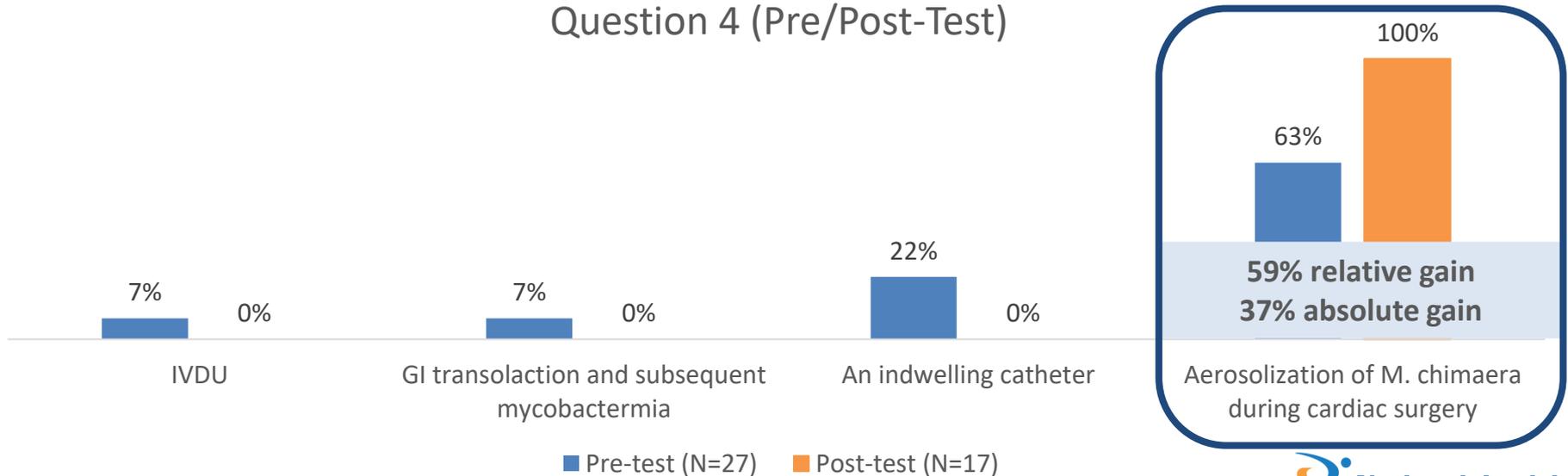


# Level 3/4 Outcomes: Question 4 (Pre/Post-Test) – Live Virtual Program

**Learning Objective:** *Identify the clinical manifestations of NTM disease*

**Q4: A patient with *M. chlamydia* endocarditis most likely acquired infection from:**

Question 4 (Pre/Post-Test)

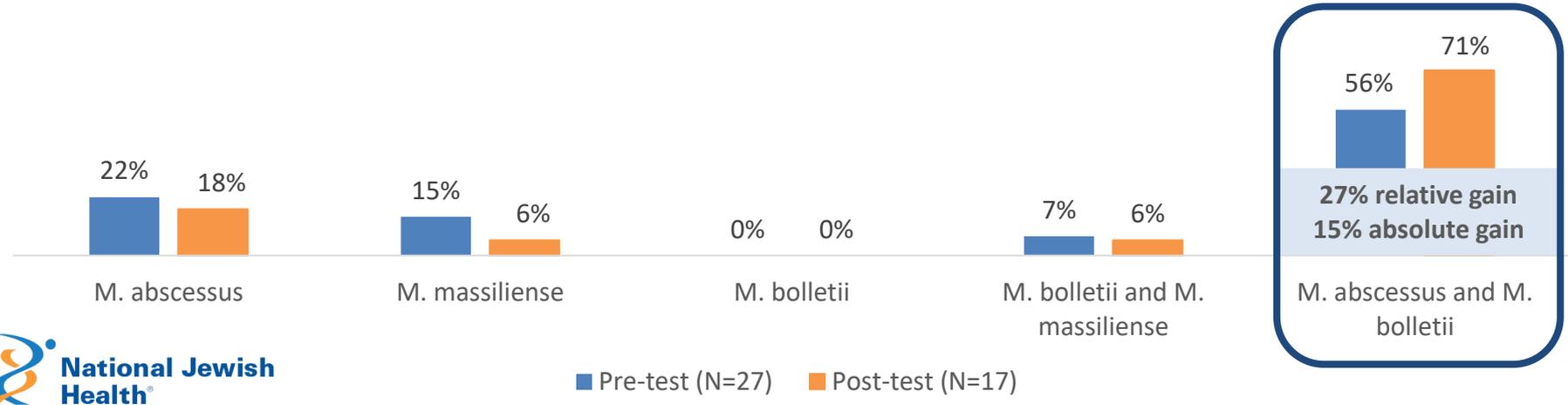


# Level 3/4 Outcomes: Question 5 (Pre/Post-Test) – Live Virtual Program

**Learning Objective:** Differentiate the various types of NTM infections.

**Q5:** In which subspecies of the *M. abscessus* complex is the *erm41* gene usually functional?

Question 5 (Pre/Post-Test)

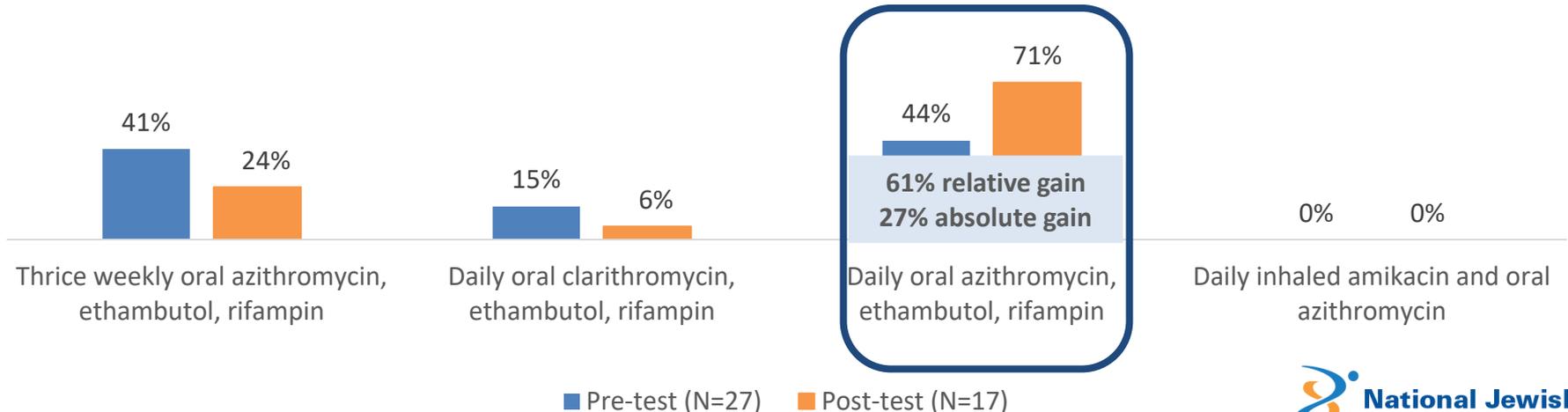


# Level 3/4 Outcomes: Question 6 (Pre/Post-Test) – Live Virtual Program

**Learning Objective:** Describe the guidelines for the diagnosis and treatment of NTM infections.

**Q6:** What do the CFF/ECFS consensus guidelines recommend for first-line treatment for macrolide-susceptible, non-cavitary MAC in patients with cystic fibrosis?

## Question 6 (Pre/Post-Test)

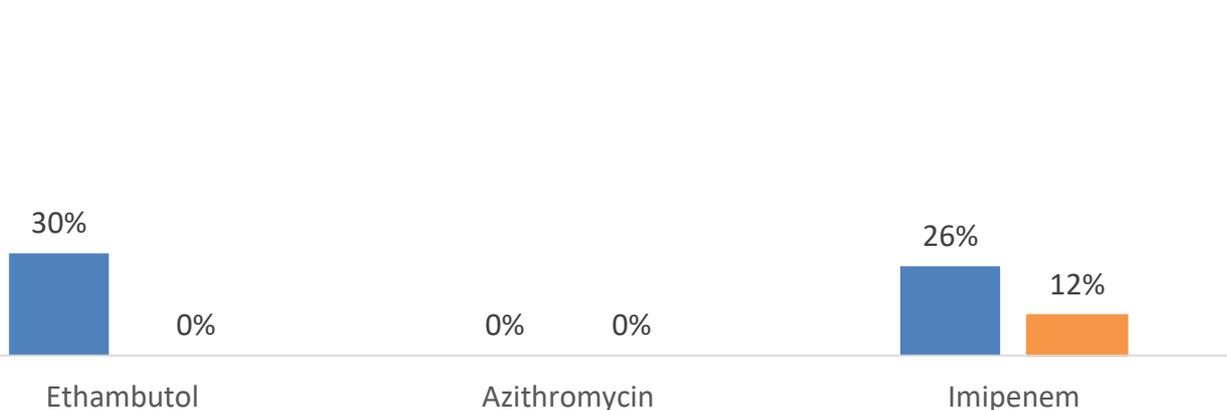
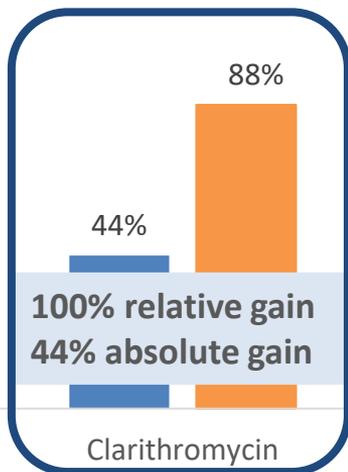


## Level 3/4 Outcomes: Question 7 (Pre/Post-Test) – Live Virtual Program

**Learning Objective:** Apply the latest evidence to make decisions about pharmacologic and non-pharmacologic management of NTM

**Q7:** Which medication can cause significant accumulation of rifabutin if given as part of a multidrug regimen for *M. avium* infection?

## Question 7 (Pre/Post-Test)



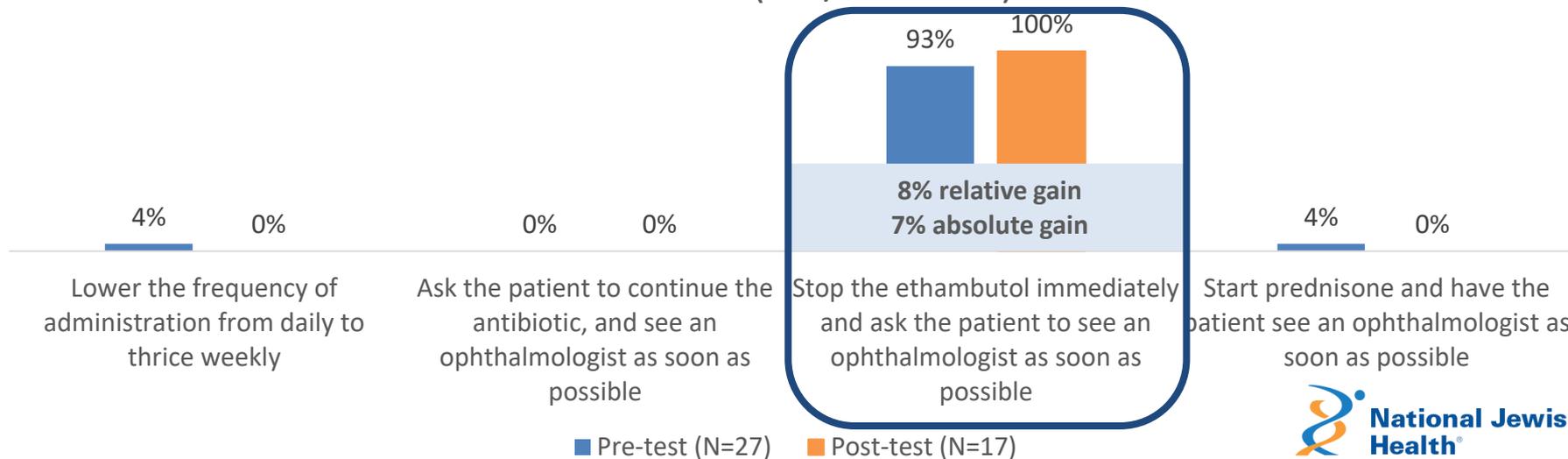
■ Pre-test (N=27) ■ Post-test (N=17)

# Level 3/4 Outcomes: Question 8 (Pre/Post-Test) – Live Virtual Program

**Learning Objective:** Describe the guidelines for the diagnosis and treatment of NTM infections.

**Q8:** If you suspect ethambutol induced optic neuritis, what is your first recommendation to the patient?

## Question 8 (Pre/Post-Test)

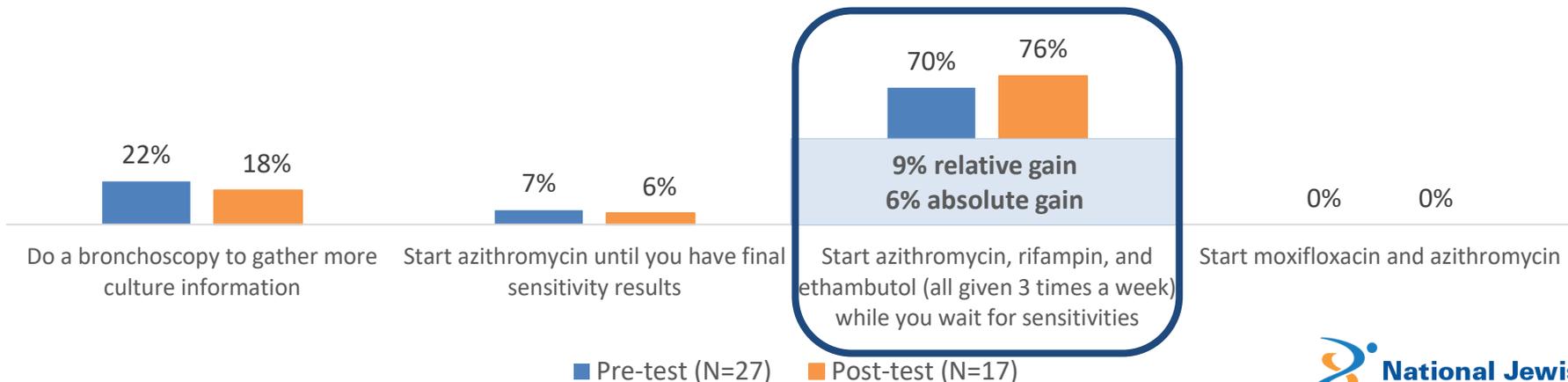


## Level 3/4 Outcomes: Question 9 (Pre/Post-Test) – Live Virtual Program

**Learning Objective:** Describe the guidelines for the diagnosis and treatment of NTM infections.

**Q9:** You have an 80-year-old patient on diltiazem, insulin, and pantoprazole with newly diagnosed pulmonary non-cavitary *M. avium* infection based on 2 smear negative/ culture positive sputums with moderate cough and fatigue. The CT scan shows only tree-in-bud changes. What diagnosis/treatment is most appropriate at this time?

### Question 9 (Pre/Post-Test)

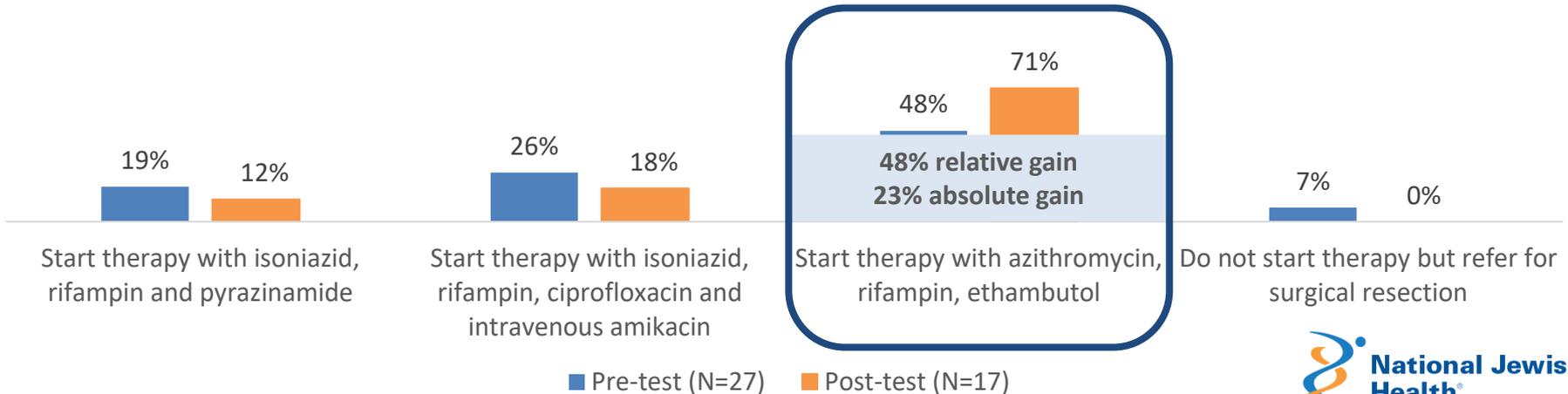


# Level 3/4 Outcomes: Question 10 (Pre/Post-Test) – Live Virtual Program

**Learning Objective:** Apply the latest evidence to make decisions about pharmacologic and non-pharmacologic management of NTM

**Q10:** A 70 year old man grows *Mycobacterium kansasii* from three out of three sputum specimens. Chest CT scan shows evidence of fibrocavitary changes in the left upper lobe and areas of emphysema. The patient complains of shortness of breath and some weight loss but minimal cough. Which of the following is the most appropriate next step?

## Question 10 (Pre/Post-Test)

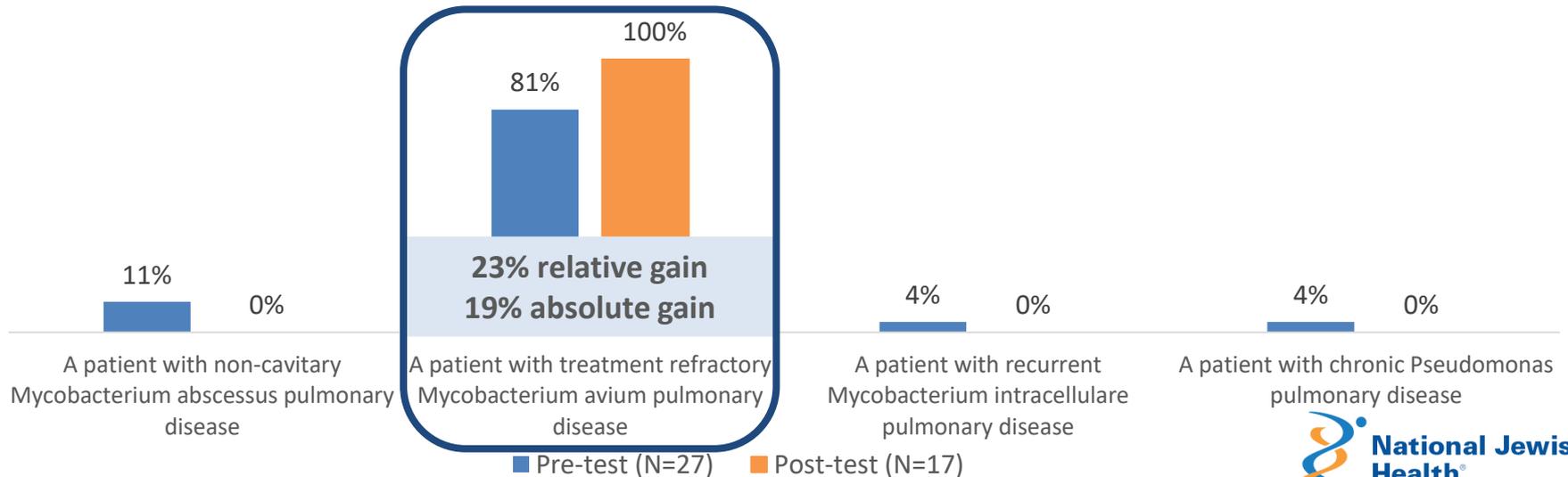


# Level 3/4 Outcomes: Question 11 (Pre/Post-Test) – Live Virtual Program

**Learning Objective:** Describe the guidelines for the diagnosis and treatment of NTM infections.

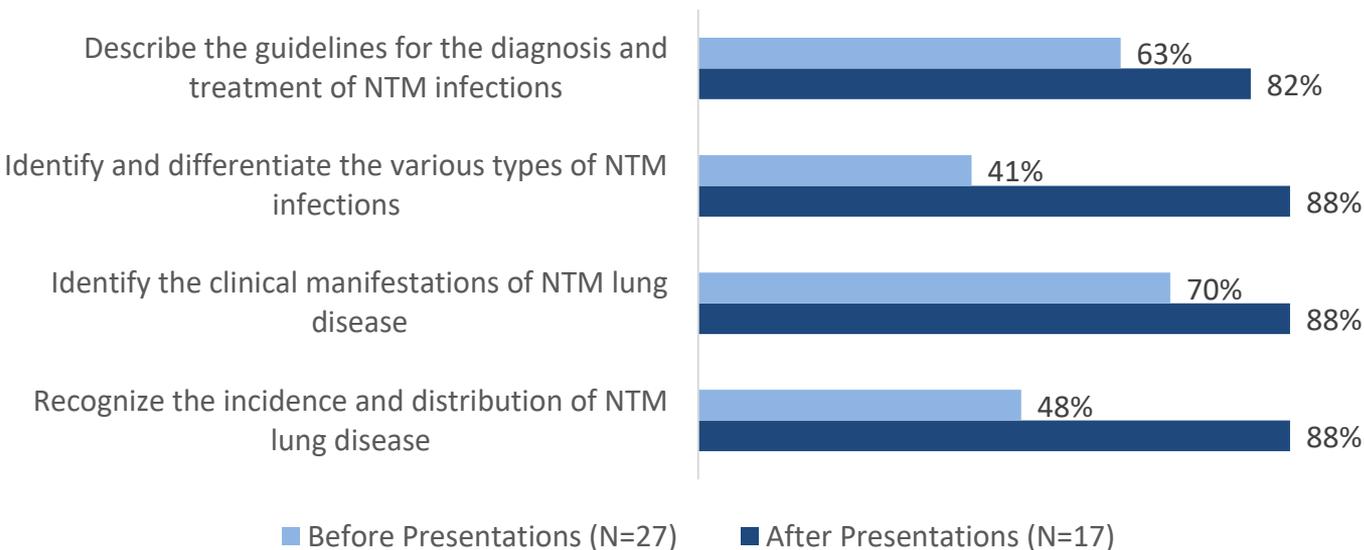
**Q11:** Amikacin liposome inhalation suspension is approved by the Federal Drug Administration (FDA) for treatment of which of the following patients?

## Question 11 (Pre/Post-Test)



## Level 4 Outcomes: Competence – Live Virtual Program

Learners reported their confidence on the learning objectives before and after the virtual program (somewhat confident – very confident)

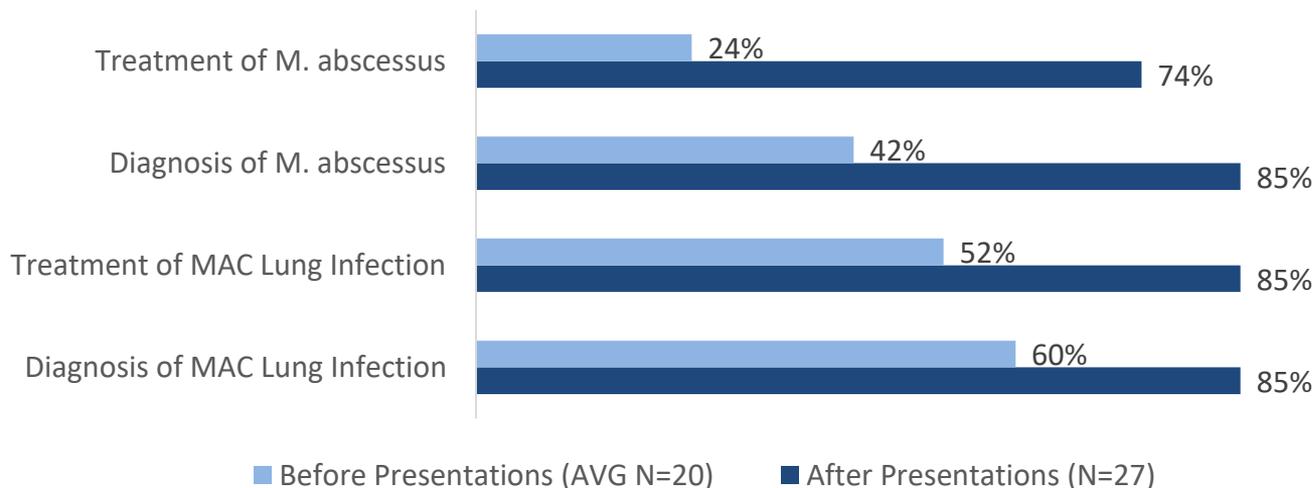


Relative Gain in Confidence: 55%

Absolute Gain in Confidence: 31%

## Level 4 Outcomes: Competence – Live Virtual Program

Learners reported their confidence on the diagnosis and treatment of MAC lung infection and M. abscessus before and after the virtual program (somewhat confident – very confident)

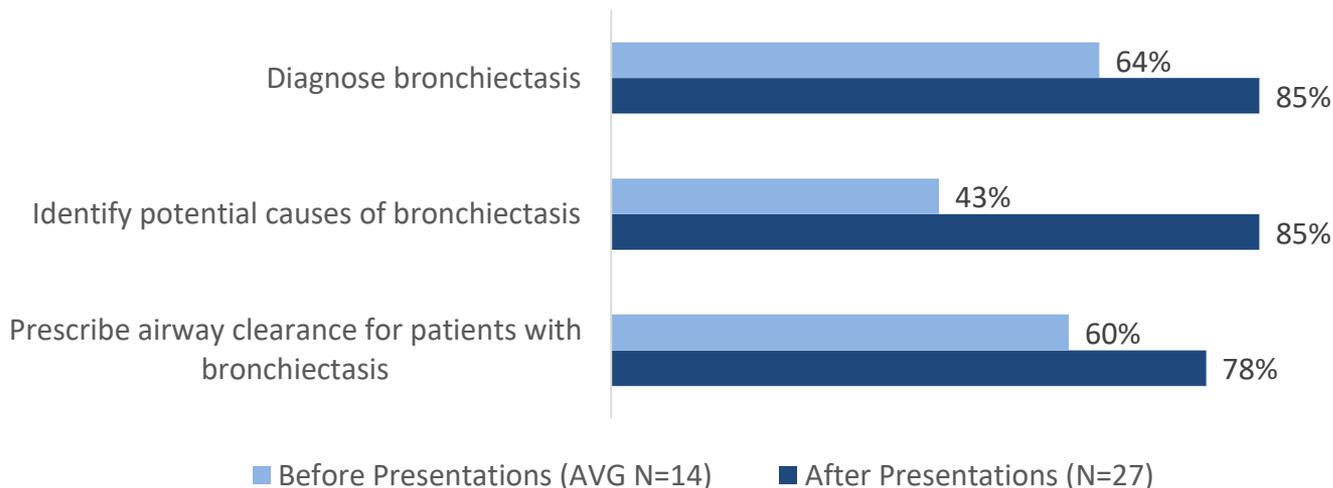


Relative Gain in Confidence: 82%

Absolute Gain in Confidence: 37%

## Level 4 Outcomes: Competence – Live Virtual Program

Learners reported their confidence on the diagnosis and treatment of bronchiectasis before and after the virtual program (somewhat confident – very confident)



Relative Gain in Confidence: 48%

Absolute Gain in Confidence: 27%

# Level 4 Outcomes (Competence): Live Virtual Program

An analysis of open-ended comments demonstrates the following changes learners intend to make:

96%

N=25

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

27%

Adjustments in standards of care and treatment strategies

27%

Improvements in diagnosis and assessment of NTM and bronchiectasis

16%

Changes in medication regimens and awareness of side effects

9%

Frequent cultures and assessment of culture conversions

7%

Integrate airway clearance into care plan

7%

Refer when needed

7%

Improvement in patient communication and education

N=30\*

\*N is larger because some respondents reported more than one intended practice change

# Program Evaluation: Live Virtual Program

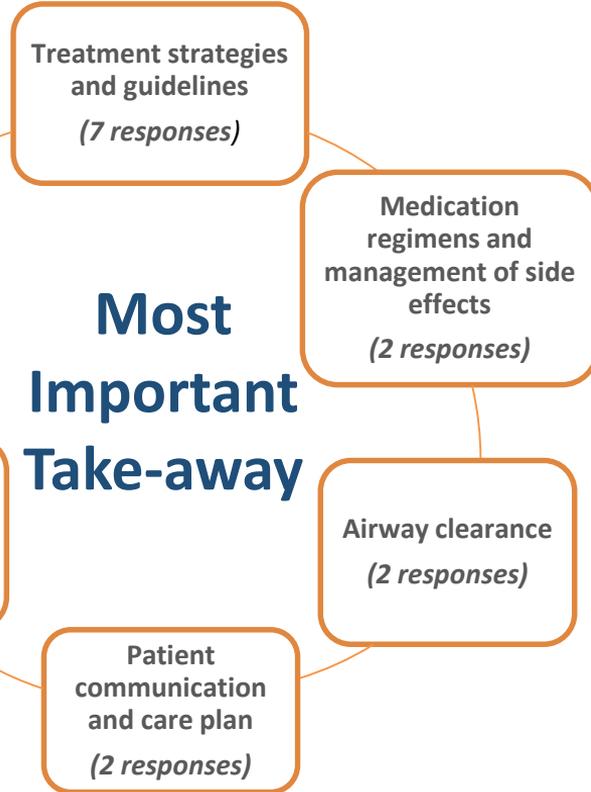
100%

- Material presented in an objective manner and free of commercial bias

96%

- Content presented was evidence-based and clinically relevant

N=25



N=17

## Program Evaluation: Live Virtual Program

**What do you believe is the greatest barrier to treatment adherence among patients with NTM?**

Pill burden	Length of therapy
Side effects	Lack of understanding
Complexity it adds to daily life	Exhaustion with labs, meds, insurance

**What topics would you like more information about in future educational activities?**

NTM complex cases	Advocacy efforts for improved drug access
NTM treatment approaches	Creation of multidisciplinary NTM clinic

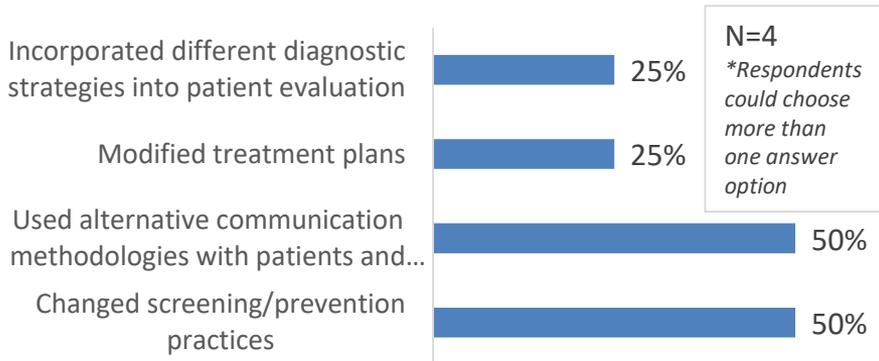
80% of learners indicated the activity addressed strategies for overcoming barriers to optimal patient care

N=25

# 30-day Follow-up Survey: Live Virtual Program

**83%** of follow-up survey respondents stated that the activity provided new ideas or information they have used in practice.  
[N=6]

What changes have you incorporated into practice as a result of this activity?



Survey respondents provided specific examples of changes they have made

- Utilized much more induced sputum collection
- Ordered patient educational materials
- Started working with pulmonary to get 7% hypertonic saline for airway clearance
- Implemented interdisciplinary approach to treatment
- Explained what foods are more potent triggers of reflux

**17%** indicated they are thinking about making changes in their practice.  
[N=6]

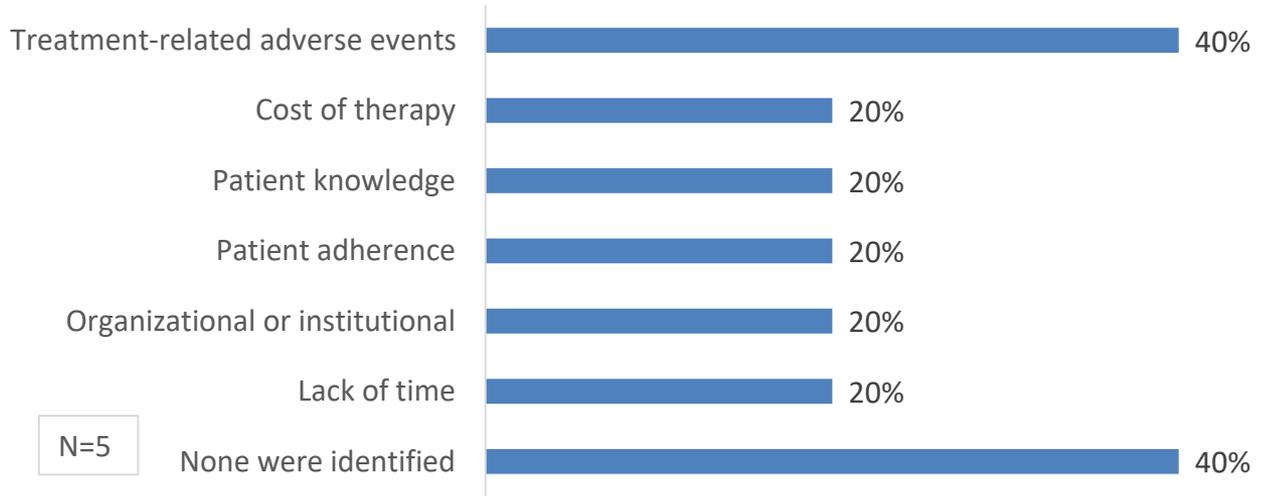
# 30-day Follow-up Survey: Live Virtual Program

80%

N=5

The activity provided information, education, tools, or resources to address barriers.

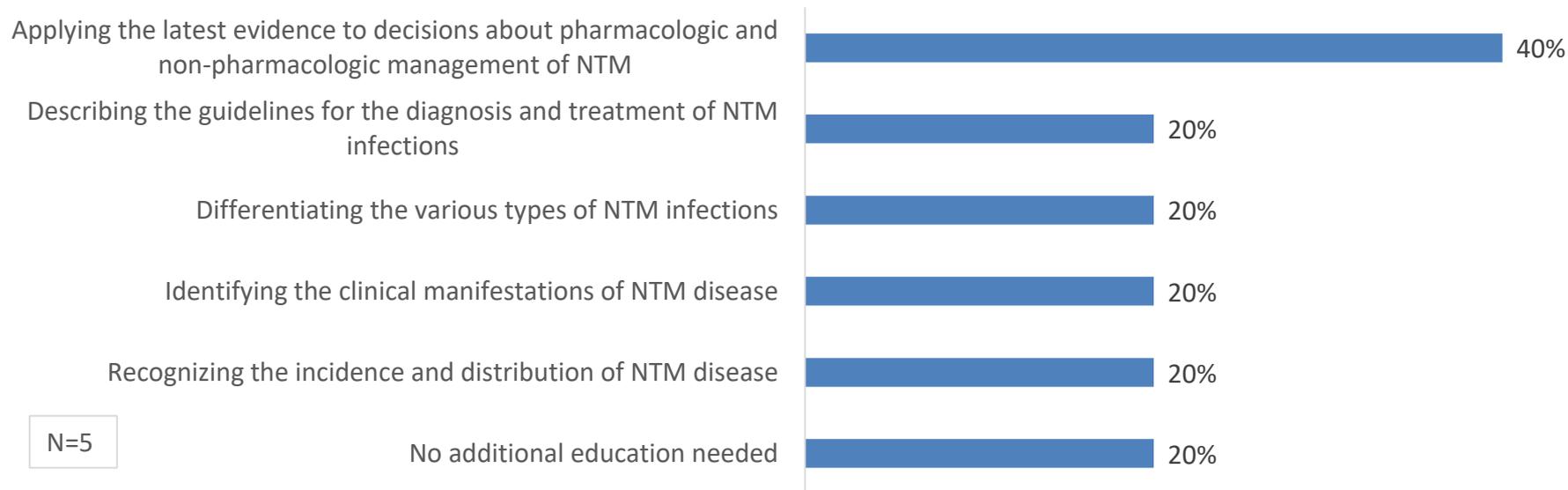
What barriers have you experienced since this activity that may impact patient outcomes or optimal patient care? Select all that apply.



N=5

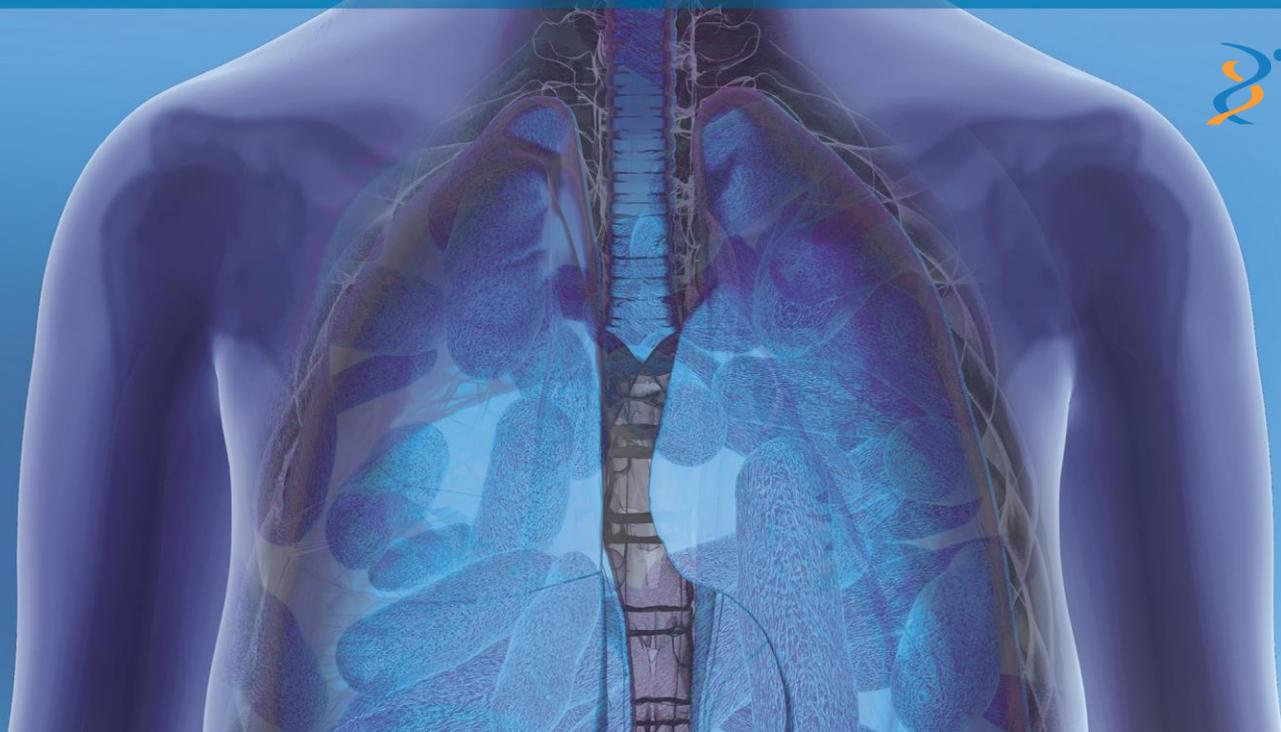
## 30-day Follow-up Survey: Live Virtual Program

In which areas do you feel you need more education? Select all that apply.



# NTM Lecture Series for Patients

November 6, 2021  
NATIONAL JEWISH HEALTH



# Summary: Live Virtual Patient Conference

146

Attendees

*"I really enjoyed the sessions. They were all extremely useful to me. They have increased my knowledge in lots of areas and made me feel more positive about the future."*  
- Live virtual patient attendee

100% of attendees reported the conference addressed topics that mattered to them [N=41]

85% of attendees reported it was important to have an opportunity to ask questions of health care providers at the conference [N=41]

95%  
reported they liked the conference format [N=40]

*"Every one of the faculty speakers was exceptional and engaging."*  
- Live virtual patient attendee

**What factors make it difficult to follow the treatment plan(s) prescribed by your providers?**

- Amount of time needed for medications and airway clearance
- Side effects from medications

**What have you found supports you most in following the treatment plans(s) prescribed by your providers?**

- Family and friend support
- Educational opportunities
- Support groups
- Changing my mindset and trusting my provider

## Accreditation

NJH is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians. The NJH Office of Professional Education produced and accredited this program and adhered to the updated ACCME guidelines.

NJH designates the live activity for a maximum of 13.0 *AMA PRA Category 1 Credits*<sup>™</sup>.

Provider approved by the California Board of Registered Nursing, Provider Number 12724, for 13.0 contact hours.

