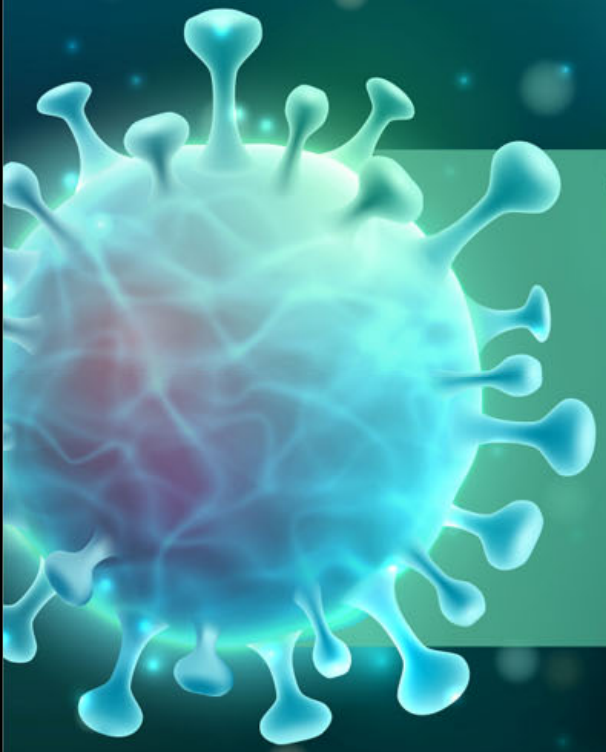
Final Outcomes Summary
January 20, 2023 – January 20, 2024
Grant ID 18796

National Jewish Health®
Breathing Science is Life®



Treating the Hospitalized COVID-19 Patient

Applying the Evolving Evidence to Your Practice

Respiratory Institute®

National Jewish Health® | Mount Sinai | Jefferson Health

OUTCOMES REPORT DEVELOPED BY:

Outcomes
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Treating the Hospitalized COVID-19 Patient: Applying the Evolving Evidence to Your Practice

Respiratory Institute

National Jewish Health | Mount Sinai | Jefferson Health

Program Summary

Program developed in partnership with the Respiratory Institutes (National Jewish Health, Mount Sinai and Jefferson Health), covered COVID-19 pathophysiology, strategies for special populations, and how our understanding of it guides therapeutic decisions. The activity included a multidisciplinary panel of nine faculty, animations, and chapterized format.

The program was accredited for 1.50 *AMA PRA Category 1 Credit*™, 1.50 nursing contact hour(s), and 1.50 knowledge-based pharmacy (0.150 CEUs).

Winner of Outstanding Healthcare Education Activity from Colorado Alliance for Continuing Medical Education (CACME).

January 20, 2023 – January 20, 2024

Online Enduring

Program Co-Chairs

James H. Finigan, MD
National Jewish Health

William J. Janssen, MD
National Jewish Health

Amount Approved:
$335,800

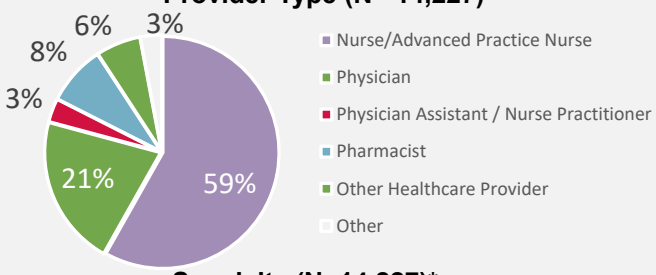
Cost per Participant:
$10.42

Reach and Provider Type

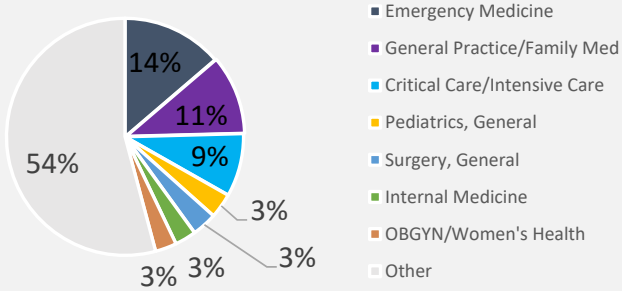
Unique HCPs Educated: 32,142

CME/CE Certificates Issued: 9,603

Provider Type (N= 14,227)*



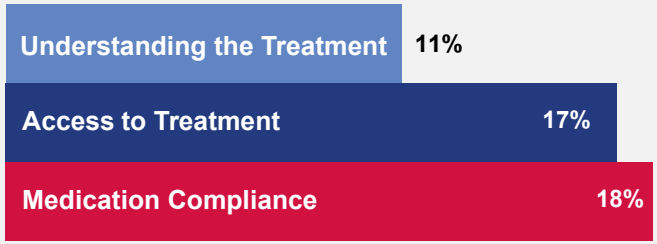
Specialty (N=14,227)*



**Medscape only provides a complete breakdown for test takers.*

Barriers to Overcome

Which barriers are most prevalent?



Practice Changes

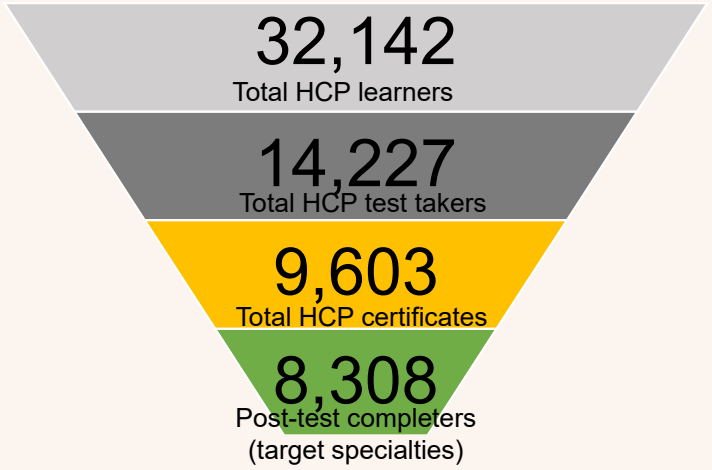
Based on what participants learned in this activity:

93% intend to make changes to their practice (N=6,831)

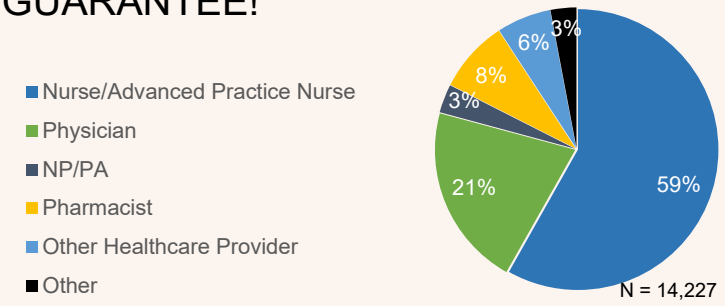
15+ Average years in practice

OUTCOMES SUMMARY

PARTICIPATION

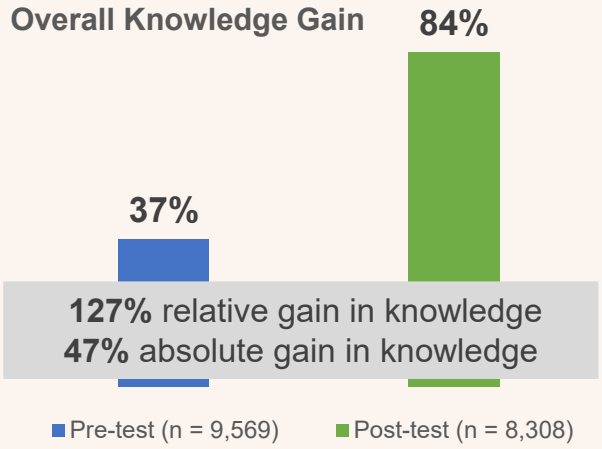


EXCEEDED THE 4500 LEARNER GUARANTEE!

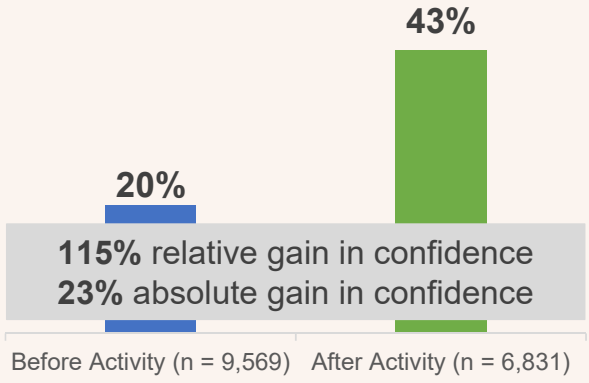


KNOWLEDGE AND COMPETENCE IMPROVEMENTS

Overall Knowledge Gain

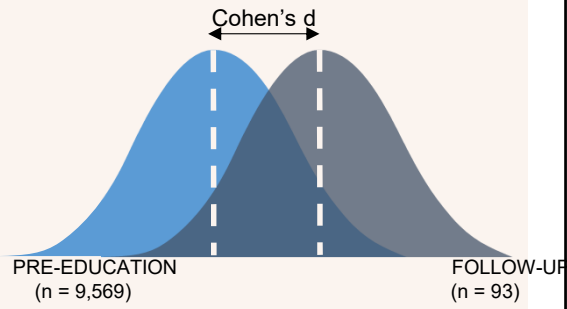


Overall Confidence Gain



OVERALL EFFECT

Overall, this activity led to an effect size of 0.76, indicating a knowledge/competence shift of **46%** compared from pre-activity to follow-up.



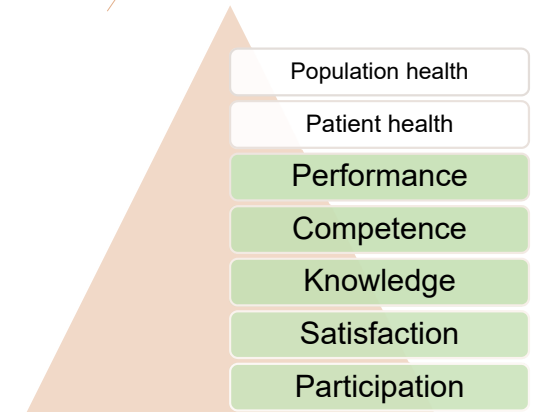
93% Respondents who intend to make changes to practice as a result of the activity

46% Of follow-up respondents who have already begun making changes at 1 month

ACTIVITY OVERVIEW AND OUTCOMES METHODOLOGY

This educational program, developed in partnership with the Respiratory Institute, covers COVID-19 pathophysiology and how our understanding of it guides therapeutic decisions. The multidisciplinary faculty panel discusses communication strategies with patients, American and European guidelines for the in-patient treatment of COVID-19, including supportive therapies and strategies for special populations, and management of patients post-hospitalization and patients with long COVID. Lastly, faculty discuss clinical trials of new and emerging treatments. The activity engages the learner with panel discussions and whiteboard animations, and chapters allow learners to view content at their convenience.

With the course evaluation assessing Moore's Levels 1 (Participation) and 2 (Satisfaction), a pre-post survey assessed Levels 3, 4 (Knowledge – Competence). A 30-day follow-up survey was used to measure retention and Level 5 (Performance) of the learners.



ACCME ACCREDITED WITH COMMENDATION

National Jewish Health designates the enduring material for a maximum of:

- 1.5 *AMA PRA Category 1 Credit*™
- 1.50 Nursing Contact Hours
- 1.50 *Knowledge-based* ACPE (0.150 CEUs)

Online Enduring Dates:
January 20, 2023 –
January 20, 2024
Activity Link:
https://www.medscape.org/viewarticle/986888

PROGRAM FACULTY

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Director, The Respiratory Centers of Excellence
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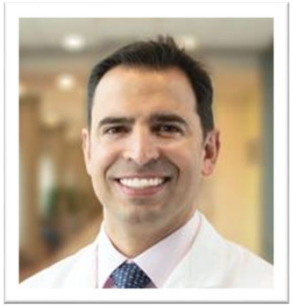
Bart Lambrecht, MD, PhD
Professor of Pulmonary Medicine
ErasmusMC and UGent
Director, VIB Inflammation Research Center
Ghent, Belgium



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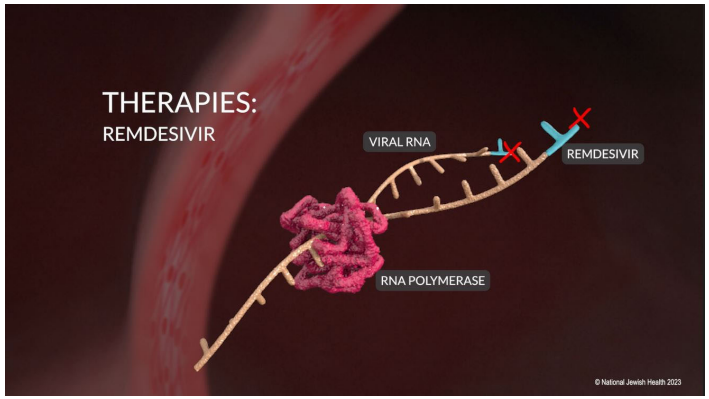
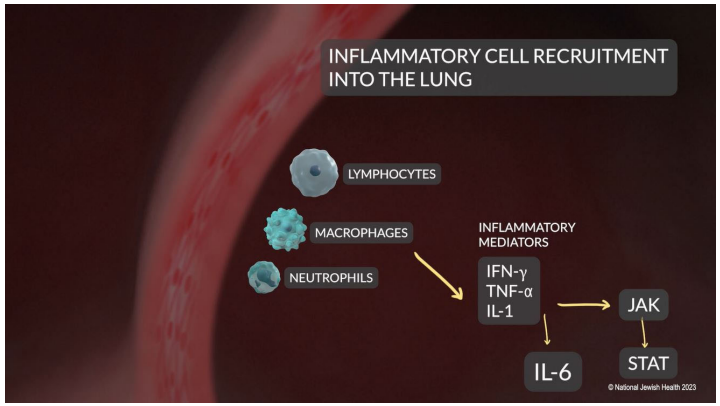
Murray, Utah, United States

Kelly Kuk, PharmD, BCPS, BCIDP
Clinical Pharmacy Specialist
Infectious Disease
Saint Joseph Hospital
Denver, Colorado, United States

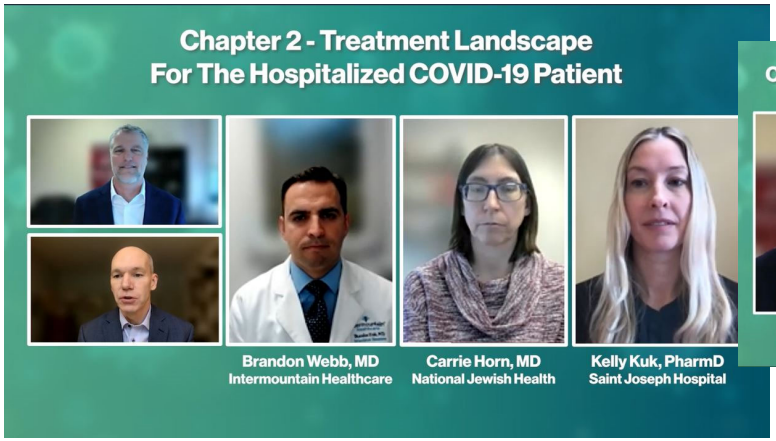
PROGRAM FEATURES

WHITEBOARD ANIMATIONS



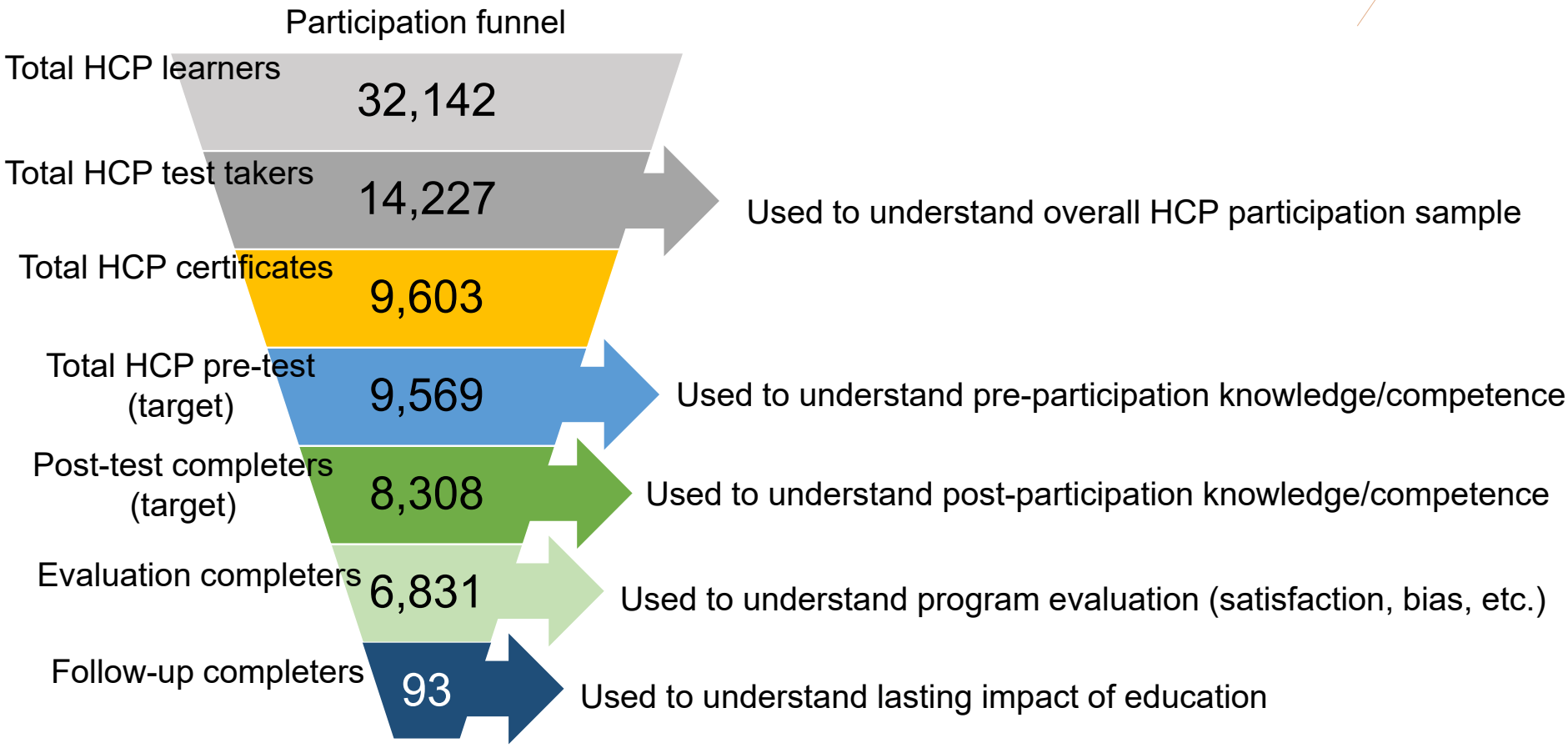


MULTIDISCIPLINARY FACULTY PANEL DISCUSSIONS



CHAPTERIZED CONTENT FOR LEARNER CONVENIENCE

OUTCOMES ASSESSMENT – PARTICIPATION

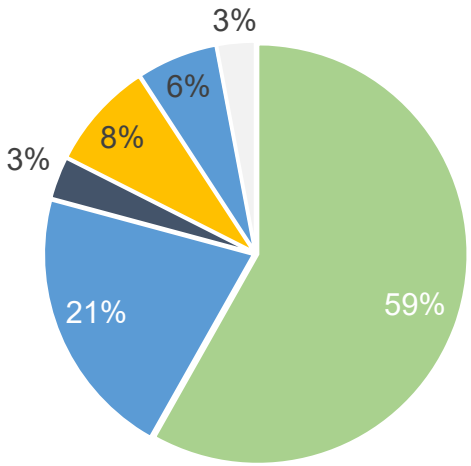


OUTCOMES ASSESSMENT – GLOBAL LOCATION OF LEARNERS

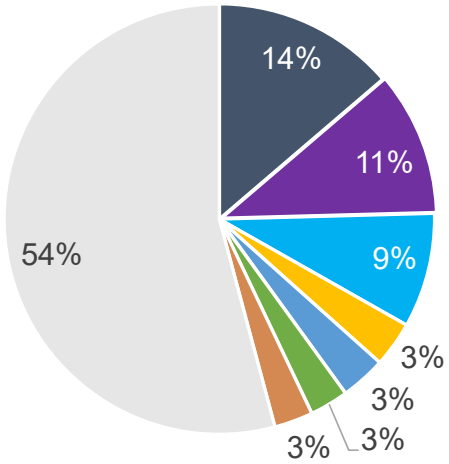
US HCPs
n = 15,792

EUROPEAN HCPs
n = 1,477

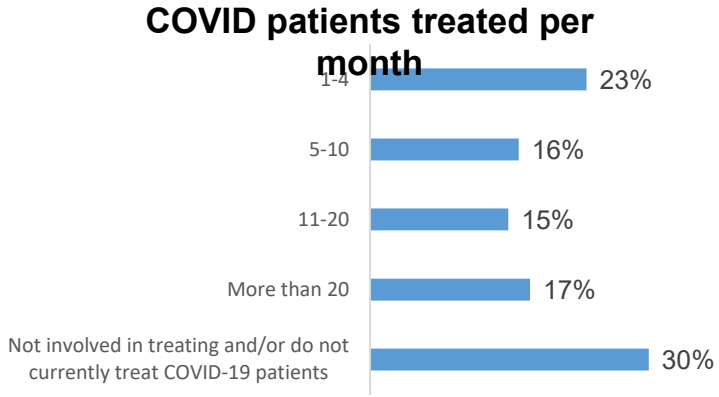
PARTICIPATION – TOTAL HCP TEST TAKERS (N = 14,227)

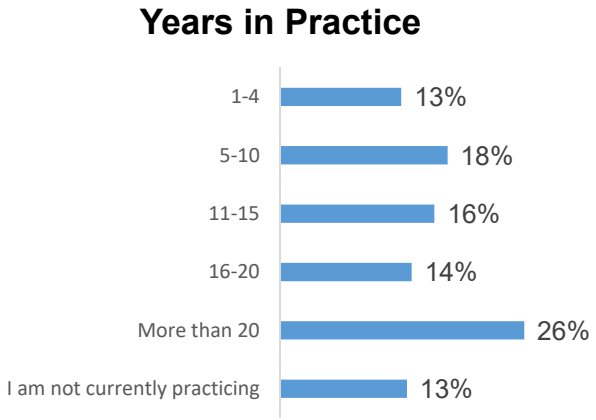


- Nurse/Advanced Practice Nurse
- Physician
- Physician Assistant / Nurse Practitioner
- Pharmacist
- Other Healthcare Provider
- Other



- Emergency Medicine
- General Practice/Family Med
- Critical Care/Intensive Care
- Pediatrics, General
- Surgery, General
- Internal Medicine
- OBGYN/Women's Health
- Other

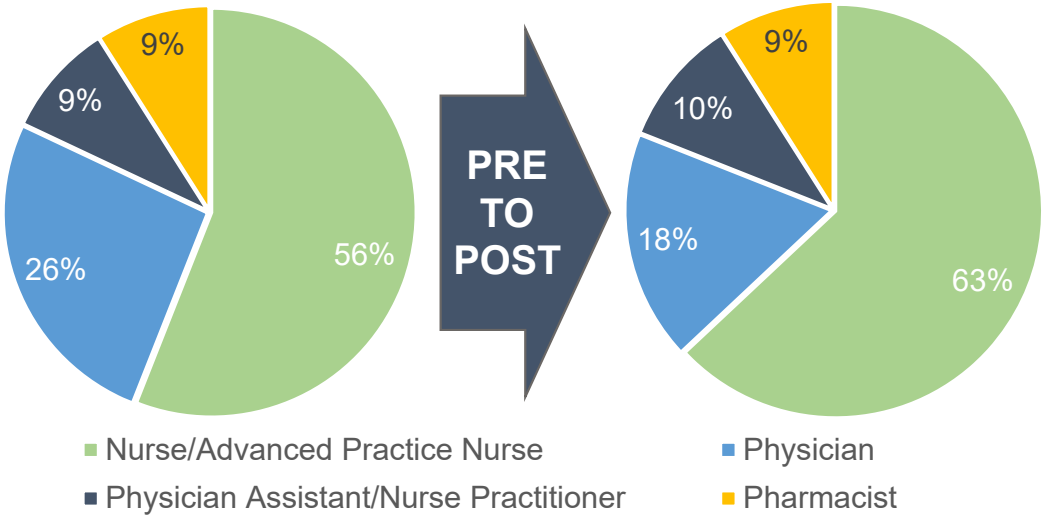




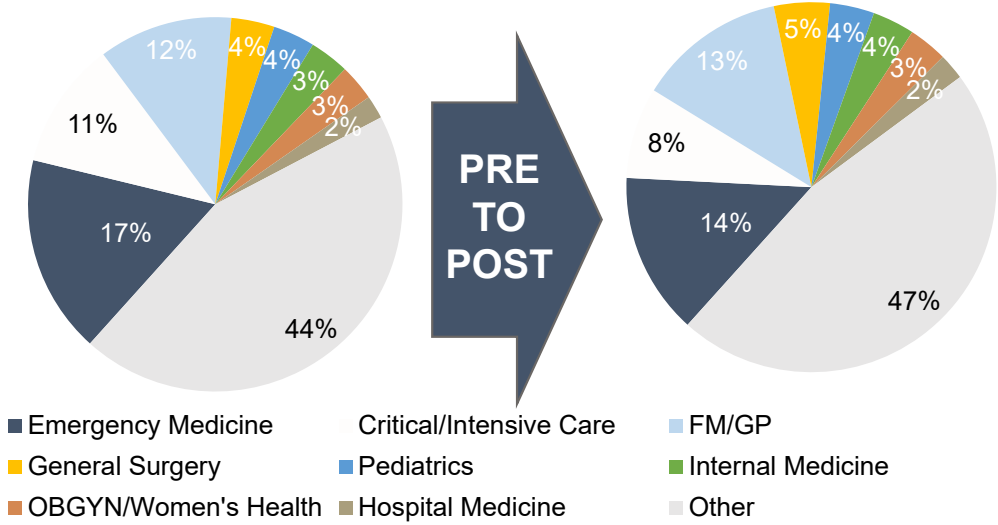
PARTICIPATION – PRE (n = 9,569) VS POST (n = 8,308)

To analyze the pre-post improvements of the learners, we focused specifically on HCPs who currently manage patients with COVID. There were no significant differences between the demographics of these group, pre-to-post.

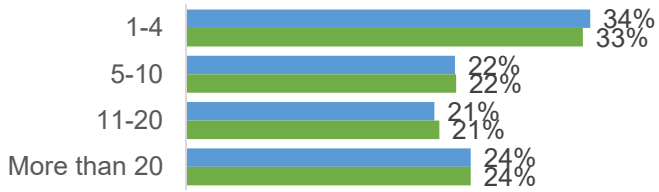
ROLE/DEGREE



SPECIALTY



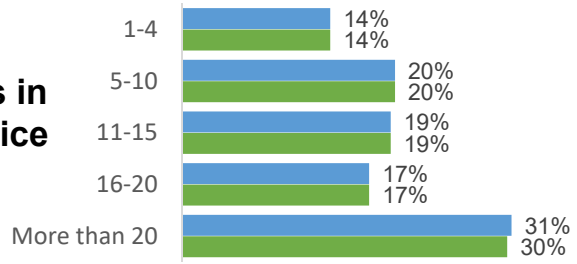
COVID Patients Treated/month



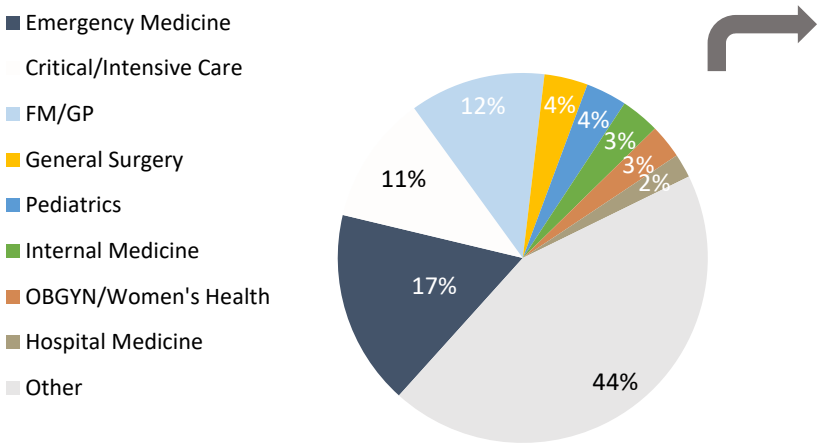
PRE

POST

Years in Practice



PARTICIPATION - OTHER

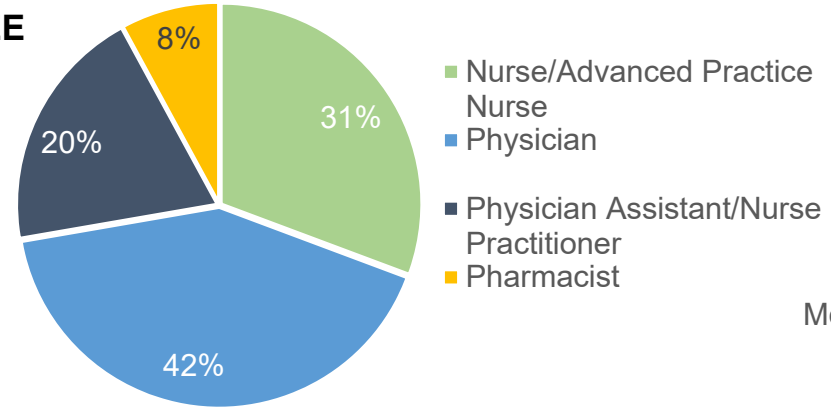


Addiction Medicine	Dermatology, General	Infusion Therapy	Oncology, Other	Pulmonary Medicine
Administration/ Management	Diabetes	Internal Medicine	Oncology, Radiation	Quality Management
Adolescent Medicine	Diabetes Educator	Legal Consulting	Ophthalmology	Radiology
Aerospace Medicine	Emergency Medicine	Medical Genetics	Orthopaedic Surgery	Radiology, Interventional
Allergy & Clinical Immunology	Endocrinology, Metabolism	Medical Microbiology	Other	Research
Anesthesiology	Endocrinology, Reproductive/Infertility	N/A	Otolaryngology	Rheumatology
Anticoagulation	Epidemiology	Neonatal/Perinatal Medicine	Pain Management	Risk Management/Utilization Review
Blood Banking/Transfusion Medicine	Faculty/Teaching	Nephrology	Pathology	School/College Health
Cardiology	Family Medicine	Neurology	Patient Education	Sports Medicine
Cardiology, Echocardiography	Forensics	Neurosurgery	Pediatrics, Allergy	Surgery, Cardiothoracic
Cardiology, Electrophysiology	Gastroenterology	None	Pediatrics, Cardiology	Surgery, General
Cardiology, General	General Practice	Nuclear Medicine	Pediatrics, General	Surgery, Oral & Maxillofacial
Cardiology, Interventional	Genomic Medicine	Nutrition	Pediatrics, Oncology	Surgery, Other
Cardiology, Nuclear	Geriatrics	Nutrition Support	Pharmacotherapy	Surgery, Surgical Oncology
Case Management	Hematology	OB/GYN	Physical Medicine & Rehabilitation	Surgery, Vascular
Compounding	Hepatology	Women's Health	Plastic Surgery and Aesthetic Medicine	Transplantation
Correctional Health	HIV/AIDS	Occupational Health	Preventive Medicine	Urology
Critical Care	Home Care	Oncology	Psychiatry	Vascular Medicine
Critical Care/Intensive Care	Hospice/Palliative Care	Oncology, Hematology/Oncology	Psychiatry/Mental Health	Wound/Ostomy
Dermatology, Cosmetic	Infectious Diseases	Oncology, Medical	Public/Community Health	

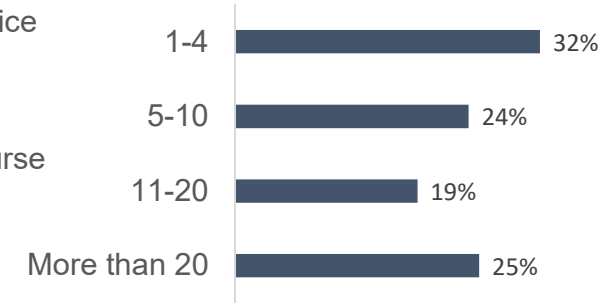
FOLLOW-UP – DEMOGRAPHICS (N = 93)

A follow-up sample was obtained at least 30 days following engagement in the activity. This sample is weighted more heavily towards the physician/NP/PA audience in the target audiences of interest. This sample is used to understand lasting impact of the education as well as challenges that will need to be reinforced.

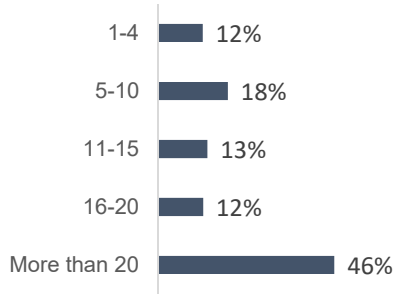
DEGREE



COVID PATIENTS / MONTH



YEARS IN PRACTICE



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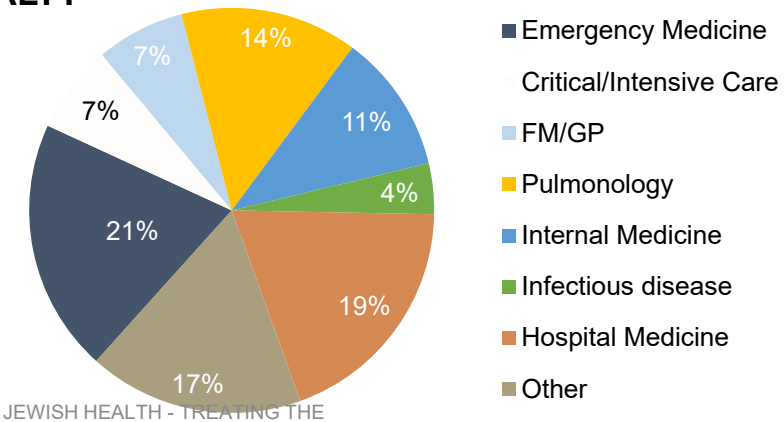
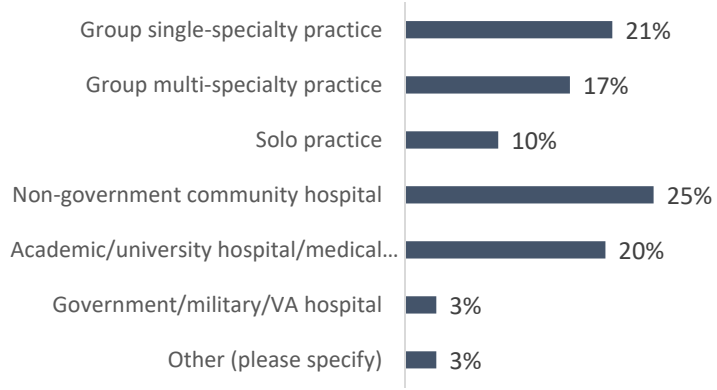
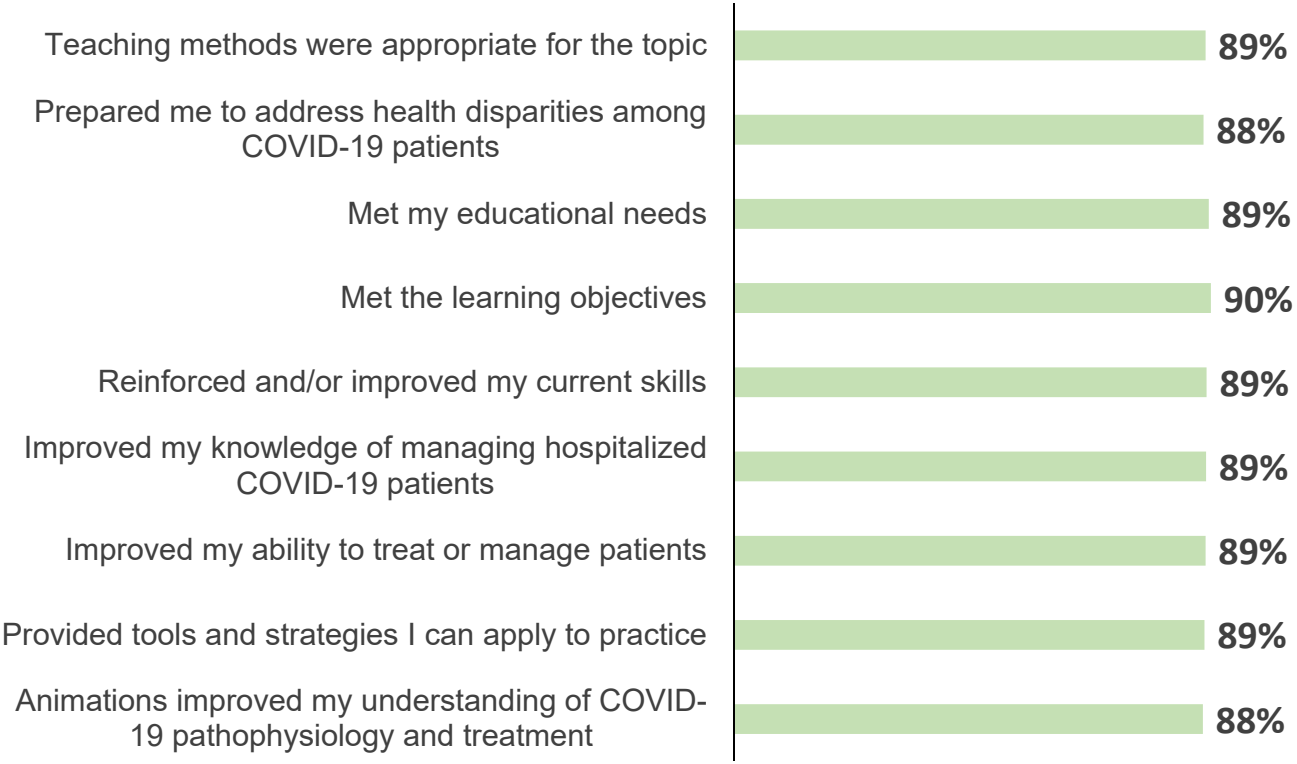


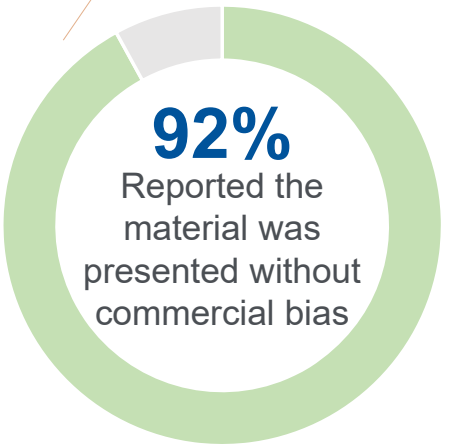
SETTING

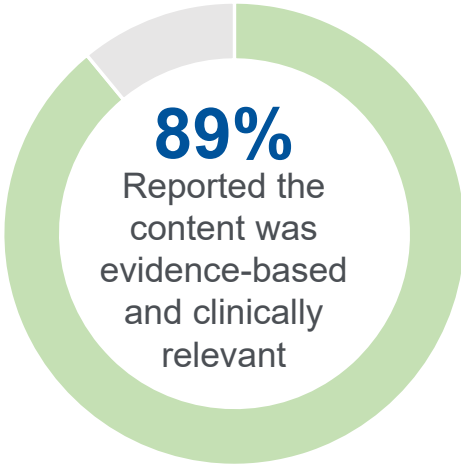


EVALUATION - SATISFACTION

Evaluation respondents agreed with the following statements about the activity: (agree, strongly agree) n = 6,831





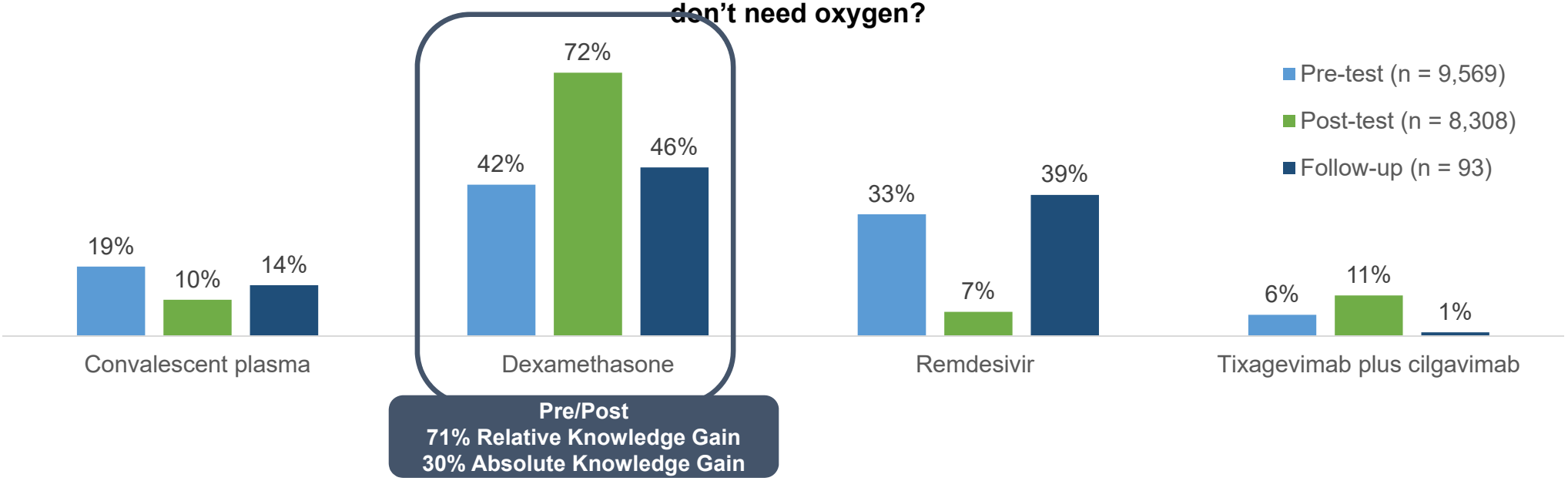


LEARNING OBJECTIVES

1. Identify key characteristics of COVID-19 pathophysiology and know the risk factors that are associated with progressive and severe disease.
2. Employ practical strategies for communication and education for at-risk patients who may become hospitalized patients with COVID-19.
3. Differentiate clinical strategies based on the stages regarding current guidelines for the patients hospitalized with COVID-19.
4. Apply evidence-based treatment plans based on current recommended guidelines and best practices for patients hospitalized with COVID-19.
5. Assess the challenges and impact of comorbidities in the treatment of patients hospitalized with COVID-19.
6. Involve multiple specialists, advanced practitioners, nurses, clinical pharmacists, and others in coordination of patient care regarding diagnosis, treatment, and management of comorbidities.
7. Evaluate new and emerging therapies for COVID-19 based on the latest efficacy and safety data as evidence evolves from leading clinical trials.
8. Integrate post-hospitalization factors and plans for overall management strategies for patients hospitalized with COVID-19.

OUTCOMES ASSESSMENT – KNOWLEDGE, COMPETENCE, PERFORMANCE

Question 1: Which of the following has been shown to improve survival in COVID-19 patients that require supplemental oxygen (either with or without mechanical ventilation) but does not appear to benefit patients who don't need oxygen?



Learning Objectives Addressed:

1 3 4

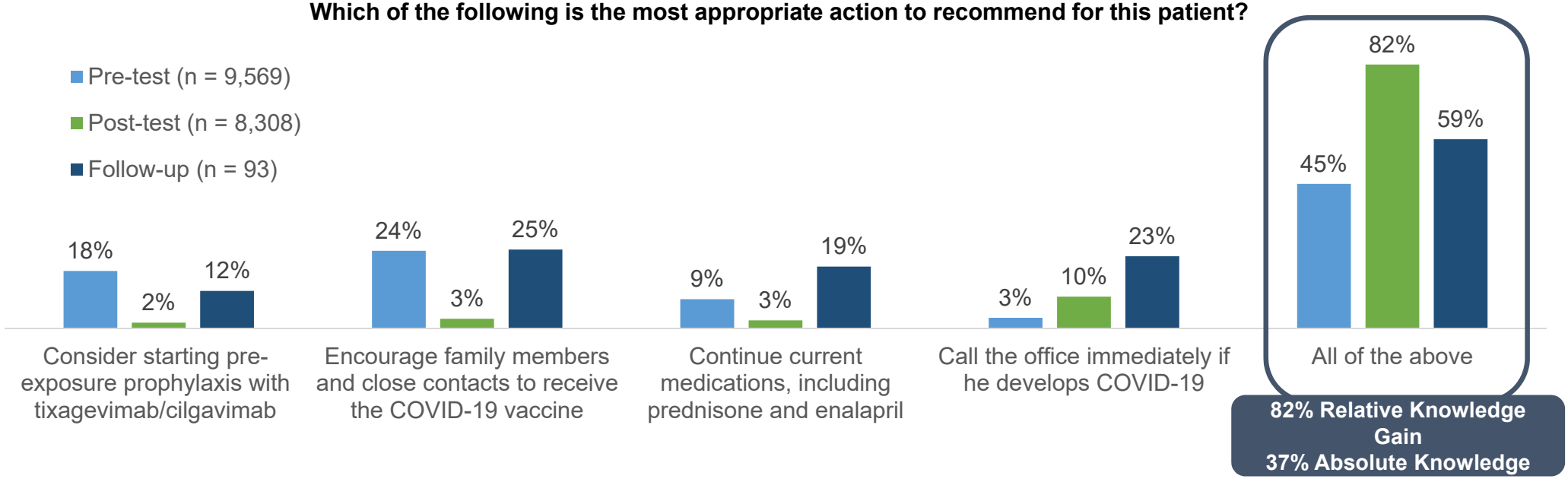
The RECOVERY trial showed a benefit of dexamethasone treatment in patients on supplemental oxygen, suggesting a role of immunopathology over viral replication at this stage of illness. Learners showed significant improvement post-education, but this knowledge improvement may not have been retained in the months following engagement.

PRE vs POST	P < .001
PRE VS FOLLOWUP	P = .39

OUTCOMES ASSESSMENT – KNOWLEDGE, COMPETENCE, PERFORMANCE

Question 2: A 45-year-old man with ulcerative colitis (UC) presents to his primary care physician for a routine visit. He has received 4 doses of the COVID-19 vaccine, including the bivalent booster 1 month ago. His current medications are prednisone 20mg daily for his UC and enalapril 10mg daily for hypertension. He is concerned about contracting COVID-19 and his risk for developing severe disease.

Which of the following is the most appropriate action to recommend for this patient?



Learning Objectives Addressed:

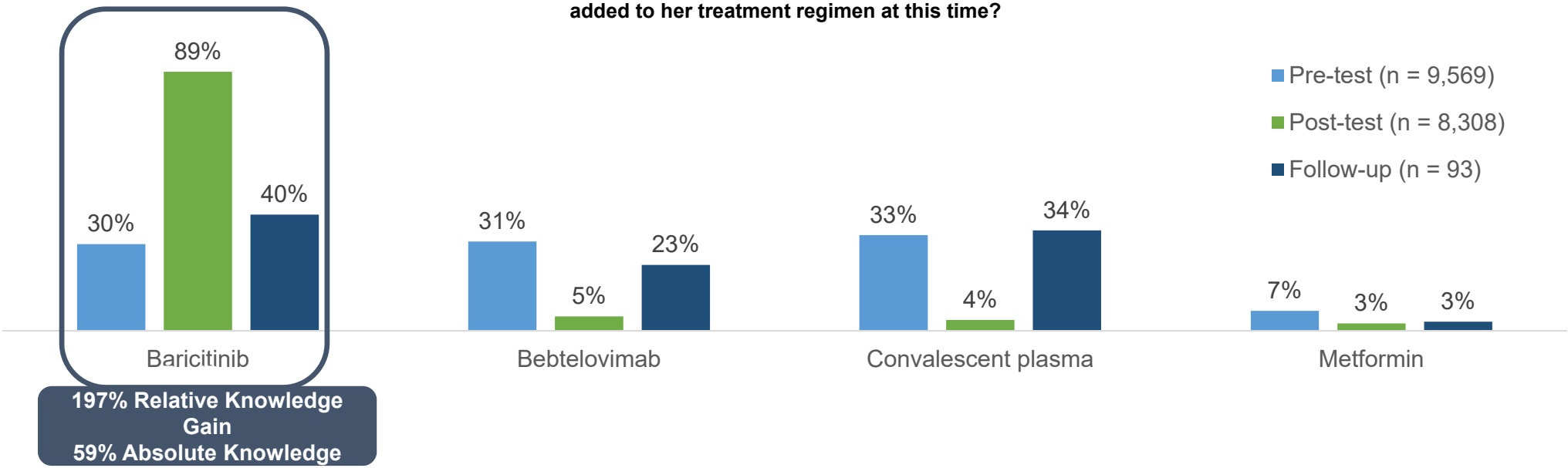
2

Prevention of COVID-19 infection is paramount in high-risk patients. Strategies include pre-exposure prophylaxis, minimizing exposure to high-risk settings, as well as continuing his current medications, if appropriate. Learners significantly improved their prevention strategies post-education, and this was somewhat retained on follow-up.

PRE vs POST	P < .001
PRE VS FOLLOWUP	P = .004

OUTCOMES ASSESSMENT – KNOWLEDGE, COMPETENCE, PERFORMANCE

Question 3: A 72-year-old woman with a past medical history of hypertension and hypercholesterolemia is hospitalized with COVID-19. She developed symptoms 7 days ago and was hospitalized 2 days ago due to low oxygen saturations. Upon admission, she was started on supplemental oxygen via nasal cannula at 3L/min and received dexamethasone and remdesivir. On hospital day 3 her work of breathing increases and her oxygen saturation remains below 90% despite increasing her nasal cannula oxygen to 6L/min. High-flow nasal cannula is initiated at 10L/min. **Which of the following has been shown to reduce 28-day mortality and should be added to her treatment regimen at this time?**



Learning Objectives Addressed:

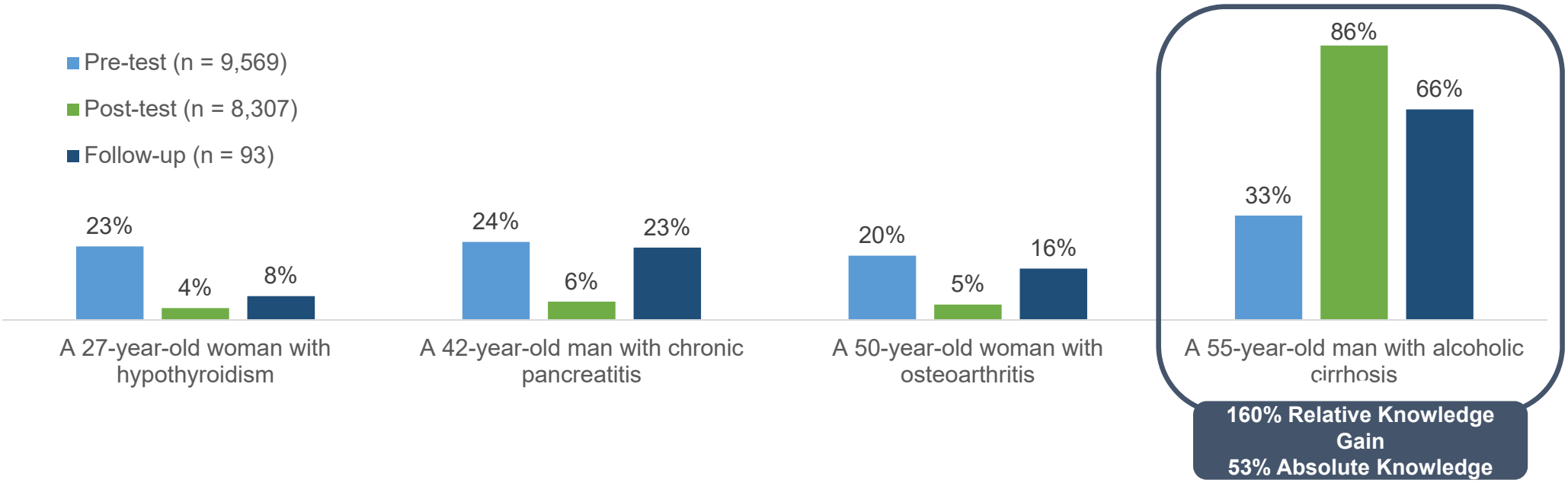
1 3 4 7

The JAK1/2 inhibitor baricitinib, which has known anti-inflammatory and anti-viral properties, was shown to reduce 28-day mortality in hospitalized patients with COVID-19 and is recommended by the NIH for hospitalized patients. While learners showed a large improvement post-education, the impact lessened by follow-up assessment.

PRE vs POST	P < .001
PRE VS FOLLOWUP	P = .003

OUTCOMES ASSESSMENT – KNOWLEDGE, COMPETENCE, PERFORMANCE

Question 4: According to the NIH guidelines, which of the following patients should be considered for remdesivir therapy if they are hospitalized but not requiring supplemental oxygen?



Learning Objectives Addressed:

1 3 4 5 6

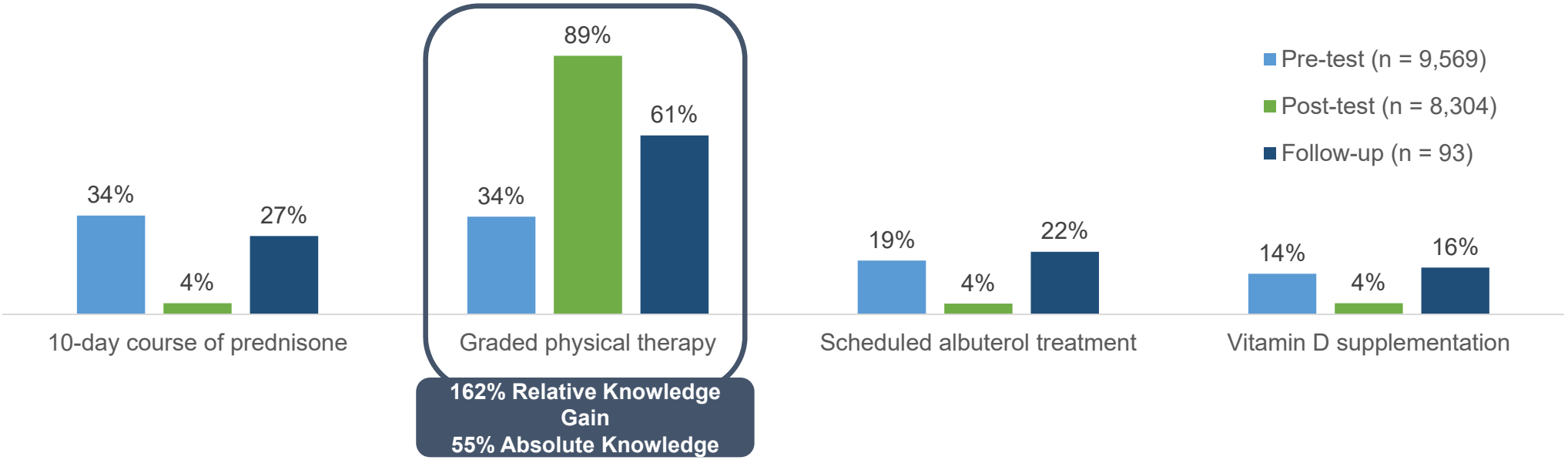
The NIH guidelines recommend earlier administration of remdesivir regardless of supplemental oxygen need in high-risk patients, which includes patients with alcoholic liver disease. Learners significantly improved their competence in remdesivir use, which stayed elevated after follow-up.

PRE vs POST	P < .001
PRE VS FOLLOWUP	P < .001

OUTCOMES ASSESSMENT – KNOWLEDGE, COMPETENCE, PERFORMANCE

Question 5: A 60-year-old man with a history of type 2 diabetes and obesity was hospitalized for 1 week for COVID-19 infection. He received dexamethasone and remdesivir and required only conventional oxygen via nasal cannula prior to discharge. At a follow-up visit with his PCP 6 weeks after hospital discharge, the patient reports that he continues to have fatigue and dyspnea with exertion. He is subsequently diagnosed with a post-COVID condition.

Which of the following would you include in his treatment plan?



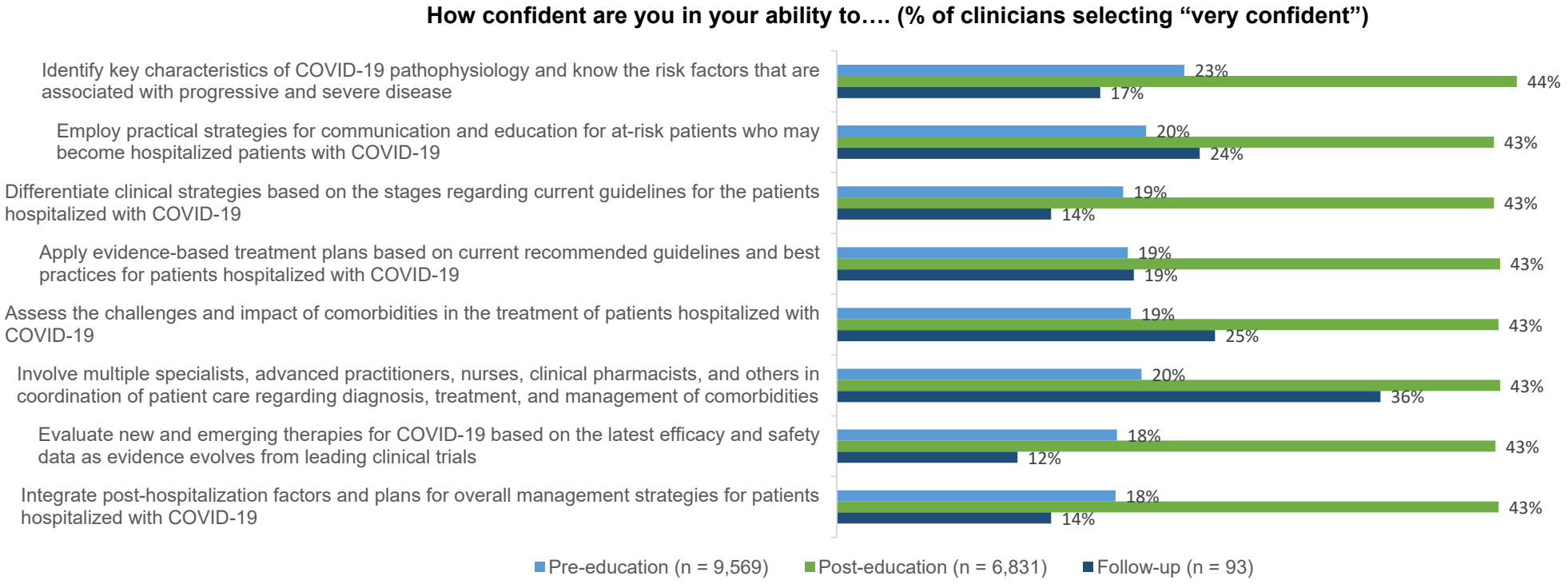
Learning Objectives Addressed:

7 8

Treatment for this type of patient should involve shared decision-making and goal setting between patients and clinicians and may include elements such as graded physical therapy. Learners significantly improved their competence in managing post-COVID conditions, which stayed elevated after follow-up.

PRE vs POST	P < .001
PRE VS FOLLOWUP	P < .001

OUTCOMES ASSESSMENT - CONFIDENCE



While the clinicians indicating a high level of confidence increased post-education, this effect diminished in the follow-up, except for involving a multidisciplinary team in patient care. With hospitalized patients, multidisciplinary management is incredibly important; improved confidence in getting many types of HCPs involved is critical to optimal care. Potentially, after completing the education and returning to practice, clinicians found themselves less confident in applying the information, needing to reflect on how to better approach their management. Continued follow-up and reinforcement, with opportunities to practice, may be needed to help employ newly learned COVID care strategies.

EVALUATION - BARRIERS

What barriers will the education provided help to address?

(open-ended question, classified by theme)

- Compliance with medications
- Access to novel therapy
- Adverse effects of treatment
- Identifying high-risk patients
- Multidisciplinary management
- Long COVID therapy concerns
- Patient communication and education
- Disparities in care
- Encouraging and promoting vaccination
- Post acute treatment planning

(n = 4,563)

67%

n = 6,831

of evaluation respondents reported the activity addressed strategies for overcoming barriers to optimal patient care

EVALUATION – PLANNED PRACTICE CHANGE

What changes will you incorporate into your practice?

(open-ended question, direct quotes)

- “Advocate for patients especially with comorbidities”
- “Better educate patients that are most at risk for severe complications of COVID-19”
- “Refer patients correctly”
- “Change my approach to managing moderately severe patients”
- “Give remdesivir to patients at risk of severe disease even if they aren’t requiring supplemental oxygen”
- “Give baricitinib to indicated patients”
- “Therapy with monoclonal antibodies”
- “Initiate JAK inhibitors earlier”
- “More frequent use of dexamethasone”
- “Coping mechanism enhancement”
- “Be more detailed in my assessment of patients”
- “Improved knowledge for cooperation with primary care physicians”
- “Early intervention”
- “Take care of long COVID syndrome with appropriate therapies”
- “Check CPET more frequently in post-COVID patients”
- “Improved communication with health team”
- “Post-COVID physical therapy”

93%

n = 6,831

of evaluation respondents intended to make changes in practice as a result of the activity

FOLLOW-UP – IMPLEMENTED PRACTICE CHANGE

What changes have you implemented into your practice?

(open-ended question, direct quotes)

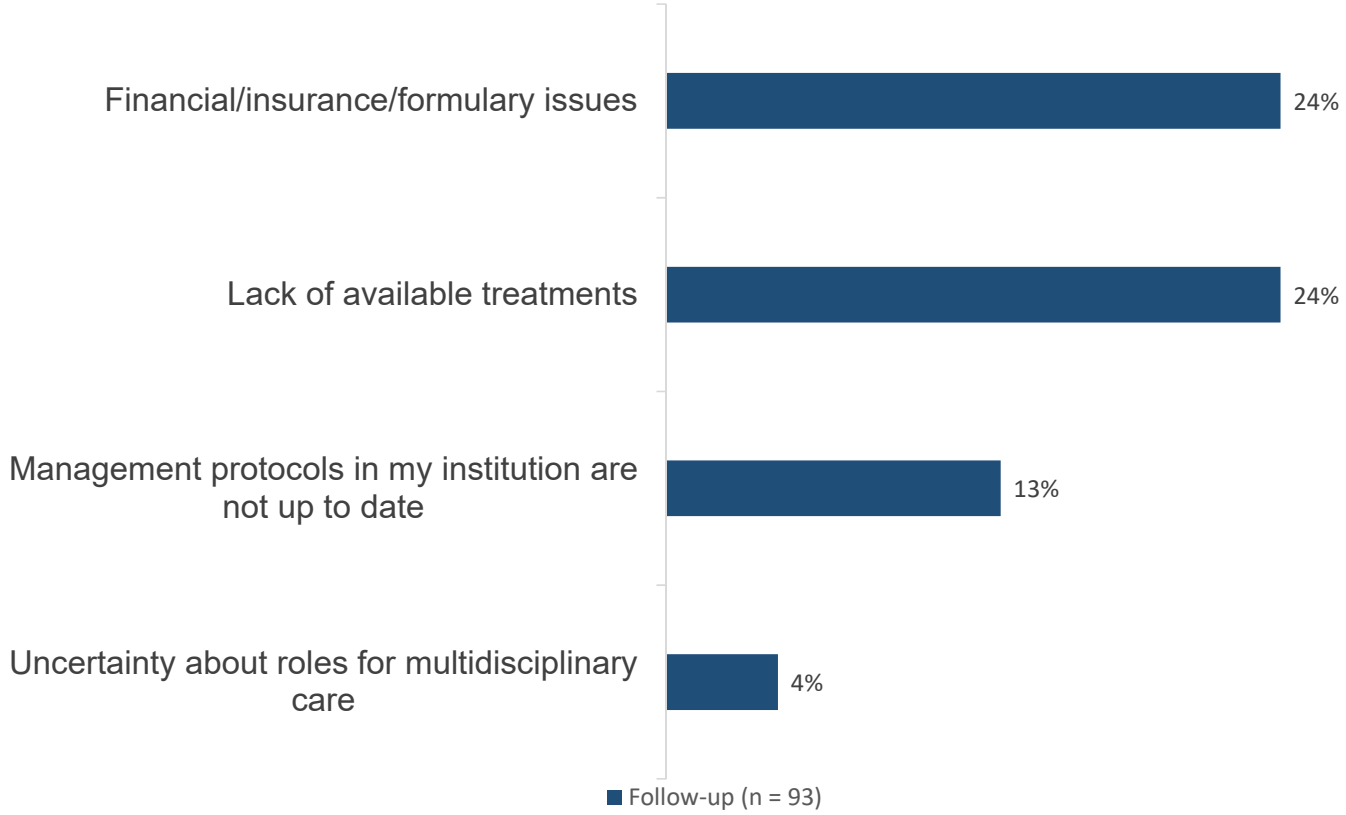
- “Earlier dexamethasone”
- “Current guideline review”
- “Improved patient education for hospitalized patients upon discharge as to what to expect and what further treatments are available”
- “Increased my use of graded physical therapy for long Covid”
- “Knowledge on new treatments and best use for each situation”
- “[Better management of] Long haul symptoms”
- “[Increased use of] New medications for treatment”

43%

n = 93

of follow-up respondents incorporated changes into practice as a result of the activity

FOLLOW-UP – ONGOING BARRIERS TO CHANGE



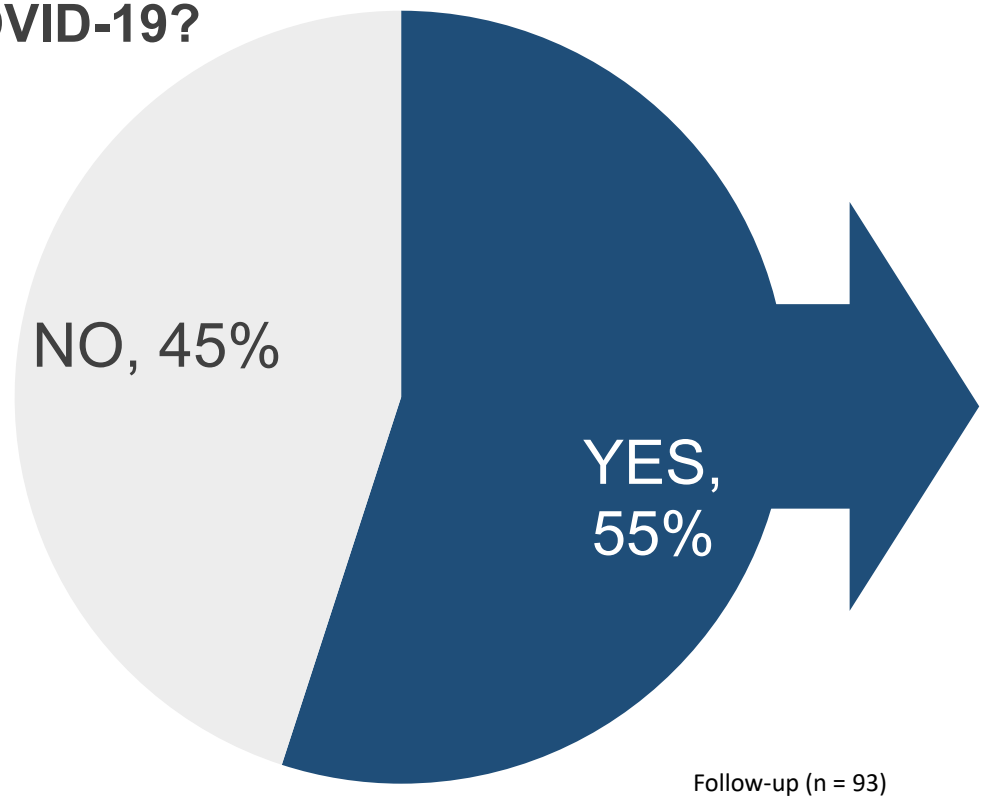
46%

n = 93

of follow-up respondents felt these and other barriers were addressed as a result of the activity, through “up-to-date management,” “protocols,” and “care coordination.”

FOLLOW-UP – ONGOING BARRIERS TO CHANGE

Did this activity prepare you to address health inequities in your patients with COVID-19?



Follow-up (n = 93)

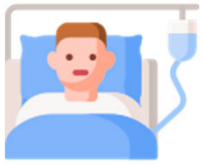
In what way?

- "Use guidelines"
- "Provide awareness"
- "My patients with comorbidities need even closer monitoring and more extensive education"
- "Educate myself and learn about new medications"

FOLLOW-UP – IMPLEMENTED PRACTICE CHANGE

Specific topic related to hospitalized patients with COVID-19 that you would like to see addressed in future education: (open-ended question, grouped by theme)

Medications and Treatment Plans
Angiotensin receptor blockers: Telmisartan, Losartan
Melatonin benefits: Prophylaxis, fibrosis prevention
Vitamin D's impact on SARS-CoV-2 inhibition
Dexamethasone & Convalescent plasma use
Post-COVID Albuterol for pulmonary issues
Specific COVID Treatments
Immunization effects & emerging therapies
New medications & variant-specific therapy
Uncertainty in Omicron treatment protocols



Patient Care and Follow-up
Hospitalized patient characteristics
Discharge recommendations & long-term effects
Long COVID recovery & outpatient management
Post-COVID complications

Medical Practices and Protocols
Recommended treatments & patient risk stratification
Specialist absence management & therapy protocols
Specific Medical Concerns
Asthma, COPD, Myocarditis management
Inflammatory CT diseases & COVID-19
Pregnancy-related COVID illness

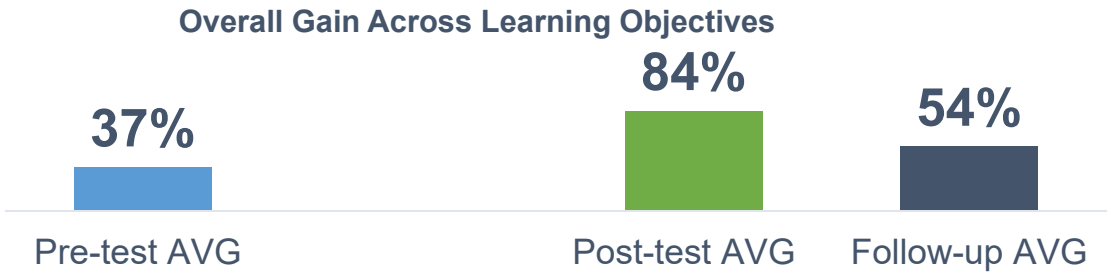
Logistics and Operations
Socioeconomic barriers & treatment compliance
Ventilation, oxygen, & hospital stay reduction
PPE uncertainties

Research and Development
COVID vaccine development & treatments
Novel treatments in low-income areas
Omicron data updates

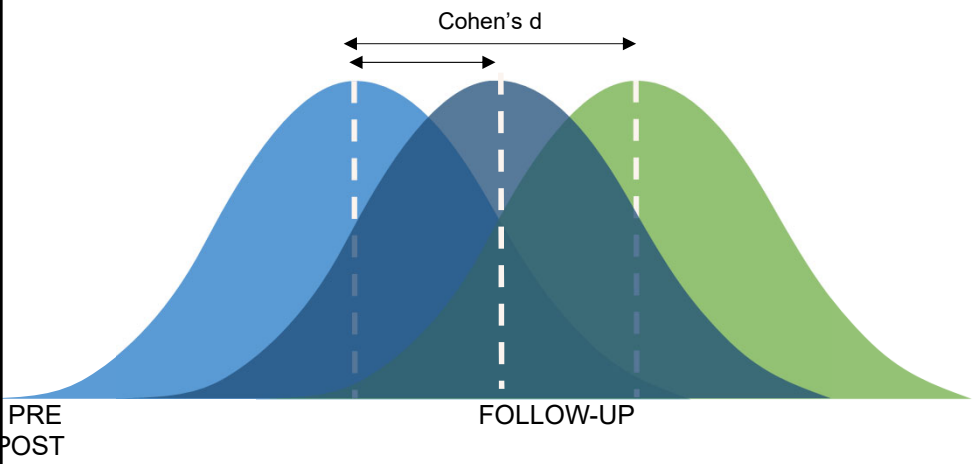
Vaccination and Public Response
Addressing vaccine hesitancy & effectiveness
Benefits of specific medications

Education and Patient Needs
Patient education & nursing care specifics
Managing special needs patients
Post-Recovery & Care
Follow-up care after discharge
Cognitive issues & therapy compliance

OVERALL EDUCATIONAL IMPACT



Overall, learners had a 47 percentage point knowledge/competence increase from pre- to post-education. Increases from pre- to a 30-day follow-up was 17 percentage points.



This education had a Cohen's d effect size of **2.42** comparing the pre- and post-education groups. Comparing the pre-education to the follow-up, the effect size was **0.76**.

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 0.76, 71% of the learner group will perform better compared to before their engagement in the education. For more information on interpreting Cohen's d, refer to https://rpsychologist.com/cohend/

Post-education, there was an improvement in learner knowledge, competence, and performance, most notably in the patients most appropriate for remdesivir therapy and the use of physical therapy in a patient's treatment plan. Continued education should reinforce the use of dexamethasone and baricitinib and focus on key issues of interest to clinicians, including the availability of therapies, updating treatment protocols, management of long COVID, and staying updated on current research.