

**Article:**

Joesph R Wiencek, Allison B Chambliss, Roger L Bertholf, Steven W Cotten, Christina Ellervik, Justin D Kreuter, Kamran M Mirza, and Zahra Shajani-Yi.
A Paradigm Shift: Engagement of Clinical Chemistry and Laboratory Medicine Trainees by Innovative Teaching Methods
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Guests: Dr. Joesph Wiencek from the Vanderbilt School of Medicine and Dr. Allison Chambliss from the University of Southern California and the Los Angeles County/ University of Southern California Medical Center.

Bob Barrett:

This is a podcast from *Clinical Chemistry*, sponsored by the Department of Laboratory Medicine at Boston Children's Hospital. I'm Bob Barrett. There are many obstacles to teaching clinical chemistry and laboratory medicine. Surveys have suggested that dually trained anatomical pathology and clinical pathology residents in particular lack interest and motivation in clinical chemistry education. And that many do not feel adequately prepared to practice clinical chemistry after their residency training. Commonly cited challenges in teaching CP topics, such as clinical chemistry, include the lack of interactive or hands-on teaching modalities and the typical overuse of traditional passive teaching methods such as reading or lecture. Further, the COVID-19 pandemic initially brought many educational activities to a halt. However, the pandemic also has provided opportunities to overhaul teaching curriculums and to incorporate virtual teaching methods. Technology such as learning management software, virtual teaching platforms, and social media, may each have a role to play in engaging the next generation of clinical laboratorians. Educators will need to continue to adapt their approaches to properly prepare future pathologists and laboratory directors for their careers and to motivate junior trainees, such as medical and graduate students, to pursue careers in clinical chemistry and laboratory medicine.

In a Q&A feature, appearing in the May 2022 issue of *Clinical Chemistry*, the journal invited a group of six experts, who have distinguished themselves as effective educators in laboratory medicine, to participate. These experts addressed the teaching challenges they've experienced, the innovative teaching they've adapted to address those challenges, and their visions for the future of education in these areas. We're pleased to have the two Q&A moderators of that session in this podcast.

Dr. Joesph Wiencek is a board-certified clinical chemist at the Vanderbilt School of Medicine, where he serves as the Service Line Medical Director of the Core Laboratory, Medical Director of Clinical Chemistry for the Core and Emergency

laboratories, and as Director of the Resident Rotation for Clinical Chemistry.

Dr. Allison Chambliss is an Associate Professor of Clinical Pathology at the University of Southern California, and the Director of Clinical Chemistry and Point-of-Care Testing at Los Angeles County/University of Southern California Medical Center where she oversees the Clinical Chemistry Rotations for Pathology residents.

So, first of all, Dr. Wienczek, what inspired you to put together this team of distinguished educators in laboratory medicine?

Joseph Wienczek: Well, thank you, Bob, for the question, and thank you for having me today. For me, the pursuit to highlight the dynamic shift that I believe is needed in teaching clinical chemistry and lab medicine actually started back in 2016. I had a wonderful opportunity to work with a microbiologist, late Dr. Chuck Stratton, and he asked me to meet at the end of my first-year fellowship. And what was interesting is he mentioned to me that he wanted to share with me something that took him close to 40 years to figure out, so I'm very fortunate for that. And his main message was, you know, to ditch this passive teaching that I think we all see all the time and to always find new ways to challenge the learner to be engaged. And honestly, since then, in 2016, I've gone on this kind of like campaign to promote formal and innovative ways of teaching to the field of medicine, and also, I've identified educators in lab medicine that share the same vanguard ideologies, such as Dr. Chambliss, as well as the other authors for this paper.

Bob Barrett: Well, Dr. Chambliss, let's go to you. What are the principal challenges in teaching lab medicine and in particular, clinical chemistry?

Allison Chambliss: Yeah. There are a couple. So, in our article, Dr. Kamran Mirza pointed out that many trainees have little to no exposure to the clinical laboratory early in their training, and they can have a difficult time understanding how our work in a clinical lab translates into patient care. So, pathology residents can come into the clinical chemistry rotations with these biases and misconception, and then that leads to them having a lack of interest from the start, which can hinder their engagement in these areas.

And lab medicine and really, clinical chemistry in particular, differ in several ways from anatomic pathology or AP, including that AP is inherently more hands-on than clinical pathology. And actually, several of the experts in our article mentioned that in their experience, many more pathology residents are interested in AP than CP from the start. And historically, clinical chemistry has been thought as Dr.

Wiencek mentioned, by traditional passive teaching methods like reading assignments and lectures, and we found that today's trainees are really looking for more engaging ways to learn.

Bob Barrett: The COVID-19 pandemic of course has affected everybody, but particularly educators. How has it affected the way that people teach residents in laboratory medicine?

Allison Chambliss: The COVID-19 pandemic initially brought many educational activities to a complete halt. And then when teaching activities started up again, they may have been considered non-essential and may have had to occur virtually or in a socially distant manner.

And so, this meant that what little hands-on teaching we were doing in clinical chemistry had to revert back to these more traditional passive methods, like lectures and reading assignments, which as we discussed, don't always do a good job of keeping trainees engaged and interested.

However, on the plus side, the pandemic provided opportunities to overhaul teaching curriculums and incorporate newer teaching techniques. Personally, during the early days of the pandemic, I was able to take an online teaching intensive course offered by my institution for faculty, where we quickly learned tips and tricks for Zoom teaching and how to use a flipped classroom model to keep students engaged virtually.

And in our article, several of our experts described the various online teaching tools that they fully embraced during the pandemic and will likely continue to use beyond the pandemic.

Bob Barrett: What kinds of innovative tools and resources did the experts described that have worked well for them?

Allison Chambliss: Our experts described so many great ideas and I highly encourage the audience to read the article to really grasp all of them. But I'll attempt to summarize some of the highlights here. Firstly, several of the experts noted that it is important to set expectations with trainees early. Dr. Justin Kreuter recommended organizing a deliberate welcome orientation at the beginning of the rotation or learning period, and this could be done virtually, if necessary, like over Zoom. And this allows the educator to get to know the trainee's background and interest, and this may offer opportunities to tailor or customize learning activities for the trainee.

Dr. Steven Cotten describes some really fun hands-on learning activities, like a scavenger hunt through different branches of the clinical lab, that gets the trainee engaged with

the laboratory's technical staff. He also described how he migrated his resident chemistry rotation curriculum to his institution's online virtual classroom platform, where students can access the curriculum from anywhere. They can take polls, multiple choice and short answer questions, and then he can track their progress and performance in an online grade book.

Dr. Roger Bertholf also described using his institution's online educational platform for similar purposes.

And then along similar lines, Dr. Christina Ellervik described her work with *Clinical Chemistry's* editor in chief, Dr. Nader Rifai, in developing the AACC and *New England Journal of Medicine's* Learning Lab program, which is an online personalized adaptive teaching platform for laboratory medicine trainees of all levels.

Dr. Kamran Mirza described his role in founding a free website for pathology education, which is known as pathelective.com.

And finally, several of the experts, and particularly, Dr. Zahra Shajani-Yi, described linking clinical chemistry to other disciplines within laboratory medicine and pathology, when possible, especially for trainees who may have a more apparent interest in AP or other lab areas. Dr. Shajani-Yi described that this could be something like including images of tissue slides when discussing tumor markers or linking clinical chemistry toxicology with forensics.

And several other experts mentioned that including topics like informatics and laboratory management in a clinical chemistry curriculum can keep the teaching well-balanced and well applicable to other lab areas.

Bob Barrett: Okay. Well, finally, Dr. Wiencek, this Q&A highlighted many inventive ways to engage trainees in laboratory medicine. What are some items that you believe will need further attention?

Joseph Wiencek: Thanks again for this question. For me, I think it really is prudent to remember that the farther we get away from our educational training experience, the higher the potential chance for us to become the dreaded bad teacher. And this is to even be said, even though we have much more experience at this point in additional innovative ways to engage the learner. And so, personally, I hope that when any of us teach, we will always continue to strive to never forget how it felt as the trainee, learning the material for the very first time.

Allison Chambliss: And Bob, I'll also add that while our article collated several great teaching ideas, it also revealed that we need to think

more about effective ways to evaluate both our teaching methods and our trainees. Interestingly, we asked our experts the question, "How do you evaluate that your evolving teaching methods are effective?" And the answers that we got were fairly limited beyond the use of quizzes or exams like the pathology resident in-service examination, which is known as the RISE exam.

And Dr. Justin Kreuter pointed out that evaluation is often an afterthought. And I think that, as a field, this is an area that we as educators should be thinking about more in the future.

Bob Barrett:

That was Dr. Allison Chambliss from the University of Southern California. She was joined by Dr. Joseph Wiencek from the Vanderbilt School of Medicine. They are the two moderators of the Q&A feature in the May 2022 issue of *Clinical Chemistry*, on engagement of clinical chemistry and laboratory medicine trainees by innovative teaching methods. And we thank them for being our guests in this podcast on that topic. I'm Bob Barrett. Thanks for listening.