

MEETING CLINICIANS' NEEDS IN REAL TIME DURING THE EVOLVING COVID-19 PANDEMIC

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MEETING CLINICIANS' EDUCATIONAL NEEDS IN REAL TIME DURING THE EVOLVING COVID-19 PANDEMIC

Introduction

On January 9, 2020, the World Health Organization (WHO) reported that a cluster of pneumonia cases being investigated in Wuhan, People's Republic of China, were determined to be caused by a novel coronavirus. Shortly thereafter, on January 17, 2020, screening for symptoms in travelers from Wuhan to the US was initiated at major US airports; and on January 21, 2020, the first case of the novel coronavirus was confirmed in the US. This was followed by rapidly spreading outbreaks across the world, leading WHO to characterize COVID-19 as a pandemic on March 11, 2020.¹

From the beginning of this rapidly developing public health crisis, Rockpointe identified the urgent need to provide up-to-date educational activities on COVID-19 diagnosis and management for clinicians. The initial uncertainty about best practices for patient care, while scientists performed evidence-based research on an abbreviated timeline, meant that information was changing quickly, and efficient distribution of educational material was of the utmost importance.

Recognizing the critical need for education about COVID-19 and remaining dedicated to the mission of providing high-quality medical education, Rockpointe immediately initiated self-funded, accredited educational programming about COVID-19 for clinicians. As the pandemic continued, scientific publications and evidence about COVID-19 emerged at a staggering rate, leading Rockpointe to continue developing educational activities on key aspects of the disease, including high-risk populations and treatment options.

Methods

Needs assessments and gap analyses were performed prior to development of each educational activity. This process allowed Rockpointe to identify unmet educational needs among clinicians and to describe the gaps that must be filled to meet the needs identified.

As the COVID-19 pandemic began to unfold and little was known worldwide about this novel virus, initial educational gaps centered on the need for a basic understanding of what was known at the time about SARS-CoV-2. In February 2020, Rockpointe addressed this need by presenting the accredited educational activity ***Understanding and Addressing the Global Spread of COVID-19: A Clinician's Guide***.

In March 2020, clinician concerns surrounding COVID-19 shifted educational needs from basic knowledge of the virus and its pathophysiology to managing patients with the disease in the context of an already overburdened healthcare system. The educational activity ***COVID-19 in the Ambulatory Care Setting: A Practical Guide for the Multidisciplinary Team*** was designed to address issues of patient triage, management, disposition, and outpatient infection control.

With the continued compilation of information on patient outcomes during the pandemic, it became clear that older patients and those with certain underlying diseases, such as diabetes, heart disease, or obesity

were at higher risk for poor outcomes than younger patients and those without these comorbidities.² In August 2020, Rockpointe presented the educational activity ***Obesity and COVID-19 in the Outpatient Setting: What Clinicians Need to Know***. To further address the special considerations for high-risk populations, ***Lung Cancer and COVID-19 in the Outpatient Setting: What Clinicians Need to Know*** was presented in October 2020. In addition, the activities ***Diabetes and COVID-19 in the Outpatient Setting: What Clinicians Need to Know*** and ***Dermatology and COVID-19 in the Outpatient Setting: What Clinicians Need to Know*** were presented in November 2020 and ***Managing Advanced Prostate Cancer in the COVID-19 Era: What Do Oncologists Need to Know?*** was presented in March 2021.

Following the identification of high-risk patient populations, vaccination and monoclonal antibody administration became recognized as critical tools for preventing infection and disease progression, respectively. However, remaining up to date on rapidly changing guidelines and recommendations for outpatient COVID-19 management was challenging for busy clinicians. In May 2021, Rockpointe presented the educational activity ***High-Risk Patients with COVID-19: Outpatient Management to Prevent Progression*** to provide updated education on this topic.

Table 1 (page 4) lists the identified educational gaps and stated learning objectives for the Rockpointe educational activities about COVID-19 and its management.

TABLE 1: Educational Gaps and Learning Objectives for COVID-19 Educational Activities

ACTIVITY TITLE	EDUCATIONAL GAPS	LEARNING OBJECTIVES
Understanding and Addressing the Global Spread of COVID-19: A Clinician's Guide	<ul style="list-style-type: none"> Clinicians lack of knowledge about the incubation time of SARS-CoV-2 Clinicians are unaware of common symptoms in patients with COVID-19 infection Clinicians lack awareness about best practices to prevent the spread of SARS-CoV-2 	<ul style="list-style-type: none"> Describe the current global status of the COVID-19 pandemic Recognize the signs and symptoms of COVID-19 and perform appropriate diagnostic studies Form evidence-based strategies for prevention of COVID-19 transmission Develop plans to manage patients with COVID-19
COVID-19 in the Ambulatory Care Setting: A Practical Guide for the Multidisciplinary Team	<ul style="list-style-type: none"> Clinicians lack awareness regarding protocol development for patient triage in the outpatient setting Clinicians lack knowledge about the assessment and management of patients with possible COVID-19, including testing best practices and disposition needs Clinicians are unaware of enhanced infection control measures needed to prevent the spread of SARS-CoV-2 	<ul style="list-style-type: none"> Develop protocols that address the situation of a patient with suspected COVID-19 in the ambulatory care setting, including private office, clinic, or urgent-care facility Indicate which specimens to obtain from a patient with suspected COVID-19 and send those samples to a laboratory capable of testing them Determine an appropriate disposition for a patient suspected of having COVID-19 Describe measures needed to clean and disinfect the office after a patient suspected of having COVID-19 departs
Obesity and COVID-19 in the Outpatient Setting: What Clinicians Need to Know	<ul style="list-style-type: none"> Clinicians lack knowledge of the pathophysiology of COVID-19 Clinicians are unfamiliar with factors that increase risks related to COVID-19 in patients with obesity Clinicians lack information about strategies for managing patients with obesity during the COVID-19 pandemic 	<ul style="list-style-type: none"> Discuss the most current understanding of the pathophysiology of COVID-19 Describe factors that increase the risks of COVID-19 for patients with obesity Develop strategies for individualized management of patients with obesity during the COVID-19 pandemic Provide counsel to patients with obesity regarding concerns or fears related to COVID-19
Lung Cancer and COVID-19 in the Outpatient Setting: What Clinicians Need to Know	<ul style="list-style-type: none"> Clinicians lack knowledge of the pathophysiology of COVID-19 Oncology clinicians are unaware of patient and disease features that increase the risk of COVID-19 in patients with lung cancer Oncology clinicians lack guidance on how to appropriately manage patients with lung cancer in the outpatient setting during the COVID-19 pandemic 	<ul style="list-style-type: none"> Discuss the most current understanding of the pathophysiology of COVID-19 Recognize and evaluate factors that increase risk of COVID-19 among patients with lung cancer Integrate consensus recommendations for the safe and effective management of patients with lung cancer during the COVID-19 pandemic Provide counsel to patients with lung cancer regarding concerns or fears related to COVID-19
Diabetes and COVID-19 in the Outpatient Setting: What Clinicians Need to Know	<ul style="list-style-type: none"> Clinicians lack knowledge of the pathophysiology of COVID-19 Clinicians are unfamiliar with how patient and disease characteristics increase the risk of COVID-19 in patients with diabetes Clinicians lack information about current recommendations for managing patients with diabetes during the COVID-19 pandemic 	<ul style="list-style-type: none"> Discuss the most current understanding of the pathophysiology of COVID-19 Describe factors that increase the risk of COVID-19 for patients with diabetes Integrate recommendations for the safe and effective management of patients with diabetes during the COVID-19 pandemic Provide counsel to patients with diabetes regarding concerns or fears related to COVID-19
Dermatology and COVID-19 in the Outpatient Setting: What Clinicians Need to Know	<ul style="list-style-type: none"> Clinicians lack knowledge of the pathophysiology of COVID-19 Clinical and patient features that increase the risk of COVID-19 in patients with inflammatory skin conditions such as atopic dermatitis and psoriasis Dermatologists lack guidance on how to appropriately manage patients in an outpatient setting during the COVID-19 pandemic 	<ul style="list-style-type: none"> Discuss the most current understanding of the pathophysiology of COVID-19 Recognize and evaluate factors that increase risk of COVID infection among patients with inflammatory skin conditions Integrate recommendations for the safe and effective management of patients with inflammatory skin conditions during the COVID-19 pandemic Provide counsel to dermatology patients regarding concerns or fears related to COVID-19
Managing Advanced Prostate Cancer in the COVID-19 Era: What Do Oncologists Need to Know?	<ul style="list-style-type: none"> Oncologists are not familiar with recent advances in the management of prostate cancer and are not adopting new recommendations for treatment timing and sequencing Oncologists lack guidance on how to appropriately manage patients with prostate cancer during the COVID-19 pandemic, including the use of telemedicine for management of therapies and routine monitoring 	<ul style="list-style-type: none"> Evaluate current and emerging treatments for patients with advanced prostate cancer based on clinical trial safety and efficacy data Develop patient-personalized treatment plans for advanced prostate cancer across all stages of disease Integrate consensus recommendations for the safe and effective management of prostate cancer during the COVID-19 pandemic Adopt recommended practices for appropriate integration of telemedicine into prostate cancer care
High-Risk Patients with COVID-19: Outpatient Management to Prevent Progression	<ul style="list-style-type: none"> Clinicians are not familiar with the most recent recommendations for outpatient management of patients with COVID-19 Clinicians are not familiar with the mechanism of action and efficacy and safety data for monoclonal antibodies that have FDA EUA for managing outpatient COVID-19 	<ul style="list-style-type: none"> Integrate the most recent recommendations when developing management strategies for outpatients with COVID-19 Assess the mechanism of action and efficacy and safety data for monoclonal antibodies that have FDA Emergency Use Authorization for managing outpatient COVID-19

Activity Evaluation

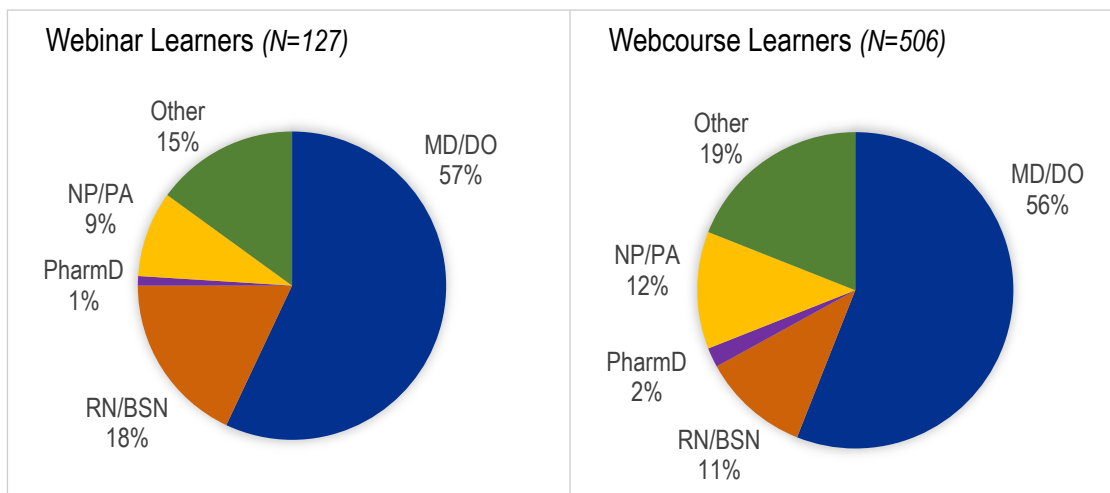
For each of the educational activities, a standardized evaluation tool was used to characterize learner demographics, satisfaction, perception of bias, perception of enhanced clinical effectiveness, and overall assessment of activity format and any educational materials provided. Immediate impacts on knowledge and competence were evaluated by comparing learner responses to multiple choice questions asked before and after an activity. The assessment also used a combination of attitude, confidence, practice, and barrier questions with open-ended, multiple choice, or Likert scale response format.

A standard pre- and post-activity survey consisting of multiple choice questions was administered. Follow-up surveys were sent electronically to participants 6 to 8 weeks after each activity to identify practice changes that had been made since participation. Effect size, which is a measure of the magnitude of a treatment effect or the size of the difference between two groups, was calculated to assess the difference between the group of responders on pre-test (no education) and the group of responders on post-test (received education). A higher percentage of non-overlap between the two groups indicates a more effective educational activity.

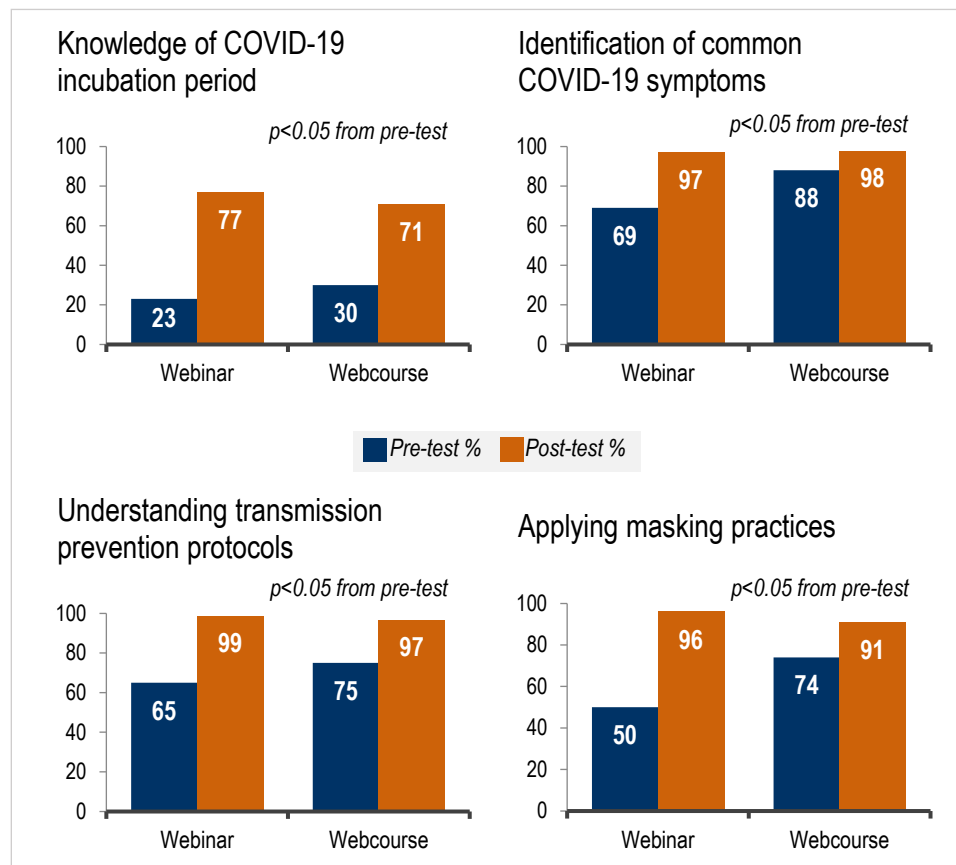
Results

Understanding and Addressing the Global Spread of COVID-19: A Clinician's Guide addressed early learning needs during the COVID-19 pandemic with the intention to provide guidance to clinicians regarding disease symptoms and prevention. 127 people participated in the webinar and 506 in the webcourse. Learners included physicians, nurses, pharmacists, and other healthcare professionals (Figure 1, below).

FIGURE 1: Learner Demographics for *Understanding and Addressing the Global Spread of COVID-19: A Clinician's Guide*



Based on the information presented in the educational activity, 98% of learners (n=617) felt they learned strategies to improve their practice and care for their patients. Pre- and post-test scores demonstrated substantial improvement in knowledge related to the stated learning objectives (Figure 2, page 6).

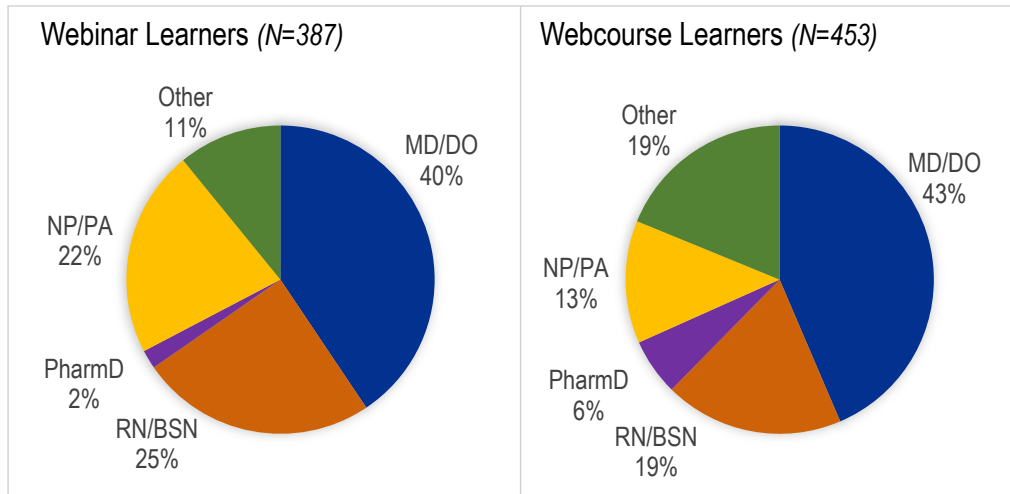
FIGURE 2: Pre- and Post-test results for *Understanding and Addressing the Global Spread of COVID-19: A Clinician's Guide*

Prior to completing the webinar or webcourse, among all learners (n=782) a majority (63%) were 'slightly confident' or 'not confident' in their ability to recognize and manage COVID-19, whereas following the activities, of 621 learners most (90%) were 'confident', 'very confident', or 'expert' in this regard. Similar patterns were noted in clinician ability to answer patient questions about COVID-19 before and after the educational activities where 53% of 680 learners were slightly or not confident in this area on the pre-test and 92% of 621 learners reported being confident, very confident, or expert on the post-test. Importantly, these gains were well-retained at follow-up, where 80% of the 95 learners responding continued to report confidence in their ability to recognize and treat COVID-19 and 92% remained confident in their ability to answer patient questions.

In follow-up, of the 95 learners responding, 74% increased their use of signs to encourage infection control practices, 71% increased requesting patients with a cough to mask, 78% increased asking about recent travel, 69% increased availability of personal protective equipment (PPE) in their offices, and 77% increased their review of PPE use with staff. The effect size for this activity was large, with a 55.4% non-overlap.

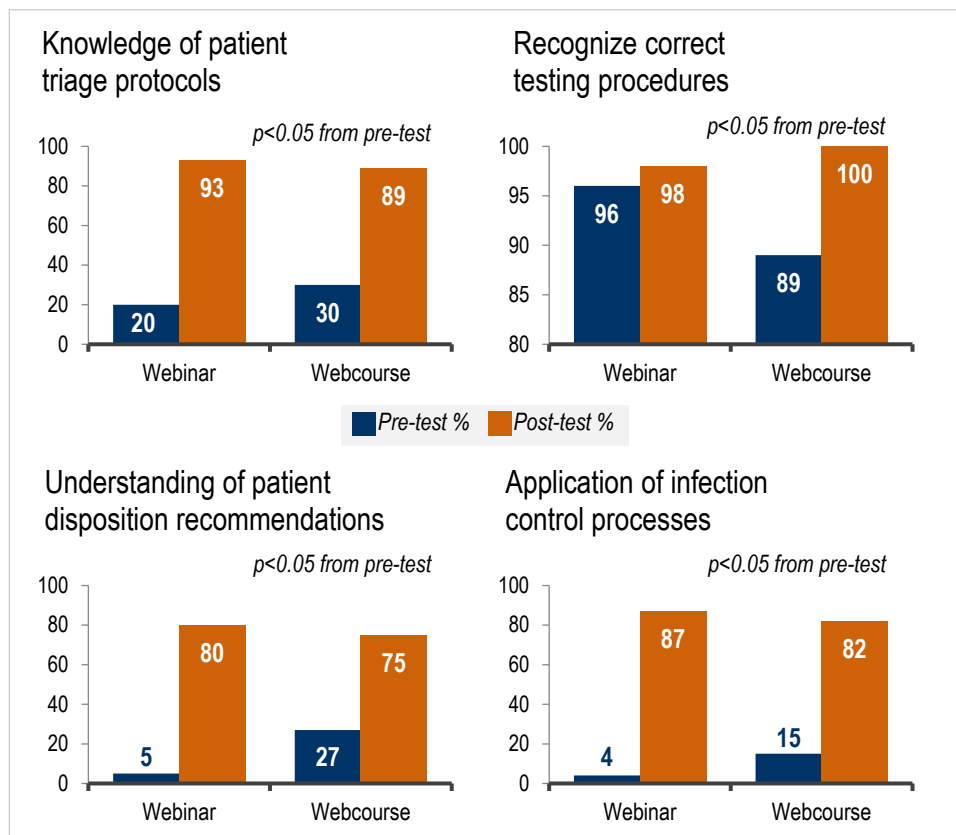
COVID-19 in the Ambulatory Care Setting: A Practical Guide for the Multidisciplinary Team further addressed management, disposition, and infection control issues related to COVID-19 as the evidence base for these topics continued to grow. Three hundred and eight seven (378) individuals from a variety of healthcare backgrounds participated in the webinar and 453 in the webcourse (Figure 3, page 7). Overall, learners (n=842) felt that 50% or more of the material presented was new to them.

**FIGURE 3: Learner Demographics for COVID-19 in the Ambulatory Care Setting:
A Practical Guide for the Multidisciplinary Team**



Pre- and post-test scores demonstrated substantial improvement in knowledge related to the stated learning objectives (Figure 4, below).

**FIGURE 4: Pre- and Post-test results for COVID-19 in the Ambulatory Care Setting:
A Practical Guide for the Multidisciplinary Team**

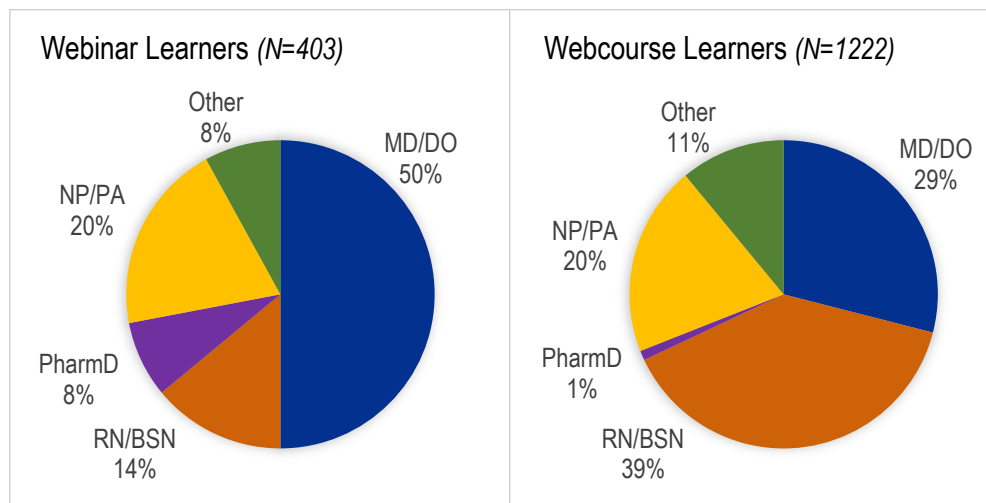


In addition, between pre- and post-test assessment, there was significant improvement in learners' reported confidence in ability to safely determine patient disposition and select proper disinfectant solutions. Prior to completing the activity, only 43% of learners reported being 'confident', 'very confident', or 'expert' in disposition determination. Following the activity, this number increased to 94%. Similarly, before the activity, 52% of learners were 'familiar', 'very familiar', or 'expert' with regard to disinfection practices and following the activity 96% reported these levels of familiarity.

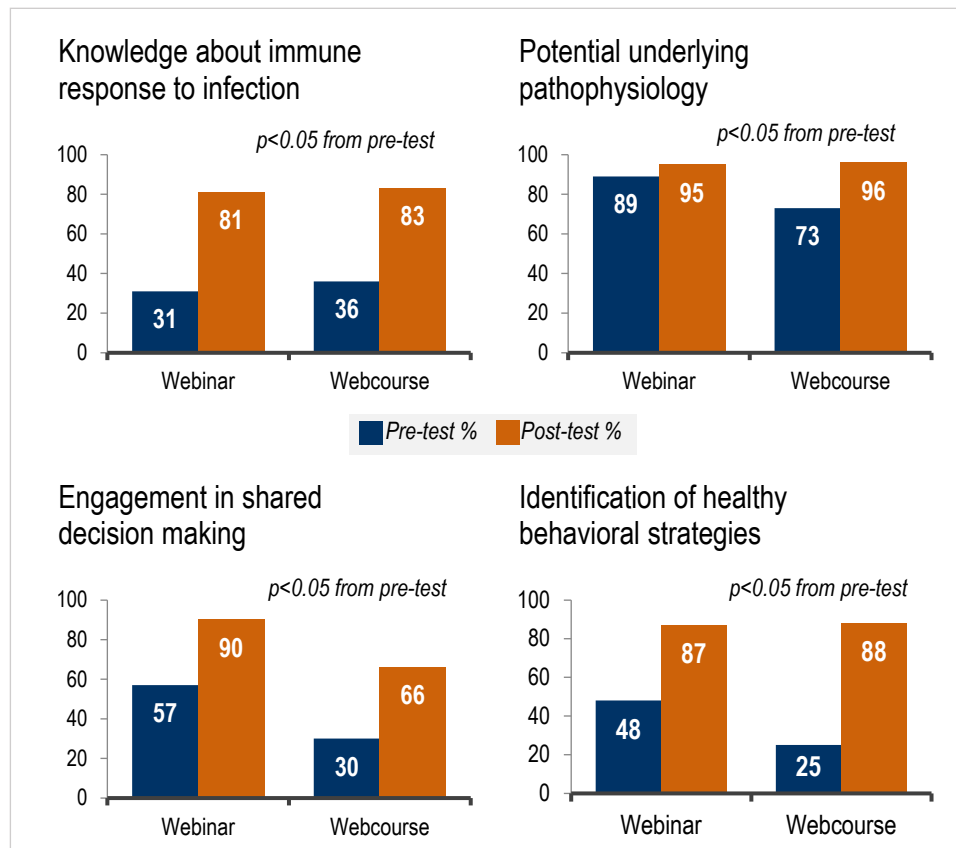
Recommended practices including implementing a telephone triage algorithm, performing nasopharyngeal testing, and using EPA-approved agents for disinfection increased by 67%, 39%, and 75%, respectively, following participation in this continuing medical education activity. At the time of follow-up analysis, 85% of learners had developed a protocol for patients presenting with suspected COVID-19. The effect size for this activity was large with a 62.2% non-overlap.

In the educational activity ***Obesity and COVID-19 in the Outpatient Setting: What Clinicians Need to Know***, learning objectives focused on understanding the effect of comorbid obesity on patient management and outcomes in COVID-19. The webinar and webcourse for these activities had 403 and 1,222 learners, respectively. These included physicians, physician associates, nurse practitioners, nurses, pharmacists, and other healthcare professionals (Figure 5, below). Almost all (97%) of learners (n=1620) agreed that this program provided them with strategies to improve their practice and better prepared them to care for their patients.

FIGURE 5: Learner Demographics for *Obesity and COVID-19 in the Outpatient Setting: What Clinicians Need to Know*

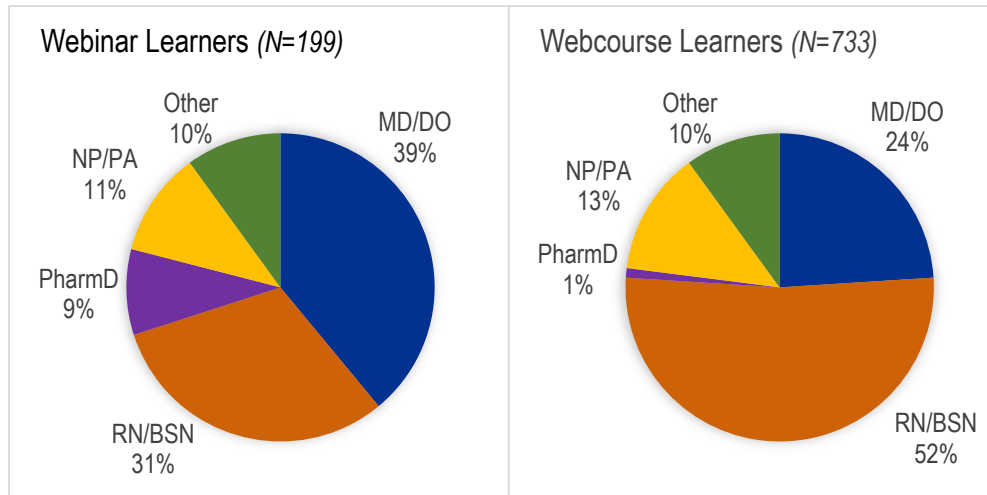


Knowledge about immune response to infection, the potential pathophysiologic mechanism of poorer COVID-19 outcomes in patients with obesity, and individualized management and counseling for patients with obesity during the COVID-19 pandemic were all assessed with pre- and post-test knowledge questions for the activity. For all variables, improvements were noted in the post-test group (Figure 6, page 9).

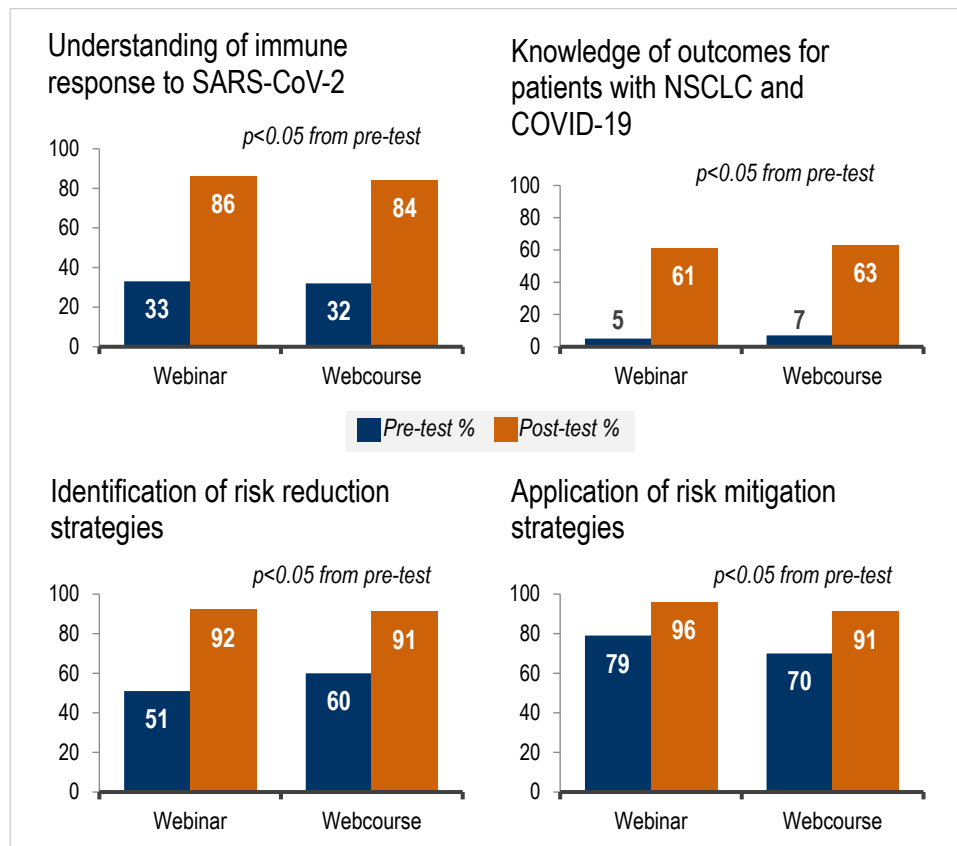
FIGURE 6: Pre- and Post-test results for *Obesity and COVID-19 in the Outpatient Setting: What Clinicians Need to Know*

For this educational activity, learner confidence in managing patients with obesity during the COVID-19 pandemic more than doubled (33% at baseline; $n=1714$) to 82% upon follow-up ($n=139$) [*'confident'* + *'very confident'* + *'expert'*]. Immediately after the activity, 90% of responders ($n=1622$) were *'very likely'* or *'likely'* to use the "5 As" to develop a management plan for patients with obesity during the COVID-19 pandemic. Upon follow-up, 66% of responders ($n=139$) stated that they now *'always'* or *'sometimes'* use the 5 As to develop a management plan for patients with obesity during the COVID-19 pandemic. Both the webinar and the webcourse were associated with a large effect size for this course, with 58.9% of clinicians who participated in the webinar and 55.4% who participated in the webcourse being more likely to deliver evidence-based care following participation.

Patients undergoing treatment for all types of cancer were an especially high-risk population during the COVID-19 pandemic given that many of them had a compromised immune status. Special considerations for patients with lung cancer during the pandemic were addressed in the activity ***Lung Cancer and COVID-19 in the Outpatient Setting: What Clinicians Need to Know***. The webinar for this activity had 199 learners and the webcourse has 733 (Figure 7, page 10). Almost all (89%) learners ($n=932$) indicated that at least half of the content was new to them.

FIGURE 7: Learner Demographics for Lung Cancer and COVID-19 in the Outpatient Setting: What Clinicians Need to Know

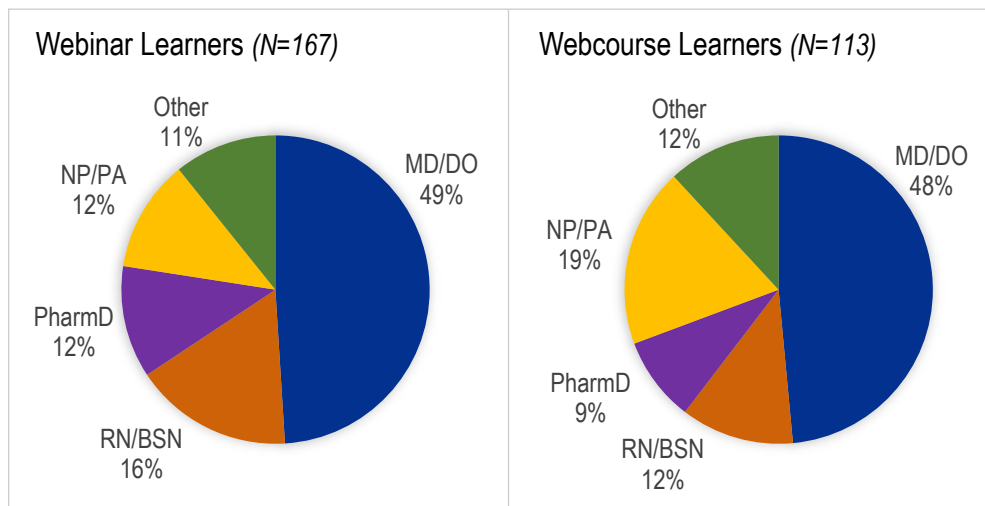
Pre- and post-test evaluation for this activity focused on both general pathophysiology and infection control for COVID-19 and specific management and outcome considerations for patients with lung cancer. In particular, learners demonstrated a substantial increase in knowledge concerning the underlying immune response of SARS-CoV-2 and mortality rates of patients with lung cancer who contract COVID-19 (Figure 8, below).

FIGURE 8: Pre- and Post-test results for Lung Cancer and COVID-19 in the Outpatient Setting: What Clinicians Need to Know

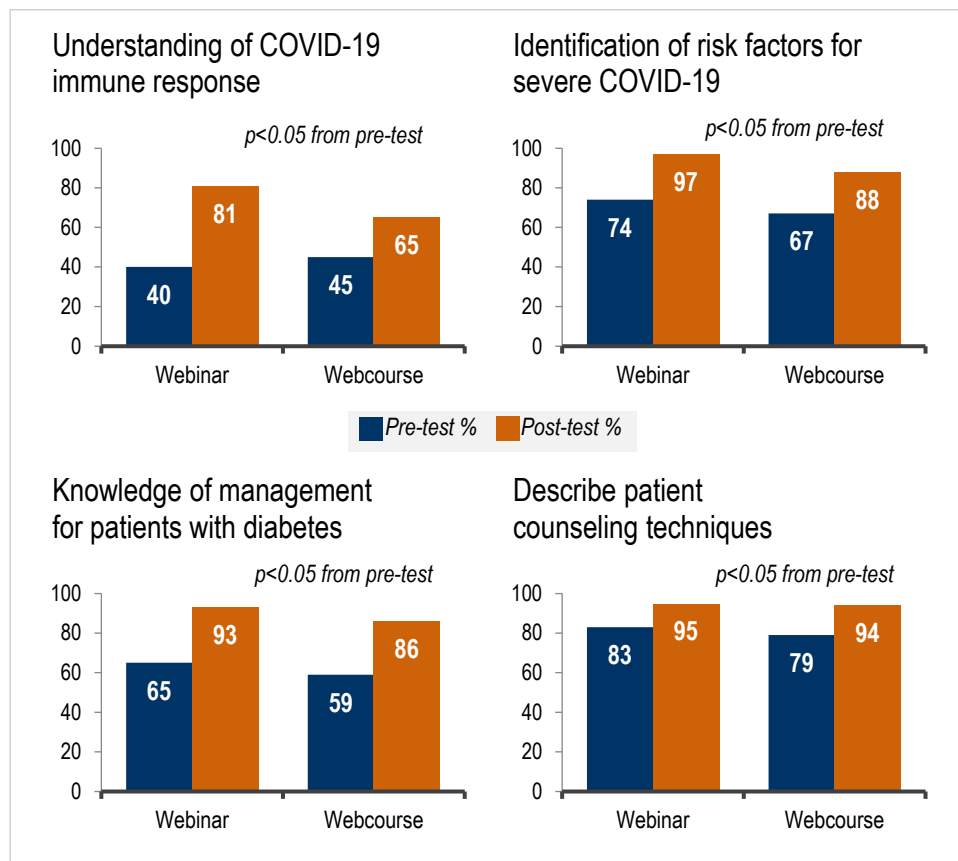
As a result of this activity, learner confidence in managing patients with lung cancer during the COVID-19 pandemic more than tripled (24% at baseline; n=1029) to 84% upon follow-up (n=31) [*'confident'* + *'very confident'* + *'expert'*]. Learners also indicated an increase in the use of telemedicine, counseling patients about their COVID-19 risk, and monitoring patients for signs of COVID-19 at follow-up by 71%, 81%, and 77% respectively. Both the webinar and the webcourse were associated with a large effect size for this course with 73% of webinar learners and 52% of webcourse learners being more likely to deliver evidence-based care following course participation.

The growing body of research demonstrating high-risk for worse outcomes in certain patient populations with COVID-19 was again the focus of the educational activity ***Diabetes and COVID-19 in the Outpatient Setting: What Clinicians Need to Know***. The webinar for this activity had 167 learners and the webcourse had 113 (Figure 9, below). Two thirds (68%) of learners (n=281) stated that 50% or more of the content presented was new to them.

FIGURE 9: Learner Demographics for *Diabetes and COVID-19 in the Outpatient Setting: What Clinicians Need to Know*

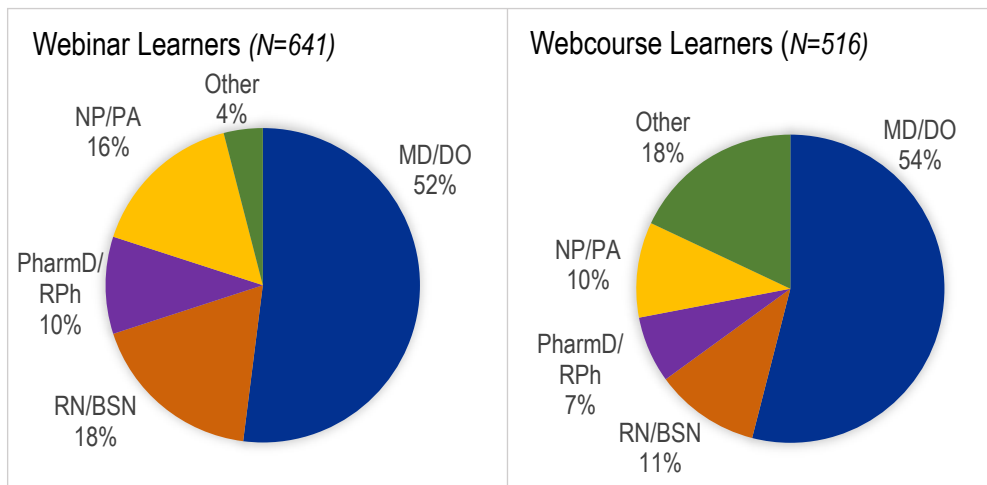


While pre- and post-test scores demonstrated improvement in knowledge related to the stated learning objectives for this activity, the audience started with a higher baseline knowledge compared to activities that occurred earlier in the pandemic (Figure 10, page 12).

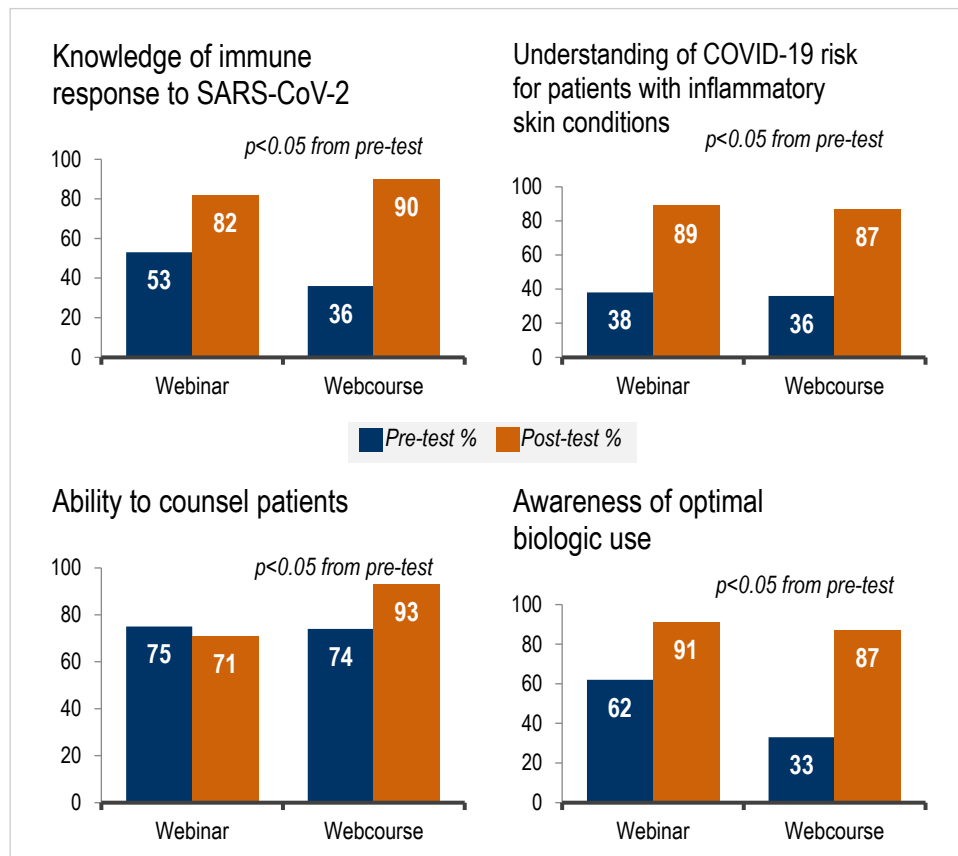
FIGURE 10: Pre- and Post-test results for *Diabetes and COVID-19 in the Outpatient Setting: What Clinicians Need to Know*

Based on this educational activity, clinician confidence in managing patients with diabetes during the COVID-19 pandemic almost doubled (41% at baseline; n=247) to 76% upon follow-up (n=38) [*'confident'* + *'very confident'* + *'expert'*]. The webinar was associated with a large effect size and the webcourse with a medium effect size.

The educational activity ***Dermatology and COVID-19 in the Outpatient Setting: What Clinicians Need to Know*** focused on educating learners who care for patients with inflammatory and other skin diseases on needs specific to their patient population during the COVID-19 pandemic. The webinar for the course had 127 learners and the webcourse had 156 (Figure 11, page13). Nearly all (99%) survey respondents (n=288) agreed this program provided them with strategies to improve their practice and better prepared them to care for their patients.

FIGURE 11: Learner Demographics for Dermatology and COVID-19 in the Outpatient Setting: What Clinicians Need to Know

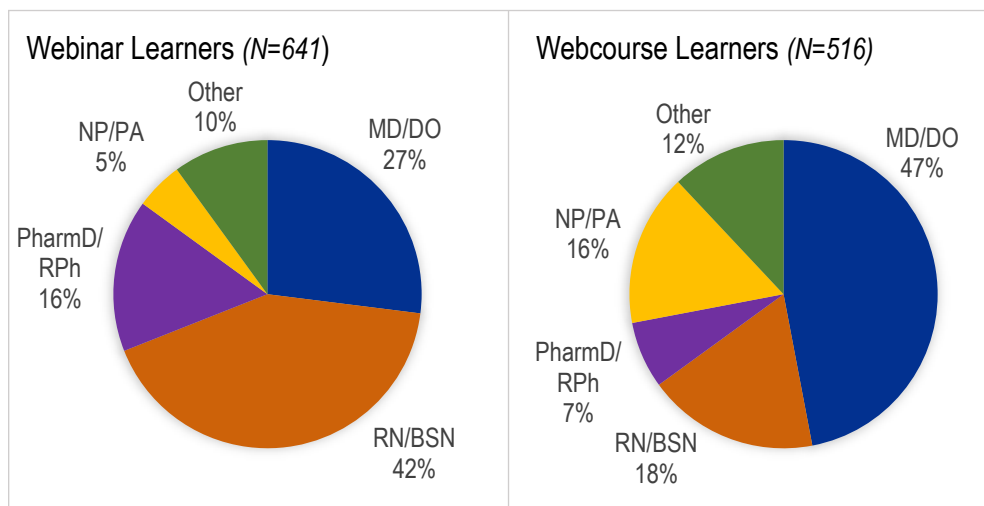
Knowledge and competence evaluation for this activity centered on general knowledge of COVID-19, special considerations for patients with dermatologic conditions during the COVID-19 pandemic, and optimal management of patients with inflammatory and other skin diseases during the pandemic. Prior to the webinar and webcourse, an area of confusion for learners surrounding COVID-19 was the impact of inflammatory skin diseases on risk of contracting COVID-19. This lack of awareness was significantly improved following activity participation (Figure 12, below).

FIGURE 12: Pre- and Post-test results for Dermatology and COVID-19 in the Outpatient Setting: What Clinicians Need to Know

Webinar and webcourse participation almost tripled learner confidence in managing patients with atopic dermatitis and psoriasis during the COVID-19 pandemic (31% at baseline to 88% upon follow-up [*confident* + *very confident* + *expert*]). The webinar and webcourse were both associated with a large effect size equating to webinar participants being 52% more likely to deliver evidence-based care and webcourse participants being 55% more likely to do so.

Managing Advanced Prostate Cancer in the COVID-19 Era: What Do Oncologists Need to Know? addressed the educational needs of clinicians caring for patients with advanced prostate cancer during the COVID-19 pandemic. For this course, the webinar had 116 learners and the webcourse had 135 learners (Figure 13, below). Most (84%) learners (n=250) indicated that at least half of the educational content presented in the course was new to them.

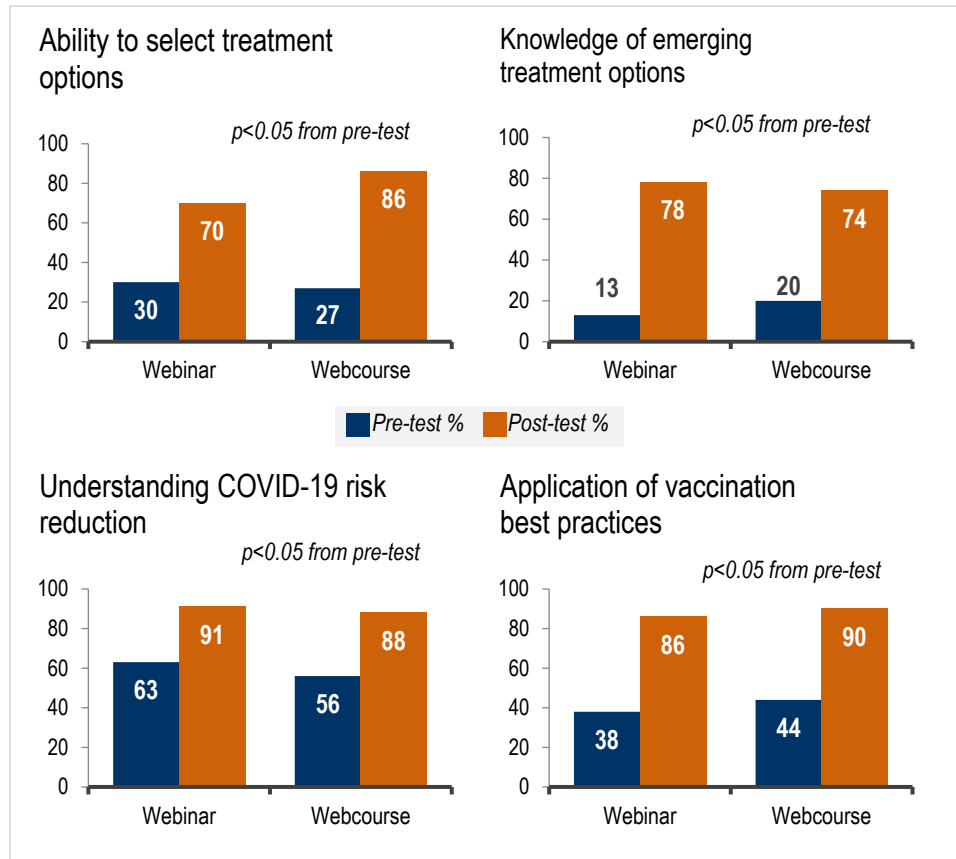
FIGURE 13: Learner Demographics for Managing Advanced Prostate Cancer in the COVID-19 Era: What Do Oncologists Need to Know?



Pre- and post-test evaluation demonstrated a significant increase in knowledge surrounding the topics of treatment for patients with advanced prostate cancer and modifications to care for this patient population during the COVID-19 pandemic (Figure 14, page 15). Importantly, this activity addressed vaccination recommendations for patients receiving prostate cancer treatment and knowledge gains on this topic were substantial.

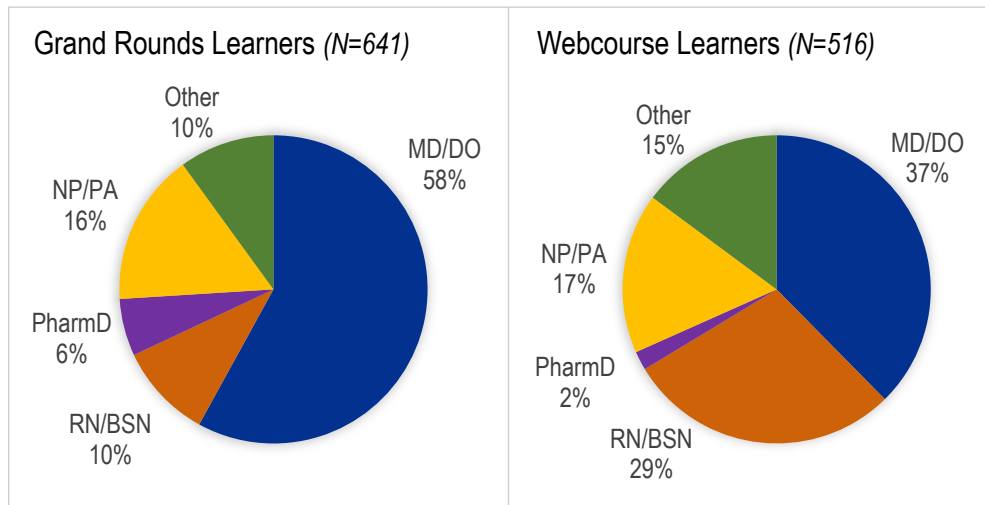
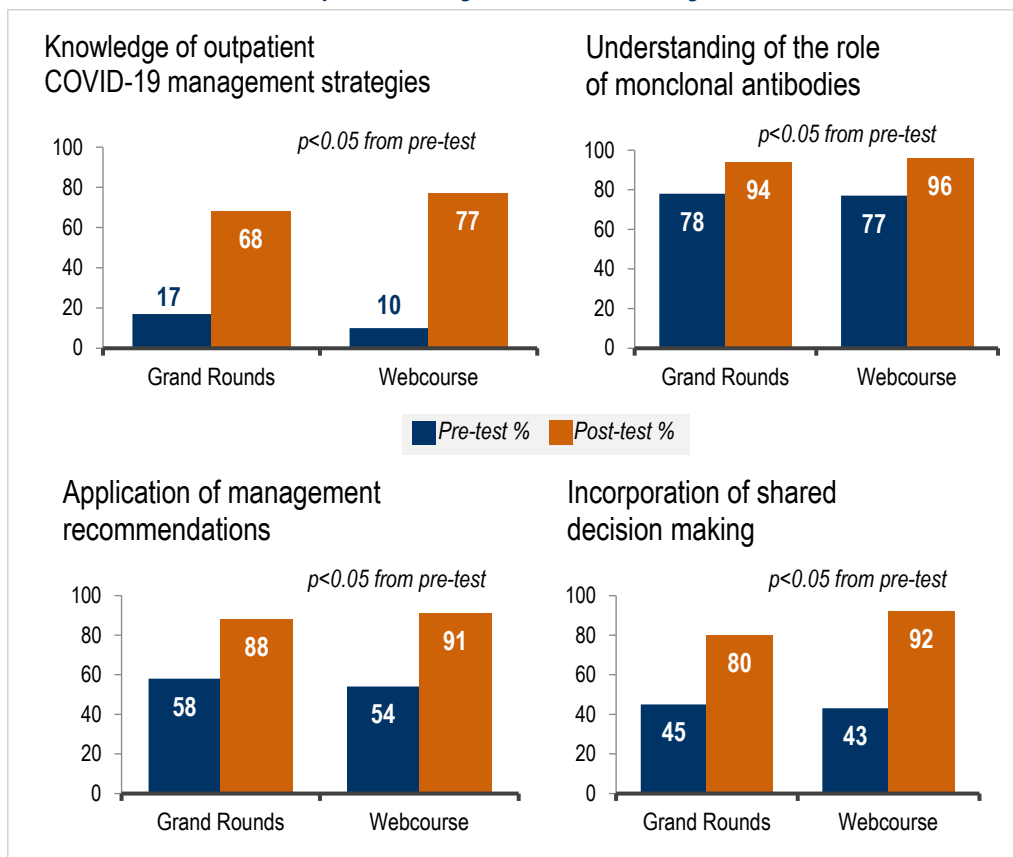
Confidence in managing patients with prostate cancer during the COVID-19 pandemic more than tripled (28% at baseline to 93% upon follow-up [*confident* + *very confident* + *expert*]). A large effect size was associated with both the webinar and the webcourse with 68% and 59% non-overlap for these activities, respectively.

Figure 14: Pre- and post-test results for *Managing Advanced Prostate Cancer in the COVID-19 Era: What Do Oncologists Need to Know?*



Finally, the educational activity ***High-Risk Patients with COVID-19: Outpatient Management to Prevent Progression*** addressed the issue of monoclonal antibody treatment for high-risk patients with COVID-19. This activity was presented as both grand rounds and as a webcourse. These activities reached 641 and 516 learners respectively (Figure 15, page 16). Almost all (99%) responders (n=1167) agreed that this program provided them with tools/information to improve their practice and better prepared them to care for their patients.

Pre- and post-test scores demonstrated substantial improvement in knowledge related to the stated learning objectives (Figure 16, page 16). Improvements were particularly pronounced in learner knowledge of outpatient COVID-19 management strategies, where low pre-test scores emphasize the initial need for education on this topic among learners.

FIGURE 15: Learner Demographics for High-Risk Patients with COVID-19: Outpatient Management to Prevent Progression**FIGURE 16: Pre- and Post-test results for High-Risk Patients with COVID-19: Outpatient Management to Prevent Progression**

Confidence in appropriately incorporating monoclonal antibodies into the management of outpatients who have COVID-19 almost tripled (28% at baseline to 78% upon follow-up [*‘confident’* + *‘very confident’* + *‘expert’*]). Both the grand rounds and webcourse activities were associated with large effect sizes (58.9% and 55.4% non-overlap, respectively).

Barriers to Optimal Patient Outcomes

Just as educational needs of clinicians evolved over the course of the pandemic, so did the barriers that clinicians faced in providing optimal patient care. In the early months of the pandemic, barriers were mostly related to patient diagnosis, with 56% of learners noting difficulty differentiating COVID-19 from other viral diseases and 61% reporting difficulty accessing testing. In addition, 63% stated that lack of disease specific treatment was a barrier at this time.

Throughout the initial months of the pandemic, access to testing and lack of specific treatment options remained significant concerns. However, lack of symptoms that clearly differentiate COVID-19 from other viral diseases decreased as a noted barrier, presumably because clinicians became more familiar with disease presentation over the course of treating patients with the disease.

Barriers to optimal outcomes for patients in high-risk groups focused more on patient difficulty accessing care and appropriate nutrition for those with obesity and clinician lack of access to PPE and telemedicine resources for patients with diabetes.

In addition, learners in the dermatology and lung cancer activities noted that patient refusal to take appropriate precautions created a substantial barrier to care with 37% and 45% identifying this as a significant barrier. For learners in the prostate cancer activity, treatment selection and sequencing were noted to be the biggest barriers to optimal patient outcomes.

Barriers to successful initiation of monoclonal antibody treatment were both clinician- and patient-focused. One third (30%) of respondents felt their lack of knowledge about prescription and use of this therapy was a barrier to optimal outcomes and 40% and 34% of learners, described lack of patient understanding and patient reluctance to use treatment, respectively, as significant barriers.

Discussion

Outcomes

The onset of the COVID-19 pandemic brought with it a number of unique challenges for clinicians. The need for urgent educational updates during a dynamic healthcare crisis is unusual in the modern medical educational landscape, where formal educational activities typically take months to plan and execute. Furthermore, as the evidence base for COVID-19 was being established from scratch, available information, guidelines, and recommendations were developed far faster than in other disease settings. In addition, the inability to gather groups of clinicians in person to participate in educational courses led immediately and with little warning to complete dependence on virtual means for providing education.^{3,4}

Early in the pandemic, as COVID-19 was just reaching the US, clinicians needed basic background information on the disease, including how best to identify symptoms and manage patients given what was known at the time from disease outbreaks in other parts of the world. Although available evidence about the diagnosis, treatment, and prevention of COVID-19 was minimal at this point and outside funding was not yet available for educational activities on this topic, Rockpointe was at the forefront of the continuing medical education field in its dedication to providing clinicians with available data so they could care for the inevitable tidal wave of patients with COVID-19 using best practices.

Prior to the educational activity *Understanding and Addressing the Global Spread of COVID-19: A Clinician's Guide*, presented in February 2020, a majority of learners (71%) were unaware of the incubation time for COVID-19 and many were unaware of proper transmission prevention protocols (26%) and that patients with suspected COVID-19 should wear a mask (29%). Rapid and widespread dissemination of information on these topics was essential to prevent disease spread and provide clinicians with accurate information to identify, treat, and counsel patients.

In March 2020, as COVID-19 was declared a pandemic and the healthcare crisis continued to evolve, much of the early evidence and education centered on urgent care of the sickest patients. Meanwhile, outpatient clinicians lacked guidance on how best to manage patients and maintain a safe environment for staff and patients. The educational activity *COVID-19 in the Ambulatory Care Setting: A Practical Guide for the Multidisciplinary Team* presented information on preparing the outpatient setting to safely and efficiently care for patients; managing patients with suspected COVID-19 in the office; selecting appropriate patient disposition; cleaning exam rooms; and initiating telemedicine.

Clinician knowledge of best practices for telephone triage of patients with suspected COVID-19 significantly increased as a result of this activity (27% at baseline to 91% on post-test). Similarly, prior to the activity only 1 in 5 learners were aware of correct disposition criteria for outpatients, whereas following the activity this number increased to nearly 4 in 5 learners (78%). Knowledge of appropriate disinfectant solutions also increased substantially (11% at baseline to 84% on post-test).

Importantly, follow-up survey results showed that the educational information provided in this activity translated into substantial improvements in clinical practice for most clinicians. A majority (67%) increased their use of a telephone triage algorithm to decide who needed to be seen in the office, many (39%) increased their utilization of nasopharyngeal testing, and a significant number (75%) increased cleaning and disinfecting of all surfaces using an EPA-approved agent. Additionally, 95% of learners indicated they were 'likely' or 'very likely' to create an office protocol to address patients presenting with suspected COVID-19 and on follow-up 85% indicated they had followed through. These improved clinical practices had a direct impact on patient care and likely improved disease identification and decreased viral spread.

Evidence gathered during the early months of the pandemic strongly indicated that certain populations of patients are at higher risk for poor outcomes if infected with COVID-19. Patients with obesity face more severe COVID-19 disease. The age-adjusted prevalence of obesity ($\text{BMI} \geq 30 \text{ kg/m}^2$) in the United States in 2017-2018 (the most recent data available) was 42.4% and the age-adjusted prevalence of severe obesity ($\text{BMI} \geq 40 \text{ kg/m}^2$) was 9.2%.⁵ Therefore, a substantial number of individuals seen in the ambulatory setting are at increased COVID-19 risk. The activity *Obesity and COVID-19 in the Outpatient Setting: What Clinicians Need to Know* was created to educate clinicians on the specific needs of this patient population.

Learner knowledge about immune response pathophysiology increased significantly from participation in this activity (43% at baseline to 74% on post-test). Increased awareness of this topic is key to understanding why patients with obesity may be more severely affected by COVID-19.^{6,7}

Increased likelihood to incorporate shared decision making was an important practice outcome from this educational activity. While only two-thirds (61%) of learners were aware of shared decision-making practices prior to participation, a large majority (90%) demonstrated accurate knowledge following

participation. Furthermore, 30% of learners indicated an intention to improve their practice by incorporating shared decision making. At follow-up, 30% had followed through.

At the end of the program, learners were significantly more knowledgeable about behavioral strategies they could suggest to patients with obesity to help them maintain good physical and mental health during the pandemic. Immediately after the activity, 27% committed to advising patients with obesity about the importance of sleep, exercise, and stress reduction. These practice changes were confirmed upon follow-up. Based on the number of patients with obesity seen by the participants monthly, the large effect size of the activity translated to a substantial number of patient encounters per month that were potentially positively impacted by knowledge gained in this course (86,649).

Similarly, patients who are immunosuppressed, such as those undergoing treatment for cancer, required special consideration during the pandemic for both disease prevention and treatment. The activity *Lung Cancer and COVID-19 in the Outpatient Setting: What Clinicians Need to Know* was designed to meet this educational need. Prior to participation, learners were largely unaware of the outcomes of patients with lung cancer who contract COVID-19, but this increased significantly following participation (7% at baseline to 62% on post-test).

In addition, learners increased their knowledge of COVID-19 prevention techniques for patients with lung cancer with almost all (91%) demonstrating knowledge of mask use on post-test, compared to baseline (59%) and nearly all (92%) understanding the role of telehealth on post-test compared to baseline (70%). Following participation, learners most commonly committed to advising patients with lung cancer about how to reduce their risk of contracting COVID-19 (26%). The practice change was confirmed at follow-up (42%).

Upon follow-up, a majority of learners reported an increased in counseling patients regarding the risk of COVID-19 (81%), incorporating telemedicine into patient care (71%), and monitoring patients for signs of COVID-19 (77%). The large effect size for both the webinar and the webcourse equate to a potential positive influence on a considerable number of patient visits per month (26,830).

Patients with diabetes are also at risk for worse outcomes from COVID-19. As 10% of the US population has diabetes and more than one-third of US adults has prediabetes, this high-risk population is large.⁸ Prior to completion of this activity, clinician confidence in ability to manage patients with diabetes during the pandemic was 41%. This almost doubled (76%) following course completion, indicating the substantial educational impact of the activity.

There was a significant increase in learners' understanding of the immune response to SARS-CoV-2 (33% at baseline to 82% on post-test). Patients with diabetes have immune dysregulation and learners are now aware of the immune response to COVID-19, leading to an understanding of the pathophysiologic basis of increased risk for severe disease seen in patients with diabetes.

Clinicians also gained significant knowledge about the risk of severe COVID-19 disease in patients with diabetes (72% at baseline to 96% on post-test) and medications that require special consideration for patients with diabetes and COVID-19 (33% at baseline to 70% on post-test). This information is crucial for clinicians to convey to their patients with diabetes so these patients can take stringent precautions to prevent infection. In addition, when caring for patients with diabetes who have COVID-19, clinicians know to be more vigilant in following these patients and to have a lower threshold for hospital admission.

Immediately after the activity, responders most commonly committed to advising patients with diabetes about steps they can take to reduce their risk of contracting COVID-19 (27%). This change was confirmed in 31% of follow-up responders. In follow-up, there were increases in other important practices as well, including providing patients with diabetes with a written sick day plan (17%) and written information about detecting and preventing DKA (17%), routinely checking on patients using telemedicine (19%), and offering links to online diabetes support groups (13%). Based on the effect size and the number of reported clinician visits per month, the knowledge gained in this activity equated to a positive effect on a significant number of diabetes-related patient visits each month (16,376).

Clinicians in the dermatology field also have specialty-specific educational needs related to COVID-19. The educational activity *Dermatology and COVID-19 in the Outpatient Setting: What Clinicians Need to Know* was designed to educate learners about the pathophysiology of COVID-19, features that increase disease risk in patients with skin conditions, and management of outpatients during the pandemic. Prior to participation, learner confidence in their ability to manage patients with atopic dermatitis and psoriasis during the COVID-19 pandemic was low (69% 'not confident' or 'slightly confident'). However, on post-test most felt 'confident', 'very confident', or 'expert' on this topic (84%), a trend that continued at follow-up (88%).

Before participation, most learners (37%) were unaware that patients with atopic dermatitis had no greater risk of COVID-19 than the general population. However, on post-test, almost all identified this as a true statement (88%). This knowledge was retained at follow-up (67%). In addition, there was significant knowledge gain about the optimization of biologics for psoriasis treatment during the pandemic (40% at baseline to 89% on post-test) that was also maintained at follow-up (83%).

Immediately after the activity, responders most commonly committed to advising patients with atopic dermatitis or psoriasis of steps they can take to reduce their risk of contracting COVID-19 (22%) and counseling patients with inflammatory skin conditions about their fears related to COVID-19 (22%). These changes were confirmed upon follow-up (25% and 19% respectively). The large effect size of these activities had a meaningful impact on patient care with the potential to effect a significant number (11,034) of inflammatory skin condition patient care visits per month.

Patients with advanced prostate cancer presented management challenges to clinicians during the COVID-19 pandemic, especially given the large number of new and emerging treatment options adding to the need for clinician education. Knowledge gaps surrounding the selection and sequencing of treatment and management issues specific to care during the pandemic were addressed in the educational activity *Managing Advanced Prostate Cancer in the COVID-19 Era: What Do Oncologists Need to Know?*

Confidence in managing patients with prostate cancer during the COVID-19 pandemic notably increased following activity participation (72% 'not confident' or 'slightly confident' at baseline and 63% 'confident', 'very confident', or 'expert' on post-test). This change was maintained at follow-up (93% 'confident', 'very confident', or 'expert'). Importantly, learners significantly increased their knowledge of new and emerging (19% at baseline to 76% on post-test) therapies secondary to activity participation.

At the conclusion of the activity, learners committed to use patient factors such as comorbidities and treatment goals to guide treatment selection (24%), use telemedicine as appropriate to reduce risk of COVID-19 transmission (26%), and advise patients regarding COVID-19 vaccination (26%). These changes were confirmed upon follow-up (27%, 21%, and 27% respectively). Because of the large effect

size of this activity, a substantial number of patient visits for prostate cancer were potentially positively influenced each month (5,180).

Following the identification of high-risk patient populations, treatment strategies aimed at mitigating disease severity in these groups were developed, including the use of monoclonal antibodies (mAbs). However, guidelines on the use of mAbs in the outpatient setting were updated frequently and clinicians required education to remain up-to-date with the most current recommendations. Therefore, the educational activity *High-Risk Patients with COVID-19: Outpatient Management to Prevent Progression* was developed to address the real-time need for education on this critical topic.

Importantly, as SARS-CoV-2 variants continued to emerge and updated data became available about the effectiveness of mAb treatment leading to changing FDA Emergency Use Authorization (EUA) criteria, frequent revisions were required to ensure the activity contained the most current information. This necessitated adjustment to educational materials as often as weekly during program design and creation.

Prior to the webinar series for this activity, which took place in May 2021, clinicians reported low confidence in their ability to appropriately incorporate mAb treatment in the outpatient management of patients with COVID-19 (71% 'not confident' or 'slightly confident'). Following the activity, a large majority rated themselves as 'confident', 'very confident', or 'expert' (83%). Additionally, 99% of responders agreed this program provided them with tools/information to improve their practice and better prepared them to care for their patients.

The ability to identify severe disease in outpatients, an essential step in administration of mAb therapy to appropriate patients, improved substantially from participation in this activity (13% at baseline to 72% on post-test). Furthermore, learners were significantly more knowledgeable about EUA criteria following participation (55% at baseline to 89% on post-test). Awareness of the requirement to provide education on alternatives to mAb treatment also doubled as a result of the activity (44% at baseline to 85% on post-test).

Immediately after the activity, responders most commonly committed to using recommended criteria to assess severity of disease in patients with COVID-19 (26%) and educating patients who test positive for COVID-19 about treatment with mAbs (25%). These changes were confirmed upon follow-up with 27% of learners reporting following through on these initiatives.

Based on the large effects size of this activity and the number of patients with COVID-19 seen per month by learners, a substantial positive effect on patient care (35,716 COVID-19 patient visits each month) resulted from clinician participation in this activity.

Future Educational Opportunities

To date, there have been over 80 million reported cases of COVID-19 and close to 1 million Americans have died from the disease.⁹ Variants continue to evolve with different levels of transmissibility and severity from their predecessors, and certain populations continue to remain at higher risk for both acquiring disease and developing more severe disease if infected.^{2,10}

In addition, evidence-based guidelines and data continue to accumulate and evolve regarding the pathophysiology, diagnosis, treatment, and prevention of COVID-19. As knowledge and best practices for the management of patients with COVID-19 continues to expand, the need for ongoing high-quality continuing education for clinicians who are likely to care for patients with COVID-19 cannot be underestimated. Since COVID-19 remains a dynamic disease, those who provide continuing education must remain committed to the development of frequent educational activities on relevant topics with the most recent and accurate information available, as this has proven to translate into improved patient care.

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