

# The Impact of COVID-19 on the Laboratory Professionals' Clinical Education: a Qualitative Study

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**Abbreviations:** MLS, medical laboratory science; PPE, personal protective equipment,

ASCP, American Society for Clinical Pathology; CDC, Centers for Disease Control.

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## ABSTRACT

A 48-question survey was developed and disseminated to laboratory professionals. This survey sought the perspective of clinical educators on a variety of topics, including two open-ended questions on the impact COVID-19 had on student clinical rotations and the ensuing policy changes. Of 207 clinical sites that participated in the survey, some terminated student clinical rotations without offering any other training alternative. Others employed a number of strategies such as shortening the length of clinical rotations, taking fewer students, transitioning to an online learning platform, or delaying training until a future date. Some mandated regular illness checks, symptom checks, and COVID-19 testing when available. Clinical educators expressed concern over the lack of continuity of student clinical training, policy changes related to COVID-19 and student training that were deemed to diminish the quality of the students' clinical education. With terminated, delayed or shortened clinical rotations at many sites, in combination with staff and supply shortages, clinical educators were concerned about the overall quality of clinical education the students were receiving. In addition to these concerns, the reduction of student graduates during the pandemic decreased the number of applicants for job vacancies exasperating a pre-pandemic problem.

As the COVID-19 pandemic has overwhelmed healthcare systems globally over the past 2 years, shortages of healthcare workers in every sector have reached crisis levels. Lazenby<sup>1</sup> notes that world trends such as an aging population, globalization, and urbanization indicate that fast-moving outbreaks of novel viruses will increase in number, and health service providers will not be able to meet the patient-care demands this portends. As educational institutions endeavor to meet the demands of the healthcare workforce by graduating qualified practitioners in medical laboratory science (MLS), respiratory therapy, radiologic technology, and nursing, the pandemic has presented many challenges. Across the spectrum of allied health training programs, hands-on practice in a suitable healthcare environment is seen as a core component of producing well-rounded practitioners in any healthcare field, as Dario and Simic<sup>2</sup> emphasized.

During the pandemic, clinical placements were disrupted or delayed due to many contributing factors, which negatively affected students' learning and the readiness of graduates to join the healthcare workforce. As Dewart<sup>3</sup> discussed, educational programs had to make difficult decisions about whether or not to continue clinical courses in consideration of student safety. Dario and Simic<sup>2</sup> highlighted that for other programs, the decision was forced on the educational program as clinical sites paused or cancelled student placements in clinical sites and attributed this reaction to patient load, the shortage of personal protective equipment (PPE), and concerns that students might contract and spread the virus. As the pandemic spread, educators were faced with adapting quickly to the new realities associated with the pandemic, and much of the current literature that addresses the impact of the pandemic is focused on the adaptations to the classroom learning environment, with less attention given to the impact on clinical placement and experiences. This article is focused on the challenges to clinical education from the perspective of the clinical educators and seeks to identify the sources of the challenges and the short-term and long-term effects on medical laboratory professionals.

## Materials and Methods

Detailed methodology can be found in "Establishing the Need for Clinical Educator Training for Laboratory Professionals" in *Laboratory Medicine*. This is the second publication from this dataset.

## Research Design

There were 48 questions developed by our research team and placed on an electronic questionnaire. The questions originated from clinical

educator and student questions and concerns as well as a literature review. The questionnaire was validated before its electronic distribution. The American Society for Clinical Pathology (ASCP) distributed the survey electronically to laboratory professionals. The survey was distributed on March 8, 2021, and was closed 6 weeks later on April 16, 2021. The data was then compiled and analyzed to find common themes and categories.

### Data Analysis

Reliability of the questionnaire was determined by calculating Cronbach's alpha (0.935), which is used to measure the internal consistency among questions. Two open-ended questions were analyzed:

What impact has the COVID-19 pandemic had on your ability to train students?

What is your hospital's policy on accepting students for clinical training during the COVID-19 pandemic?

A thematic analysis was performed as described by Braun and Clarke<sup>4</sup> for the open-ended questions. Dummy codes initially assigned to the data were used to identify themes and subthemes or categories. Validity of final themes were enhanced with communication between research team members. The Institutional Review Board at Austin Peay State University approved this research under IRB # 0-066.

### Results

Of the 207 participants, 110 responded to 2 open-ended questions. From these open-ended questions, 3 common themes emerged: clinical facilities' continuity of student training during the COVID-19 pandemic, policy changes that were changed or implemented for students during the COVID-19 pandemic, and concerns for the quality of the clinical education provided.

Fifty-nine clinical sites and associated MLS programs explained the greatest hindrance to a student's clinical education during COVID-19 was the termination of clinical rotations. The other 148 clinical sites worked to keep students either attending or involved in their clinical rotations. Common categories were noted by the participants who continued to work with students through the COVID-19 pandemic along with their frequencies (FIGURE 1).

Another theme that presented among participant responses was policy changes regarding students as a result of the COVID-19 pandemic. There were common categories noted by the responses to policy changes listed by participants. These can be found in TABLE 1. A majority of participants explained the main policy changes involved requiring students to adhere to infectious disease safety protocols, such as wearing a mask. Other practices implemented by policy included face shields, social distancing, daily temperature checks, and symptom questionnaires.

The last theme noted was that many clinical educators had concerns for students who attended their clinical education in person during the COVID-19 pandemic. The most frequently cited concern among clinical educators was the impact of the pandemic on the quality of training the students received due to staff shortages and limited supplies, among other things. Other clinical educators expressed concern for the shortened clinical rotations. A full list of the categories of concerns can be found in TABLE 2.

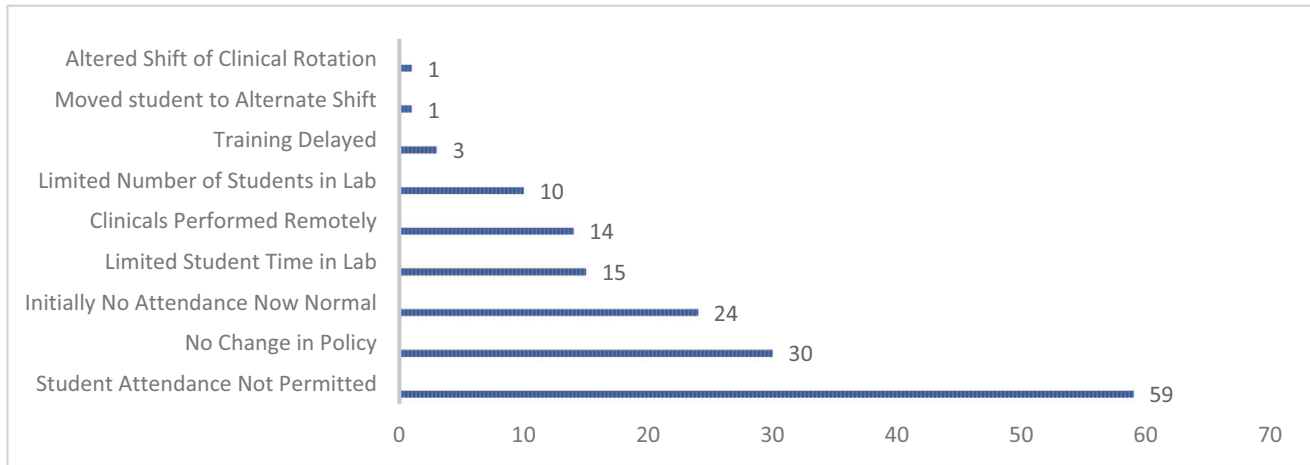
### Discussion

Fifty-nine participants explained the greatest hindrance during the COVID-19 pandemic was that students were not allowed to attend clinical training and in these cases, participants did not provide an alternate training solution for the students. According to Lazenby,<sup>1</sup> some healthcare providers closed their doors to students due to overwhelming patient demand and critical shortage of personal protective equipment. One participant indicated that students were given the ability to test out of clinicals when their program was shut down. This provided an easy solution where students who had the required knowledge were exempt. The participant did not explain what happened if a student's program was shut down and the student was not able to test out of their clinical training. As explained many times by clinical educators in this survey, face-to-face training is an important part of medical laboratory professional education and outside of the COVID-19 pandemic, this would likely not be an acceptable course of action. Dario and colleagues<sup>2</sup> indicate that clinical experience is a core component of the healthcare curriculum. Another clinical educator stated, "students were still able to come to the [clinical laboratory] during lock down because the students were considered essential." One clinical educator indicated that their students dropped from their medical laboratory program during the COVID-19 pandemic. This is an unfortunate and extreme course of action, but perhaps for those clinical sites who still required student attendance, this may have been a request some students could not meet. This may have been due to personal fears regarding the pandemic, inability to find childcare, or the inability to afford to drive to a nonpaid clinical rotation during the pandemic. The cause was not disclosed by the clinical educator, but this is a reminder of the life-altering effects the COVID-19 pandemic had on students at the onset or during times of lockdown. Lazenby<sup>1</sup> expanded on another approach, that of healthcare providers hiring students to battle overwhelming staffing shortages, although none of the participants in this survey referenced that practice.

Of the 10 participants who stated that their clinical sites accepted fewer students during the COVID-19 pandemic, two participants detailed their student reduction. One participant indicated that their clinical site reduced their student intake by 75%. Another participant stated that before the pandemic, their clinical site took 3 students. After the COVID-19 pandemic began, their employer reduced this number to 1 student. Many clinical sites have several open and ready-to-fill medical laboratory professional positions. By reducing the number of students trained at their facility, ultimately the clinical site is reducing the number of graduates that could apply for those open positions. One participant reported an increase in requests to take students but provided no rationale. This is likely due to the reduced number of clinical sites willing to take students during the COVID-19 pandemic resulting in students being reassigned to sites able to continue their training.

Three participants stated that student training was delayed at their clinical site without providing additional information. Anderson<sup>5</sup> states that the theoretical and practical learning separation due to delays in real-world experience can adversely affect student learning and retention. However, 1 participant noted that students who tested positive for COVID-19 required a delay in clinical training until the next clinical rotation of students. This prevented the clinical educator and the MLS academic program from the need to track lost clinical training hours and coordinate make-up time. Although this was true for this clinical site, 1 participant indicated that the [clinical educators] were required to be flexible with the student's make-up hours if the student contracted

**FIGURE 1. Student attendance and clinical site's pandemic return policy**



**TABLE 1. Student Related Policy Changes Caused by COVID-19 Pandemic**

Theme	Subthemes	Participant Response	Number of Participants
Policy changes	Illness screening	Require daily temperature check, symptom questionnaire, etc., to attend	12
	• Frequency		
	Safety protocols	Require masking, eye protection or face shield, and social distancing to attend	18
	• PPE	Students are no longer allowed patient contact	1
	• Patient contact	Students are no longer afforded the ability for make-up days	1
	COVID vaccination	Require COVID-19 vaccination to attend	2
COVID testing	Require regularly scheduled COVID-19 testing to attend	2	
	• Frequency		

**TABLE 2. Clinical Educator Concerns When Students Attended During COVID-19 Pandemic**

Theme	Subtheme	Participant Response	Number of Participants
Concerns about quality of education	Staff and supply shortages	Significant impacts to training quality due to staff shortages, limited supplies, and additional COVID-19 related responsibilities	9
	• Trainers		
	• PPE	Not enough personal protective equipment for students	2
	• Lab supplies		
	Shortened rotations	Shortening student's time in clinical laboratory decreases the quality of their education	3
	COVID-19 policy-related hindrances to education	Mask wearing inhibits non-verbal communication with the student (Example: The mask inhibits the approving smiles from the clinical educator.)	2
• Nonverbal communication	Unable to effectively adhere to social distancing policies while training	4	
• Proximity			

COVID-19. Another clinical educator had an entirely different perspective. This individual's clinical site forbade the student from making up hours, regardless of whether the absence was related to a COVID-19 illness or not.

Seven participants reported the amount of time each student trained was reduced. One participant further elaborated by explaining that before the COVID-19 pandemic, students stayed in each clinical rotation for 6 weeks. During COVID-19, rotations were reduced to 3 weeks. One clinical educator stated that student training was

changed to an alternate shift. A different clinical educator reported requesting a student be moved to either second shift or a weekend shift for training. Often the idea behind moving students to an alternate shift is that the student can receive more individual attention from the assigned clinical educator. Given the desperate need for clinical laboratory staff and shortages of supplies, these problems are likely encountered on any shift. There may be some benefits to the student training on an alternate shift, but at this time no data in the literature exists.

Fourteen clinical sites transitioned to an online learning platform during the COVID-19 pandemic. This was accomplished by several modalities. Many clinical educators livestreamed their work while performing testing. Students would watch their clinical educators perform patient testing, quality control, calibration, and instrument maintenance during their daily routine. When the opportunities arose, the clinical educators would provide theoretical concepts or a detailed response to the testing they were performing. Sometimes clinical educators would record short segments of examples from patient testing they found critical to student success. Some clinical educators also created a compilation of instrument maintenance videos and procedure videos accessed using online resources. Often, these livestreams and video segments were accompanied by patient case studies. Some clinical educators were quick to point out that this type of training significantly affects the quality of education the MLS student receives and often further commented on the importance of face-to-face training. One participant stated that they only performed online clinical training for microbiology. This is likely due to the limited availability of clinical sites that have full clinical microbiology departments.

Two of the thirteen participants who indicated that there was no impact to MLS clinical education provided further evidence of their operations to maintain student attendance. One participant stated that the university the students attended required all clinical students to receive COVID-19 testing regularly. The clinical site allowed student attendance based on this COVID-19 testing schedule implemented by the university and proof of a negative test result. One participant indicated that the clinical site required regular testing of the students and further explained that students were prioritized for COVID-19 vaccination once the vaccine was made available. Implementing these policies prevented the interruption of student attendance at their clinical site during the COVID-19 pandemic.

Another challenge clinical educators encountered was lack of PPE for students. Although the students were practicing in the same environment as clinical laboratory professionals and their clinical educators, the students were not provided the same protections as clinical staff. National PPE shortages and exorbitant costs caused clinical sites to implement policies to reduce the usage of PPE. Lazenby<sup>1</sup> referenced the shortage of PPE and how it negatively affected clinical placement availability for nursing students. Two participants stated there was not enough PPE for students. Another participant said that students were deployed to patient floors to help prevent clinical staff from doffing PPE. Participants indicated that students took on the role of “runners and messengers.” In addition to these personal protection deficiencies, 4 participants indicated that it was difficult to maintain the social distancing required by policies while attempting to train students. Although these clinical educator comments focused on concerns over protecting the students, one clinical educator explained “students did not take the infectious disease [protocols] seriously” and had concerns about his or her own wellbeing as well as the students’. A different clinical educator whose clinical site continued to take students during the COVID-19 pandemic stated, “the school prefers [students] not to go into COVID-19 rooms, but our [students] do anyway because they’re not worried about [contracting COVID-19]. They know it comes with the job when they get a COVID-19 patient and the fact that we run the COVID tests, as well.” Two clinical educators were not supportive of wearing masks as they felt the masks inhibited nonverbal communication with the students. In other words, students could not tell if their clinical educators were smiling in approval or simply observing their

student’s work. Another clinical educator said, “Observing social distance and mask wearing has made it more difficult to be ‘hands-on’ and ensure the student understands effectively.” Students are present and handling samples in the same environment as their clinical educators. Students should be provided the same protections through either their clinical sites or through their academic institutions.

One clinical educator stated that the quality of the student was diminished. This is not seen only in medical laboratory professionals but also in multiple other levels of education and specialties. The United States Department of Education defended the return of students from online learning during the COVID-19 pandemic to brick-and-mortar learning by referencing a substantial 10-point drop in math improvement scores across the United States.<sup>6</sup> After the COVID-19 pandemic concludes, it is likely institutional cohort studies will reflect a similar effect caused by the rapid and unprepared transition from in-person learning to online learning. Clinical educators also pointed out the quality of clinical education students were receiving was diminished. Three clinical educators felt this was due to their clinical site’s reduced time in a clinical rotation. One participant indicated this is happening because there are not enough medical laboratory professionals to train students on the bench. Two clinical educators said that being a clinical educator adds to the workload and there is not enough time to focus on the student. Nine other clinical educators stated that it is not only staffing shortages but also the limited ability to get supplies for the clinical laboratory. The COVID-19 pandemic affected supply chains and coupled with the increased demand, many materials were difficult to obtain for the laboratory. It was risky to use additional supplies for examples or to perform repeat testing while training a student because there was no guarantee that supply orders would arrive on time or at all. As 1 participant succinctly expressed, “everything” affected training a student during COVID-19.

Most participants indicated that they did not allow student attendance early in the pandemic but have recently modified their course of action to allow student attendance. Most participants who recently allowed students to attend their clinical sites further noted that students are required to be screened for COVID-19 or other illnesses before entry. Students are also required to follow the clinical site’s infectious disease protocols for COVID-19. This includes wearing a mask, social distancing, and wearing goggles or eye protection.

Clinical sites varied with student expectations regarding attendance and infection control policies. It was cumbersome to keep up with constantly changing Centers for Disease Control (CDC) recommendations in an academic setting.

## Limitations

Many clinical educators expressed concerns over the quality of clinical training students were receiving during the COVID-19 pandemic. Currently, there is no data that suggests the clinical education students received was poorer than the education received prior to the pandemic. Future research should correlate student ASCP scores obtained during the course of the pandemic to those scores obtained by students both before and after the pandemic. Weaker ASCP examination scores may indicate a need for a longer new employee training or orientation period for students who graduate during times when abnormally high volumes of stressors are present in the clinical laboratory, such as pandemics and extreme staffing shortages.

Another limitation was that this survey was distributed to persons who hold an ASCP membership. This survey does not take into

consideration those practicing laboratory professionals who do not hold a ASCP membership.

## Conclusion

It is clear there was no consistency among clinical educators, clinical sites, or academic programs when trying to navigate the COVID-19 pandemic. Clinical sites either did not allow students to attend clinical training, reduced the number of students who went to clinicals, reduced the time students were at clinicals, or performed online clinical training. Many clinical educators believe these choices came at the expense of the students' clinical education.

Furthermore, students should be provided the same protections as their clinical educators. Students do perform patient testing in the same environment and under the same conditions as their clinical educators. Those protections should be provided by the clinical site as governmental regulations prevent entities that are not clinical in nature from purchasing PPE, such as N-95 masks, when supplies are in high demand. These regulations restricted academic institutions from purchasing supplies such as nitrile gloves and N-95 masks for academic laboratory programs. Ultimately, without changing these policies to allow academic institutions access to these materials for clinical students, students will not be able to be successfully complete their clinical internships, preventing the graduation of students in a field that is already extremely understaffed.

Most of the clinical educators who participated in this study worked at clinical sites that did not allow student attendance during the COVID-19 pandemic, limited rotation hours, or decreased the number of students in their laboratory. Many of those clinical sites also have multiple vacant laboratory professional positions. Obtaining clinical sites for students enrolled in a medical laboratory academic program where the students complete their clinical rotations is a requirement for student graduation. Decreasing the number of students training in the field ultimately decreases the number of graduated professionals able to apply for those vacant positions. As Holmes and Hogg<sup>7</sup> emphasized in their compilation of reflections on the pandemic, the limitations of clinical experiences for students will have a profound impact on the future supply of healthcare providers and can weaken healthcare systems in the future. Students going into the field of medicine should continue to perform clinical internships during pandemics and in times with other stressors. Clinical educators concerned about liabilities should develop a contractual agreement to release the clinical facility from responsibilities, such as infection, as opposed to not allowing students to attend their clinical rotation at the clinical site. Contracts should also state clearly the expectations for students who are completing their internship at a clinical facility during the pandemic or other clinical stressors. Contracts should state student vaccine requirements, SARS-CoV-2 testing or other testing requirements, when the student should and should not attend their clinical rotation, whether or how the student will make up hours missed, and explanations as to their role in the laboratory during their clinical rotation. Contracts can circumvent problems when expectations are clearly defined before clinicals start for students.

Part of the problem with this pandemic was limited defined expectations for students as there has not been a pandemic of

this scale in decades, and there were times where regulations from the (CDC were changing daily. Expectations for students during the pandemic should be defined now to avoid reduction in students at clinical sites when the next pandemic or clinical stressor presents itself. Preventing students from completing their clinical sites exasperated preexisting staffing issues in the clinical laboratory. Reducing the number of laboratory professional graduates ultimately reduced the number of applicants for vacant positions in laboratory medicine.

Other areas of medicine, such a radiography's accrediting agency, allow clinical sites to provide students with employment opportunities during times of high demand or during stressful situations that put significant pressure on the department. Clinical sites may consider creating a student clinical/medical laboratory assistant position, where students may work 2 to 3 hours a day, in addition to their clinical hours, to relieve some of the stress from their clinical site. Although vacant phlebotomy and clinical laboratory assistant positions may exist at students' clinical sites, most require long 8-to-12-hour working times. Many students will not entertain the idea of working 8 to 12 hours in addition to their clinical rotation hourly requirements. This prevents students from applying for such positions and causes students to work in areas other than the clinical laboratory to earn wages, whereas students could be working a more manageable 2 to 3 additional hours in a working position to relieve stress on the clinical laboratory.

It is important to keep in mind that these were occurrences noted during the SARS-CoV-2 pandemic (2020 to 2021) and many clinical facilities have resumed taking students for clinical rotations, as staffing has allowed.

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