The Intersection of COVID-19 and Chronic Lung Disease:
Treating Real World Issues with Evolving Data

Final Live and Online Outcomes Summary
Novartis Grant #NGC39911
**Program Overview**

This educational initiative was composed of three activities designed to improve the awareness, knowledge, and competence of physicians in the comprehensive diagnosis, assessment, and management of patients with COVID-19 and chronic lung disease. The two live webinar presentations provided opportunities for specialists and healthcare providers to engage with and ask questions of expert faculty who are treating patients with COVID-19 in both inpatient and outpatient settings. Expert faculty described the key concepts in the pathophysiology and immunology of COVID-19, addressed the latest treatment options for patients with COVID-19, and discussed how chronic lung disease factors into treatment strategies, as well as how to manage those patients even after COVID-19. An online enduring activity recorded from the live webinars provided greater reach to clinicians treating patients affected by these conditions. This activity was updated to remain relevant as COVID-19 evolves.

**Learning Objectives**

- Describe clinical features and key concepts in the pathophysiology of COVID-19 and its interaction with the human immune response.
- Discuss strategies for managing patients with COVID-19 and chronic lung disease.
- Evaluate current and emerging therapies for patients with COVID-19 and chronic lung disease.
Faculty Presenters

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

Rebecca C. Keith, MD
Associate Professor
Department of Medicine
Division of Pulmonary, Critical Care & Sleep Medicine
Interstitial Lung Disease Program
Autoimmune Lung Center
National Jewish Health
Denver, CO

Joshua J. Solomon, MD
Associate Chief, Section of Critical Care
Associate Professor
Department of Medicine
Division of Pulmonary, Critical Care & Sleep Medicine
National Jewish Health
Denver, CO
This program was awarded the Outstanding CME/CPD Activity Award from the Colorado Alliance for Continuing Medical Education (CACME) during their 2021 Annual Conference.
The Intersection of COVID-19 and Chronic Lung Disease: Treating Real World Issues with Evolving Data

Online Enduring Program
Launched 8/20/2020
https://learning.freecme.com/a/35256PAnDMvU

Updates to the program were provided throughout the year as new data and treatment options emerged

1) **January 2021**: vaccine update, inpatient management update (convalescent plasma, tocilizumab, remdesivir, baricitinib), and bamlanivimab

2) **July 2021**: post-COVID fibrosis, COVID-19 and variants, and monoclonal antibody therapies for COVID-19

“I appreciated that they updated the presentation when new information became available.” – Online enduring program learner
Quantitative Educational Impact Summary: Final Online Enduring Program

Participation

- RN/LPN: 22%
- MD/DO: 19%
- BSN: 18%
- PA: 14%
- NP: 5%
- MA: 2%
- B.S.: 2%
- M.S.: 1%
- M. S.: 1%
- Other: 11%

RN/LPN=587
MD/DO=514
BSN=487
PA=375
NP=121
MSN=104
MA=61
RRT=50
B.S.=45
M.S.=17
Other=297
Total=2658

2,168 Completers

Exceeded enduring program guarantees by nearly 1,500 learners!

Potential Impact to 702,416 patient visits this year

Overall Knowledge Gain

- Pre-test (AVG N=751)
  - 52%
- Post-test (N=2291)
  - 84%

62% Relative Knowledge Gain

32% Absolute Knowledge Gain

Top 3 Intended Practice Changes

88% of evaluation respondents (N=2168) reported they intend to make changes to their practice
- Apply knowledge to practice and keep up-to-date with changing information
- Treatment and management of COVID-19
- Assessment of signs and symptoms

“The educational design of this activity was useful, effective and provided opportunities for interactivity.”
- Online enduring program learner

The Intersection of COVID-19 and Chronic Lung Disease: Treating Real World Issues with Evolving Data

[Final Online Outcomes]
Qualitative Educational Impact Summary: Final Online Enduring Program

<table>
<thead>
<tr>
<th>Participants</th>
<th>Educational Impact</th>
<th>Intended Practice Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2,658</strong> Total Learners</td>
<td><strong>35%</strong> relative knowledge gain seen from learners regarding describing clinical features and key concepts in the pathophysiology of COVID-19 and its interaction with the human immune response. [N=2291]</td>
<td><strong>88%</strong> of evaluation respondents reported they intended to make changes to their practice as a result of the educational activity [N=2168]</td>
</tr>
<tr>
<td><strong>13,508</strong> COVID Patients Weekly</td>
<td><strong>142%</strong> relative knowledge gain seen from learners in regards to evaluating current and emerging therapies for patients with COVID-19 and chronic lung disease [N=2291]</td>
<td><strong>65%</strong> of evaluation respondents indicated the activity addressed strategies for overcoming barriers to optimal patient care [N=2168]</td>
</tr>
<tr>
<td>Which translates to <strong>702,416</strong> Potential patient Visits Annually</td>
<td><strong>180%</strong> relative knowledge gain seen from learners in discussing strategies for managing patients with COVID-19 and chronic lung disease [N=2291]</td>
<td></td>
</tr>
</tbody>
</table>

“I think the activity was outstanding. There was so much to take away from the knowledge presented” – Online enduring program learner
## The Intersection of COVID-19 and Chronic Lung Disease: Treating Real World Issues with Evolving Data

### Final Online Outcomes

#### Level 1 Outcomes: Final Online Enduring Program: Participation by Degree

<table>
<thead>
<tr>
<th>Degree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>RN/LPN</td>
<td>587</td>
</tr>
<tr>
<td>MD/DO</td>
<td>514</td>
</tr>
<tr>
<td>BSN</td>
<td>487</td>
</tr>
<tr>
<td>PA</td>
<td>375</td>
</tr>
<tr>
<td>NP</td>
<td>121</td>
</tr>
<tr>
<td>MSN</td>
<td>104</td>
</tr>
<tr>
<td>MA</td>
<td>61</td>
</tr>
<tr>
<td>RRT</td>
<td>50</td>
</tr>
<tr>
<td>B.S.</td>
<td>45</td>
</tr>
<tr>
<td>M.S.</td>
<td>17</td>
</tr>
<tr>
<td>Other</td>
<td>297</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,658</strong></td>
</tr>
</tbody>
</table>

![Pie chart showing participation by degree](chart.png)
The Intersection of COVID-19 and Chronic Lung Disease: Treating Real World Issues with Evolving Data

[Final Online Outcomes]

Level 1 Outcomes: Final Online Enduring Program: Participation by Specialty

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Care</td>
<td>223</td>
</tr>
<tr>
<td>Primary Care</td>
<td>206</td>
</tr>
<tr>
<td>General Practice</td>
<td>188</td>
</tr>
<tr>
<td>Surgery</td>
<td>181</td>
</tr>
<tr>
<td>Emergency Medicine</td>
<td>176</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>133</td>
</tr>
<tr>
<td>Critical Care Medicine</td>
<td>116</td>
</tr>
<tr>
<td>Cardiology</td>
<td>113</td>
</tr>
<tr>
<td>Internal Medicine</td>
<td>112</td>
</tr>
<tr>
<td>Pulmonology</td>
<td>80</td>
</tr>
<tr>
<td>Education</td>
<td>78</td>
</tr>
<tr>
<td>Anesthesiology</td>
<td>76</td>
</tr>
<tr>
<td>Home Care</td>
<td>67</td>
</tr>
<tr>
<td>Case Management</td>
<td>66</td>
</tr>
<tr>
<td>Obstetrics &amp; Gynecology</td>
<td>63</td>
</tr>
<tr>
<td>Administration</td>
<td>60</td>
</tr>
<tr>
<td>Psychiatry</td>
<td>56</td>
</tr>
<tr>
<td>Other</td>
<td>664</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,658</strong></td>
</tr>
</tbody>
</table>

Other Includes:
- Infectious Disease
- Hospitalist
- Dentistry
- Pain Management
- Geriatric Medicine
- Hematology-Oncology
- Radiology
- Orthopedic

The diagram shows the distribution of participation by specialty, with Acute Care leading at 8% and Other at 25%. The total participation is 2,658.
## Level 2&3 Outcomes: Learning & Satisfaction – Final Online Enduring Program

**Analysis of participant responses related to educational needs**

Participants reported the activity was “Excellent” to “Good” at:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improving your ability to treat or manage your patients</td>
<td>95%</td>
</tr>
<tr>
<td>Addressing topics that were useful for daily practice</td>
<td>95%</td>
</tr>
<tr>
<td>Reinforcing and/or improving your current skills</td>
<td>96%</td>
</tr>
<tr>
<td>Meeting your educational needs</td>
<td>96%</td>
</tr>
</tbody>
</table>

Learners reported high levels of satisfaction related to the ability of the activity to impact practical applications.
The Intersection of COVID-19 and Chronic Lung Disease: Treating Real World Issues with Evolving Data

Level 2&3 Outcomes: Learning & Satisfaction – Final Online Enduring Program

Analysis of learner responses related to confidence after the activity from “somewhat to very confident”

<table>
<thead>
<tr>
<th>Topic</th>
<th>Confidence Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing strategies for managing your patients with chronic lung disease and COVID-19</td>
<td>73%</td>
</tr>
<tr>
<td>Discussing prognosis with patients</td>
<td>73%</td>
</tr>
<tr>
<td>Making a diagnosis of COVID-19</td>
<td>77%</td>
</tr>
</tbody>
</table>

N=2168
The Intersection of COVID-19 and Chronic Lung Disease: Treating Real World Issues with Evolving Data

Level 3 Outcomes (Knowledge): Final Online Enduring Program: Overall Knowledge Gain

Overall Knowledge Gain

Pre-test (AVG N=751) 52%
Post-test (N=2291) 84%

62% Relative Knowledge Gain
32% Absolute Knowledge Gain
The Intersection of COVID-19 and Chronic Lung Disease: Treating Real World Issues with Evolving Data

Level 3 Outcomes (Knowledge) – Final Online Enduring Program: By Learning Objective

Knowledge Gain by Learning Objectives

Evaluate current and emerging therapies for patients with COVID-19 and chronic lung disease
- Pre-test (AVG N=751): 25%
- Post-test (N=2291): 66%
  - Relative Knowledge Gain: 35%
  - Absolute Knowledge Gain: 23%

Discuss strategies for managing patients with COVID-19 and chronic lung disease
- Pre-test: 25%
- Post-test: 70%
  - Relative Knowledge Gain: 180%
  - Absolute Knowledge Gain: 45%

Describe clinical features and key concepts in the pathophysiology of COVID-19 and its interaction with the human immune response
- Pre-test: 36%
- Post-test: 87%
  - Relative Knowledge Gain: 142%
  - Absolute Knowledge Gain: 51%

[Final Online Outcomes]
Level 3 Outcomes (Knowledge): Final Online Enduring Program: Question 1

Learning Objective: Describe clinical features and key concepts in the pathophysiology of COVID-19 and its interaction with the human immune response

Question 1: Which of the following is true with respect to disease transmission of COVID-19?

- Pre-/Post-test

<table>
<thead>
<tr>
<th></th>
<th>Pre-test (N=860)</th>
<th>Post-test (N=2291)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R0 is the prevalence of infectious COVID-19 cases in the population</td>
<td>18%</td>
<td>6%</td>
</tr>
<tr>
<td>The basic R0 for SARS-CoV-2 is estimated at 4-5</td>
<td>12%</td>
<td>9%</td>
</tr>
<tr>
<td>The basic R0 can change with viral mutations</td>
<td>36%</td>
<td>79%</td>
</tr>
<tr>
<td>If the R0 is reduced to 1.1 with social distancing and vaccination, herd immunity will essentially eliminate spread of the virus</td>
<td>33%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Relative Gain: 119%
Absolute Gain: 43%
Level 3 Outcomes (Knowledge): Final Online Enduring Program: Question 2

Learning Objective: *Describe clinical features and key concepts in the pathophysiology of COVID-19 and its interaction with the human immune response*  

**Question 2:** Other than older age, which of the following is a known risk factor with a hazard ratio of 1.5 or greater for developing severe COVID-19 disease?

![Question 2: Pre-/Post-test](chart)

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Pre-test (N=776)</th>
<th>Post-test (N=2291)</th>
<th>Relative Gain</th>
<th>Absolute Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female sex</td>
<td>2%</td>
<td>1%</td>
<td>69%</td>
<td>1%</td>
</tr>
<tr>
<td>Chronic non-asthma lung disease</td>
<td>1%</td>
<td>1%</td>
<td>95%</td>
<td>1%</td>
</tr>
<tr>
<td>Immunization for influenza</td>
<td>1%</td>
<td>1%</td>
<td>22%</td>
<td>2%</td>
</tr>
<tr>
<td>Asthma using inhaled steroids</td>
<td>2%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous infection with other coronaviruses</td>
<td>5%</td>
<td>2%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Relative Gain:** 38%  
**Absolute Gain:** 26%
Learning Objective: Discuss strategies for managing patients with COVID-19 and chronic lung disease

Question 3: Which of the following is likely to mediate efficacy of dexamethasone in COVID-19?

- Increasing TNF signaling intensity
- Inhibition of NF-kB signaling
- Decreasing serine protease levels (e.g. SerpinA1)
- Improved host anti-viral response

Question 3: Pre-/Post-test

<table>
<thead>
<tr>
<th></th>
<th>Pre-test (N=712)</th>
<th>Post-test (N=2291)</th>
<th>Relative Gain</th>
<th>Absolute Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing TNF signaling</td>
<td>16%</td>
<td>10%</td>
<td>70%</td>
<td>180%</td>
</tr>
<tr>
<td>Inhibition of NF-kB</td>
<td>25%</td>
<td></td>
<td>45%</td>
<td></td>
</tr>
<tr>
<td>Decreasing serine</td>
<td>23%</td>
<td>11%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>protease levels (e.g.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SerpinA1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improved host anti-viral</td>
<td>37%</td>
<td>10%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Learning Objective: *Describe clinical features and key concepts in the pathophysiology of COVID-19 and its interaction with the human immune response*  

**Question 4:** What reported symptoms would make you suspect your patient had COVID?

**Question 4: Pre-/Post-test**

- **New or worsening cough:** 2% Pre-test, 1% Post-test
- **Dyspnea and increased respiratory rate:** 1% Pre-test, 1% Post-test
- **GI symptoms including nausea, vomiting, diarrhea:** 1% Pre-test, 2% Post-test
- **Loss of taste or smell:** 3% Pre-test, 6% Post-test
- **Any of the above:** 93% Pre-test, 91% Post-test

Note: This question shows a slight decrease in knowledge gain. However, the majority of learners answered this question correctly in both pre- and post-test, indicating a strong knowledge base regarding the clinical features of COVID-19 among learners.
Learning Objective: Evaluate current and emerging therapies for patients with COVID-19 and chronic lung disease

Question 5: Which of the following are currently recommended for use for inpatients with COVID-19 by the National Institutes of Health (NIH)?

<table>
<thead>
<tr>
<th>Therapy</th>
<th>Pre-test (%)</th>
<th>Post-test (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remdesivir</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Dexamethasone</td>
<td>9%</td>
<td>2%</td>
</tr>
<tr>
<td>Convalescent plasma</td>
<td>1%</td>
<td>3%</td>
</tr>
<tr>
<td>A and B</td>
<td>36%</td>
<td>87%</td>
</tr>
<tr>
<td>All of the above</td>
<td>51%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Relative Gain: 142%
Absolute Gain: 51%
An analysis of open-ended comments demonstrates the following changes learners intend to make:

- **88%** Respondents intend to make changes to practice as a result of the activity (N=2168)
  - 25% Apply new knowledge of COVID-19 in practice and seek opportunities for continued learning
  - 24% Treatment and management of COVID-19
  - 15% Assessment of signs and symptoms of COVID-19
  - 12% Appropriate PPE and safety protocols
  - 11% Patient education on COVID-19 treatment and prevention
  - 6% Proper medication use based on current evidence
  - 4% Utilization of screening and testing
  - 3% Follow-up of post-COVID patients (N=1257)
Program Evaluation: Final Online Enduring Program

- Material presented in an objective manner and free of commercial bias: 98%
- Content presented was evidence-based and clinically relevant: 99%

Most important take-away:

- Overall increase in knowledge & need to keep up-to-date with evolving data of COVID-19 (494 responses)
- Treatment and management approaches for COVID-19 (411 responses)
- Appropriate safety and prevention protocols, including vaccines (156 responses)
- Keep underlying conditions in mind when evaluating (125 responses)
- Recognition of signs and symptoms of COVID-19 (114 responses)
- Importance of testing and screening (25 responses)
- Use of medications based on evidence-based practices (96 responses)
- Educating the patient about the disease and prevention (55 responses)
## Program Evaluation: Final Online Enduring Outcomes

<table>
<thead>
<tr>
<th>What do you think is biggest challenge related to COVID-19?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of testing</td>
</tr>
<tr>
<td>Lack of PPE</td>
</tr>
<tr>
<td>Lack of resources</td>
</tr>
<tr>
<td>Screening patients</td>
</tr>
<tr>
<td>Asymptomatic patients</td>
</tr>
<tr>
<td>Rumors vs. facts when talking with patients</td>
</tr>
<tr>
<td>Continually changing standards of care</td>
</tr>
<tr>
<td>Cost and insurance coverage</td>
</tr>
</tbody>
</table>
Program Evaluation: Final Online Enduring Program Strategies for Overcoming Barriers

- Implementation of telemedicine
- Help patients better understand COVID-19
- Safer strategies to conduct outpatient visits
- Use of drive-up clinics and phone triage
- Treatment and management strategies
- How to treat patients with chronic lung disease safely while taking care of COVID-19 patients
- Increase of knowledge about virus to educate staff

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

65%
N=2168
Program Evaluation: Final Online Interim Outcomes

<table>
<thead>
<tr>
<th>What topics would you like more information about in future educational activities?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continued updates on COVID-19 management</td>
</tr>
<tr>
<td>Inpatient critical care management</td>
</tr>
<tr>
<td>Lung ultrasound</td>
</tr>
<tr>
<td>Recurrence of COVID-19 infection</td>
</tr>
<tr>
<td>COVID-19 vaccine</td>
</tr>
<tr>
<td>Asthma</td>
</tr>
<tr>
<td>COPD</td>
</tr>
<tr>
<td>Proper time to test for COVID-19</td>
</tr>
<tr>
<td>Prevention of COVID infection</td>
</tr>
<tr>
<td>Emergency procedures</td>
</tr>
<tr>
<td>Long-term effects of COVID-19</td>
</tr>
<tr>
<td>Chronic lung disease</td>
</tr>
<tr>
<td>Geriatric population and COVID-19</td>
</tr>
<tr>
<td>Patient cases</td>
</tr>
<tr>
<td>COVID-19 variants</td>
</tr>
<tr>
<td>Current COVID-19 research</td>
</tr>
</tbody>
</table>

*An update on new evidence-based treatment options and the vaccines were added to the online enduring program.
The Intersection of COVID-19 and Chronic Lung Disease: Treating Real World Issues with Evolving Data

Live Webinar Series
Interim Outcomes Summary

freeCME Live Webinar (1): July 21, 2020
freeCME Live Webinar (2): July 24, 2020
The Intersection of COVID-19 and Chronic Lung Disease: Treating Real World Issues with Evolving Data

[Final Live Outcomes]

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

Rebecca C. Keith, MD
Associate Professor
Department of Medicine
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Interstitial Lung Disease Program
Autoimmune Lung Center
National Jewish Health
Denver, CO

Joshua J. Solomon, MD
Associate Chief, Section of Critical Care
Associate Professor
Department of Medicine
Division of Pulmonary, Critical Care & Sleep Medicine
National Jewish Health
Denver, CO

Live Webinar Series
Webinar (1) – targeted nationally (7/21/2020): 346 Learners
Webinar (2) – targeted nationally (7/24/2020): 305 Learners
Total Live Webinar Learners: 651

“The enthusiasm and commitment shown by these clinicians was truly inspiring. It was the most positive I have felt about the pandemic. Bravo! We will make it to the other side of this pandemic.”

- Live virtual session attendee
The Intersection of COVID-19 and Chronic Lung Disease: Treating Real World Issues with Evolving Data

[Final Live Outcomes]

Quantitative Educational Impact Summary: Live Virtual Grand Round Sessions

Participation

<table>
<thead>
<tr>
<th>Role</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD/DO</td>
<td>15%</td>
</tr>
<tr>
<td>NP</td>
<td>4%</td>
</tr>
<tr>
<td>PA</td>
<td>3%</td>
</tr>
<tr>
<td>PharmD</td>
<td>1%</td>
</tr>
<tr>
<td>RN</td>
<td>43%</td>
</tr>
<tr>
<td>RT</td>
<td>3%</td>
</tr>
<tr>
<td>Other</td>
<td>31%</td>
</tr>
</tbody>
</table>

MD/DO=96  RN=280  NP=28  PA=19  RT=19  PharmD=7  Other=202  Total=651

Potential Impact to 68,224 patient visits this year

651 learners  501 completers

Overall Average Knowledge Gain (Overall): 50%

Pre-Formative assessment: Webinar 1

- Relative Gain: 32%
- Absolute Gain: 21%

Pre-test (N=212) Post-test (N=193)

Post-Formative assessment: Webinar 1

- Relative Gain: 72%
- Absolute Gain: 36%

Pre-test (N=150) Post-test (N=165)

Top 3 Intended Practice Changes

74% reported they intend to make changes to their practice

- Educate colleagues on information learned from webinar
- Implement appropriate PPE and safety protocols
- Proper medication use based on current evidence

“Very interesting and relevant presentation. I learned a lot and really appreciate the doctors experiences with in their practice both inpatient and outpatient perspective.”

- Live virtual session attendee

70%

Learners indicated the activity addressed strategies for overcoming barriers to optimal patient care
## Qualitative Educational Impact Summary: Live Virtual Grand Rounds Sessions

<table>
<thead>
<tr>
<th>Participants</th>
<th>Educational Impact</th>
<th>Practice Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>651</strong></td>
<td><strong>28%</strong> relative knowledge gain seen from learners regarding describing clinical features and key concepts in the pathophysiology of COVID-19 and its interaction with the human immune response. [N=165]</td>
<td><strong>74%</strong> of evaluation respondents reported they intended to make changes to their practice as a result of the educational activity [N=351]</td>
</tr>
<tr>
<td><strong>Total Learners</strong></td>
<td>Who see <strong>1,312 COVID Patients Weekly</strong></td>
<td><strong>70%</strong> of evaluation respondents indicated the activity addressed strategies for overcoming barriers to optimal patient care [N=351]</td>
</tr>
<tr>
<td></td>
<td>Which translates to <strong>68,224</strong> Potential patient Visits Annually</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>296%</strong> relative knowledge gain seen from learners in regards to evaluating current and emerging therapies for patients with COVID-19 and chronic lung disease [N=165]</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>311%</strong> relative knowledge gain seen from learners in discussing strategies for managing patients with COVID-19 and chronic lung disease [N=165]</td>
<td></td>
</tr>
</tbody>
</table>

"I felt the presenters had a high degree of expertise and imparted useful information. I enjoyed the presentation." – Live virtual session attendee
Level 1 Outcomes: Live Virtual Grand Round Sessions: Participation by Degree

<table>
<thead>
<tr>
<th>Degree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD/DO</td>
<td>96</td>
</tr>
<tr>
<td>RN</td>
<td>280</td>
</tr>
<tr>
<td>NP</td>
<td>28</td>
</tr>
<tr>
<td>PA</td>
<td>19</td>
</tr>
<tr>
<td>RT</td>
<td>19</td>
</tr>
<tr>
<td>PharmD</td>
<td>7</td>
</tr>
<tr>
<td>Other</td>
<td>202</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>651</strong></td>
</tr>
</tbody>
</table>
Level 1 Outcomes: Live Virtual Grand Round Sessions: Participation by Specialty

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Care</td>
<td>65</td>
</tr>
<tr>
<td>Pulmonary</td>
<td>41</td>
</tr>
<tr>
<td>Internal Medicine</td>
<td>23</td>
</tr>
<tr>
<td>Critical Care Medicine</td>
<td>20</td>
</tr>
<tr>
<td>Surgery</td>
<td>18</td>
</tr>
<tr>
<td>Emergency Medicine</td>
<td>17</td>
</tr>
<tr>
<td>Infectious Disease</td>
<td>13</td>
</tr>
<tr>
<td>Allergy &amp; Immunology</td>
<td>11</td>
</tr>
<tr>
<td>Pathology</td>
<td>8</td>
</tr>
<tr>
<td>Other</td>
<td>435</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>651</strong></td>
</tr>
</tbody>
</table>

The Intersection of COVID-19 and Chronic Lung Disease: Treating Real World Issues with Evolving Data

[Final Live Outcomes]
## Level 1 Outcomes: Live Webinar Sessions: Participation by Engagement

### Time in Webinar

<table>
<thead>
<tr>
<th>Time in Webinar</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-29 Minutes</td>
<td>32</td>
</tr>
<tr>
<td>30-59 Minutes</td>
<td>47</td>
</tr>
<tr>
<td>60-89 Minutes</td>
<td>71</td>
</tr>
<tr>
<td>90+ Minutes</td>
<td>501</td>
</tr>
</tbody>
</table>

**Total Learners:** 651

**Completers:** 501 (77% of total learners stayed on for the entire 90 minutes)

**Interest rating:** 92%

Interest rating - the percentage of time the GoToWebinar player was the primary tab open on the participant’s screen.

---

The Intersection of COVID-19 and Chronic Lung Disease: Treating Real World Issues with Evolving Data

[Final Live Outcomes]
The Intersection of COVID-19 and Chronic Lung Disease: Treating Real World Issues with Evolving Data

Level 1 Outcomes: Live Webinar Sessions: Participation by Region

- 104 learners
- 60 learners
- 158 learners
- 322 learners

Other:
- Quebec
- Northwest Territories
- Yukon (3)
- Guam
- Puerto Rico

N=651
Level 2&3 Outcomes: Learning & Satisfaction - Live Webinar Sessions

Analysis of participant responses related to educational needs
Participants reported the activity was “Excellent” to “Good” at:

- Improving your ability to treat or manage your patients: 98%
- Addressing topics that were useful for daily practice: 98%
- Reinforcing and/or improving your current skills: 99%
- Meeting your educational needs: 100%

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

National Jewish Health strives to offer the best possible education to physician and healthcare providers. Our gold standard approach to a series of live presentations includes formative assessment between sessions to support evidence-based refinement and improvement of subsequent presentations.

In this series, two pre-/post-test questions were revised as outlined on slides 39 and 40 after faculty recommendations and analysis. For the question on slide 40, this was also revised to better align with a different learning objective.
Level 3 Outcomes (Knowledge): Live Webinar Sessions: Overall Knowledge Gain (Before & After Formative Assessment)

**Pre-Formative assessment: Webinar 1**
- Pre-test (N=212)
- Post-test (N=193)
- Overall Knowledge Gain: 87%
- Relative Gain: 32%
- Absolute Gain: 21%

**Post-Formative assessment: Webinar 2**
- Pre-test (N=150)
- Post-test (N=165)
- Overall Knowledge Gain: 86%
- Relative Gain: 72%
- Absolute Gain: 36%

Average Knowledge Gain (Overall): 50%
The Intersection of COVID-19 and Chronic Lung Disease: Treating Real World Issues with Evolving Data

Level 3 Outcomes (Knowledge) - Live Webinar Sessions By Learning Objective (Post Formative Assessment)

<table>
<thead>
<tr>
<th>Knowledge Gain by Learning Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluate current and emerging therapies for patients with COVID-19 and chronic lung disease</td>
</tr>
<tr>
<td>Discuss strategies for managing patients with COVID-19 and chronic lung disease</td>
</tr>
<tr>
<td>Describe clinical features and key concepts in the pathophysiology of COVID-19 and its interaction with the human immune response</td>
</tr>
</tbody>
</table>
Level 3 Outcomes (Knowledge): Live Webinar Sessions: Question 1

Learning Objective: Describe clinical features and key concepts in the pathophysiology of COVID-19 and its interaction with the human immune response

Question 1

Other than older age, which of the following is a known risk factor with a hazard ratio of 1.5 or greater for developing severe COVID-19 disease?

a. Female sex  
b. Chronic non-asthma lung disease  
c. Immunization for influenza  
d. Asthma using inhaled steroids  
e. Previous infection with other coronaviruses

Question 1: Pre-/Post-test

<table>
<thead>
<tr>
<th></th>
<th>Pre-test</th>
<th>Post-test</th>
<th>Absolute Gain</th>
<th>Relative Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Female sex</td>
<td>66%</td>
<td>98%</td>
<td>32%</td>
<td>48%</td>
</tr>
<tr>
<td>b. Chronic non-asthma lung disease</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Immunization for influenza</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Asthma using inhaled steroids</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Previous infection with other coronaviruses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Webinars 1 and 2 (Pre=387; Post=358)
**Learning Objective:** Discuss strategies for managing patients with COVID-19 and chronic lung disease

**Question 2**
Which of the following is likely to mediate efficacy of dexamethasone in COVID-19?

- a. Increasing TNF signaling intensity
- b. **Inhibition of NF-κB signaling**
- c. Decreasing serine protease levels (e.g. SerpinA1)
- d. Improved host anti-viral response

<table>
<thead>
<tr>
<th></th>
<th>Pre-test</th>
<th>Post-test</th>
<th>Relative Gain</th>
<th>Absolute Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>19%</td>
<td>61%</td>
<td>221%</td>
<td>42%</td>
</tr>
<tr>
<td>b.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Webinars 1 and 2 (Pre=326; Post=358)
Level 3 Outcomes (Knowledge): Live Webinar Sessions: Question 3

Learning Objective: Describe clinical features and key concepts in the pathophysiology of COVID-19 and its interaction with the human immune response

Question 3
What reported symptoms would make you suspect your patient had COVID?

a. New or worsening cough
b. Dyspnea and increased respiratory rate
c. GI symptoms including nausea, vomiting, diarrhea
d. Loss of taste or smell
e. Any of the above

The majority of learners answered this question correctly in both pre- and post-test, indicating a strong knowledge base regarding the clinical features of COVID-19 among learners.
Learning Objective: *Describe clinical features and key concepts in the pathophysiology of COVID-19 and its interaction with the human immune response*

**Question 4 (Pre-formative assessment)**
Which of the following is true with respect to disease transmission of COVID-19?

- **a.** R0 is the number of cases in the population with COVID-19
- **b.** The R0 can be influenced by public health measures
- **c.** Since the basic R0 for COVID-19 is 2-3, no one person can infect more than 5 other people

**Question 4: Pre-/Post-test**

<table>
<thead>
<tr>
<th></th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. R0 is the prevalence of infectious COVID-19 cases in the population</td>
<td>76%</td>
<td>94%</td>
</tr>
<tr>
<td>b. The basic R0 for SARS-CoV-2 is estimated at 4-5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. The basic R0 can change with viral mutations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. If the R0 is reduced to 1.1 with social distancing and vaccination, herd immunity will essentially eliminate spread of the virus</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Relative Gain:** 24%
**Absolute Gain:** 18%

*Webinar 1 (Pre=194; Post=193)*

**Question 4 (Post-formative assessment)**
Which of the following is true with respect to disease transmission of COVID-19?

- a. R0 is the prevalence of infectious COVID-19 cases in the population
- b. The basic R0 for SARS-CoV-2 is estimated at 4-5
- c. The basic R0 can change with viral mutations
- d. If the R0 is reduced to 1.1 with social distancing and vaccination, herd immunity will essentially eliminate spread of the virus

**Question 4: Pre-/Post-test**

<table>
<thead>
<tr>
<th></th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. R0 is the prevalence of infectious COVID-19 cases in the population</td>
<td>47%</td>
<td>65%</td>
</tr>
<tr>
<td>b. The basic R0 for SARS-CoV-2 is estimated at 4-5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. The basic R0 can change with viral mutations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. If the R0 is reduced to 1.1 with social distancing and vaccination, herd immunity will essentially eliminate spread of the virus</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Relative Gain:** 38%
**Absolute Gain:** 18%

*Webinar 2 (Pre=100; Post=165)*
Level 3 Outcomes (Knowledge): Live Webinar Sessions: Question 5

**Learning Objective (pre assessment):** Describe clinical features and key concepts in the pathophysiology of COVID-19 and its interaction with the human immune response

**Learning Objective (post assessment):** Evaluate current and emerging therapies for patients with COVID-19 and chronic lung disease

**Question 5 (Pre-formative assessment)**
Which of the following has not been shown to increase your risk of poor outcomes with COVID-19 (based on current data)?

a. Hypertension
b. Diabetes
c. Chronic Obstructive Pulmonary Disease (COPD)
d. Asthma
e. Advanced Age

**Question 5: Pre-/Post-test**

<table>
<thead>
<tr>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>68%</td>
<td>92%</td>
</tr>
</tbody>
</table>

Relative Gain: 35%
Absolute Gain: 24%

Webinar 1 (Pre=245; Post=193)

**Question 5 (Post-formative assessment)**
Which of the following are currently recommended for use for inpatients with COVID-19 by the National Institutes of Health (NIH)?

a. Hydroxychloroquine
b. Remdesivir
c. Dexamethasone
d. Convalescent plasma
e. B and C
f. All of the above

**Question 5: Pre-/Post-test**

<table>
<thead>
<tr>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>24%</td>
<td>95%</td>
</tr>
</tbody>
</table>

Relative Gain: 296%
Absolute Gain: 71%

Webinar 2 (Pre=182; Post=165)
Level 4 Outcomes (Competence): Live Webinar Sessions

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

- 74% of learners intend to make changes to practice as a result of the activity (N=351)
- Educate colleagues of information learned (17%)
- Apply new knowledge of COVID-19 in practice and seek opportunities for continued learning (17%)
- Proper medication use based on current evidence (14%)
- Appropriate PPE and safety protocols (14%)
- Assessment and management of COVID-19 (11%)
- Assessment of patients with underlying conditions (10%)
- Understanding signs and symptoms of COVID-19 (8%)
- Ability to answer patient questions (6%)
- Utilization of testing (3%)

N=281
The Intersection of COVID-19 and Chronic Lung Disease: Treating Real World Issues with Evolving Data

[Final Live Outcomes]

Program Evaluation: Live Webinar Sessions

99% • Material presented in an objective manner and free of commercial bias

99% • Content presented was evidence-based and clinically relevant

N=351

Overall increase in knowledge & need to keep up-to-date with evolving data of COVID-19 (123 responses)

Importance of testing and sharing knowledge (10 responses)

Management and treatment approaches for COVID-19 (63 responses)

Recognition of signs and symptoms of COVID-19 (25 responses)

Keep underlying conditions in mind when evaluating (46 responses)

Appropriate safety protocols (34 responses)

Most important take-away

“"This webinar was extremely informative and increased my knowledge of COVID-19/CLD tremendously.”" –Live Webinar Participant

N=301
### Program Evaluation: Live Webinar Sessions

<table>
<thead>
<tr>
<th>What do you think is biggest challenge related to COVID-19?</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Keeping informed and up-to-date with evolving data</td>
<td>Testing</td>
</tr>
<tr>
<td>Difficulty communicating with patients</td>
<td>Fatigue</td>
</tr>
<tr>
<td>Anxiety surrounding exposure</td>
<td>Resources such as adequate supplies like PPE, ventilators, etc.</td>
</tr>
<tr>
<td>Protecting patients and staff</td>
<td>ICU capacity</td>
</tr>
<tr>
<td>No definitive treatment</td>
<td>Consistent safety protocols</td>
</tr>
<tr>
<td>Financial issues</td>
<td>Contact tracing</td>
</tr>
<tr>
<td>Misinformation spread by media</td>
<td>Variability of response to COVID-19</td>
</tr>
<tr>
<td>Compliance with CDC guidelines</td>
<td>Accessibility to patients</td>
</tr>
</tbody>
</table>
Program Evaluation: **Live Webinar Sessions**  
**Strategies for Overcoming Barriers**

- Types of medications and therapeutics available
- Better insight into understanding the disease
- Adaptation of working environment for better management of care and safety protocols
- Better understanding on where the healthcare community is at in relation to treating COVID-19 in the short and long term
- Screening processes to implement
- Post care of COVID-19 treatment
- Recognition of patient apprehension with regards to necessary procedures
- Telemedicine
- Implementation of phone triage

Learners indicated the activity addressed strategies for overcoming barriers to optimal patient care (N=351)

70%
### Program Evaluation: Live Webinar Sessions

<table>
<thead>
<tr>
<th>What topics would you like more information about in future educational activities?</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>COVID-19 vaccine updates</td>
<td>Effects on “long haul” survivors</td>
</tr>
<tr>
<td>Pediatric COVID-19</td>
<td>Asthma</td>
</tr>
<tr>
<td>Auto immune diseases</td>
<td>Acute kidney injury</td>
</tr>
<tr>
<td>Cardiology</td>
<td>Sleep medicine</td>
</tr>
<tr>
<td>Depression due to quarantine</td>
<td>Ethics related to COVID-19 management</td>
</tr>
<tr>
<td>Lung disease</td>
<td>Infection prevention</td>
</tr>
<tr>
<td>COVID-19 and COPD</td>
<td>COVID-19 data updates</td>
</tr>
<tr>
<td>Effects of isolation on elderly</td>
<td>NTM infections</td>
</tr>
<tr>
<td>Vaping</td>
<td>OBGYN patients</td>
</tr>
</tbody>
</table>
The Intersection of COVID-19 and Chronic Lung Disease: Treating Real World Issues with Evolving Data

45-day Follow-up Survey: Live Webinar Sessions

Did this activity provide new ideas or information you have used in practice?

- Yes: 58%
- Haven't had an opportunity to implement changes into practice: 12%
- Not applicable: 30%

Of those who indicated they hadn’t implemented changes into practice are still committed to making changes.

N=5
The Intersection of COVID-19 and Chronic Lung Disease: Treating Real World Issues with Evolving Data

[Final Live Outcomes]

45-day Follow-up Survey: Live Webinar Sessions

What change(s) have you incorporated into practice as result of the activity?

- Changed screening/prevention practices: 30%
- Used alternative communication methodologies with patients and families: 23%
- Modified treatment plans: 17%
- Incorporated different diagnostic strategies into patient evaluation: 10%
- Other: 43%

- Review of COVID-19 symptoms, travel, testing history with patients upon every interaction
- Phone screen day before appointment
- More follow-up care for post-COVID patients
- App on phone to directly connect with family
- Patient education

N=30
The Intersection of COVID-19 and Chronic Lung Disease: Treating Real World Issues with Evolving Data

45-day Follow-up Survey: Live Webinar Sessions

Did the activity provide information, education, tools or resources to be able to address these barriers?

- Yes: 66%
- No: 19%
- I did not experience any barriers: 16%

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

- Patient knowledge: 25%
- Staffing: 22%
- Patient adherence: 16%
- Lack of evidence-based guidelines: 13%
- Lack of time: 13%
- Organizational or institutional: 9%
- Access to equipment: 6%

N=32
45-day Follow-up Survey: Live Webinar Sessions

In which areas do you feel you need more education?

- Evaluating current and emerging therapies for patients with COVID-19 and chronic lung disease: 50%
- Discussing strategies for managing patients with COVID-19 and chronic lung disease: 22%
- Describing clinical features and key concepts in the pathophysiology of COVID-19 and its interaction with the human immune response: 19%
- Other: 3%

N=32

25% of respondents indicated no additional education is needed.
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.

Live Webinars
NJH designates this live activity for a maximum of 1.5 AMA PRA Category 1 Credits™.

Provider approved by the California Board of Registered Nursing, Provider Number 12724 for 1.5 nursing contact hours.

Online Enduring
NJH designates this enduring material for a maximum of 1.5 AMA PRA Category 1 Credits™.

Provider approved by the California Board of Registered Nursing, Provider Number 12724 for 1.5 nursing contact hours.