Three at AACC: rapid STI testing, toxicology, biosafety

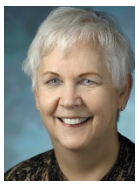
Charna Albert

November 2020—Point-of-care testing for sexually transmitted infections, toxicology investigation, and biosafety practices are three of the hundreds of topics that will come online next month during AACC's virtual annual meeting.

New point-of-care technologies are needed to reduce transmissibility of sexually transmitted infections, which have increased every year for the past five years, says Charlotte Gaydos, DrPH, professor emerita at the Center for Point-of-Care Technologies Research for Sexually Transmitted Diseases, Johns Hopkins School of Medicine and the Johns Hopkins Bloomberg School of Public Health. Dr. Gaydos will talk about what's new and what's to come in "A Step Forward for Point-of-Care Technologies for Sexually Transmitted Infections."

Dr. Gaydos and her group studied the use of a rapid diagnostic test for STIs in an emergency care setting in a randomized clinical trial reported in 2019. In that study, performed in the Johns Hopkins emergency department, participants received either standard-of-care nucleic acid amplification testing for *Chlamydia trachomatis* (CT) and *Neisseria gonorrhoeae* (NG) or GeneXpert rapid NAAT, which has a turnaround time of 90 minutes. In the rapid test group, all of those who tested positive received treatment. In the control standard-of-care group, 43.8 percent of those who tested positive went untreated (Gaydos CA, et al. *Ann Emerg Med.* 2019;74[1]:36–44). "A lot of this is due to the fact that it's hard to get in touch with patients once they leave the ED," Dr. Gaydos says. "Multiple attempts were made to try to find the patients from the routine test group, to no avail."

The study also found that rapid *C. trachomatis* and *N. gonorrhoeae* testing in the ED significantly reduced overtreatment for women without CT/NG infections compared with the standard-of-care control group. "In the routine test group," Dr. Gaydos says, "47 percent were overtreated," compared with only 23 percent (for CT) and 25 percent (for NG) of uninfected rapid test patients. "A remarkable show of what could happen when you use a rapid test," says Dr. Gaydos, who calls the results "an eye-opener."



Dr. Gaydos

With an even more rapid test—one that produces a result in 20 or 30 minutes—overtreatment could be reduced further, she says, and for that there are "some new kids on the block."

A molecular point-of-care nucleic acid amplification test developed by Binx Health received FDA clearance this summer, Dr. Gaydos says. The test, which provides results in 30 minutes, was approved for use with a vaginal swab for women and urine samples for men collected by clinicians or patients. A study reported in May found sensitivity for chlamydia to be 96 percent for women and 92.5 percent for men, and for gonorrhea, 100 percent for women and 97.3 percent for men, "with specificity at 99 and 100 percent," Dr. Gaydos says (Van Der Pol B, et al. *JAMA Netw Open*. 2020;3[5]:e204819).

"There was no difference between the clinician-collected specimen and self-collected specimen," she says. "This can save clinicians a lot of time."

Visby Medical is awaiting FDA clearance for a chlamydia, gonorrhea, and trichomoniasis POC test for women only and for self-collected vaginal swabs. It provides results in 20 minutes employing a single-use device that contains a

PCR-based NAAT. “Everything happens—the amplification and the reading of the results—in this little cartridge about the size of a deck of cards. And sensitivity is just excellent [97 to 99 percent], with very high specificities,” Dr. Gaydos says. The company has applied for dual approval, she adds, which would provide FDA clearance and a CLIA waiver at the same time. She hopes the test will receive clearance by the time of the conference.

Joining Dr. Gaydos in the session will be Barbara Van Der Pol, PhD, MPH, of the University of Alabama-Birmingham School of Medicine, who will talk about wait time assessments of patient populations for STI point-of-care testing. Joany Jackman, PhD, of the Johns Hopkins applied physics laboratory and a center co-investigator, will detail the center’s funding opportunities for developers of POC tests for STIs. And Anne Rompalo, MD, also a co-investigator in the center, will discuss clinical adoption of POC STI tests based on needs assessments and value-based decisions. Or, as Dr. Gaydos puts it, “What does it take for a hospital, urgent care center, or ED to adopt a point-of-care test? Because there are barriers, like money, new protocols, new equipment.” Case in point: Despite the strong showing of the GeneXpert rapid test in the clinical trial published in *Annals of Emergency Medicine*, Johns Hopkins has yet to implement the test in the ED.

“Implementation is a big barrier to be overcome,” Dr. Gaydos says.

In “The Toxicology Tool Kit—An Interactive, Case-Based Approach to Toxicology Investigations,” Danyel Tacker, PhD, associate professor of pathology at West Virginia University School of Medicine, and Nicholas Heger, PhD, assistant professor of anatomic and clinical pathology, Tufts University School of Medicine, will share tips, tricks, and best practices to help laboratory professionals of all levels with toxicology case reviews.

Dr. Heger

The “tool kit,” says Dr. Heger, who is also medical director of clinical laboratory operations at Tufts Medical Center, refers to an investigatory skill set. “It’s not going to be a cheat sheet that will solve every problem. It’s more about providing some of the tips, tricks, common pitfalls to avoid, the best practices, and the pearls.” The session will be applicable to anyone performing toxicology testing who wants to provide a better service to clinicians, he says.

“We’re trying to steer attendees toward reliable resources and teach some basics about different drug classes,” says Dr. Tacker, who is also director of clinical chemistry at West Virginia University Health System. “But we can’t cover everything in one session. So it’s going to be more general and driven by cases and examples.”

One of Dr. Tacker’s cases will report on a finding of her mass spectrometry lab early this year after it validated a large opioid panel. To test the system, her technical staff pulled 10 random urine remnant specimens and found that four had fentanyl in them. Despite the opioid epidemic and the West Virginia region being hard hit, the number seemed too high. “We have a responsibility to do something about it,” Dr. Tacker says. She studied the charts and found that three of the four results were unexpected. “They weren’t inpatients,” she explains. After conferring with behavioral medical specialists, the laboratory did a QA study in which it monitored all live specimens coming into the mass spec lab for fentanyl that wasn’t prescribed. The finding: 11 percent had fentanyl in them. By the end of the first quarter of this year, the lab had enough data to compel the institution to add fentanyl screening to its routine drug screen panel.

“So part of the tool kit will involve savvy about what you as a laboratorian can do” and how to reach out to providers, “because we do have shifts in drug trends, and the tests we use aren’t always well tuned to the needs clinically.” So the question is: “Are your screens built for their purpose?”

Dr. Tacker

Understanding how to work through a false-negative screen is critical, Dr. Tacker says, as greater numbers of providers screen patients for prescription drug compliance. “False-negatives are a harder and newer kind of phenomenon that we get a lot of questions about because of the paranoia about overprescribing opioids.” If the patient for whom the lab and provider have a negative result is supposed to be taking a benzodiazepine, “are you going to accuse the patient of diversion or are you going to dig deeper?” Dr. Tacker says she urges digging deeper, “because a lot of patients are unintentionally noncompliant with prescriptions.” Some are simply afraid of the effects of opioids. “So there are nuances to work through in toxicology now that you did not hear as much about 10 or 20 years ago.”

Using nontraditional sources to find answers to some questions—those that are less straightforward—is becoming the norm, Dr. Heger says. Talking to a manufacturer, preferably someone in scientific affairs or R&D, can be a good source of information about a specific assay, he says, particularly for information that might have come online after the company’s initial FDA clearance.

Contacts at various reference labs, state regulatory agencies, or medical examiner offices can also reveal trends of new and emerging drugs and classes. “You’ve got to look outside the box,” he says.

Dr. Heger’s laboratory saves aliquots from each urine drug screen specimen for a minimum of three months. Providers aren’t necessarily able to follow up with the lab about a result right away, and when they do—especially if it is about a potential false-positive—it’s important to have the specimen on hand, he says.

Providers at Tufts Medical Center consult with pathologists and toxicologists before making a plan for definitive testing. That way, Dr. Heger explains, the toxicologists on staff are able to select the best test and the most suitable reference lab. “Depending on the clinical question, it might make sense to send it to one laboratory versus another, depending on the scope of testing, methodology, and price. We’ll ask the providers, ‘What is the question you’re trying to answer?’ From there we’ll start a dialogue.” When the results are back, he or a colleague sends the provider a customized response explaining what the result means. “And the clinicians love it,” despite it requiring more of their time on the front end.

“What we are trying to do,” Dr. Tacker says, “is hit on the gap between what the providers need and what lab professionals can provide and how we can fill it.”

Safety fatigue, a lack of regulatory “oomph,” and laboratory instruments that aren’t necessarily designed to be decontaminated are all hurdles clinical laboratories face in responding to biosafety risks, says Sheldon Campbell, MD, PhD, professor of laboratory medicine at Yale School of Medicine. The key to mitigating these risks, Dr. Campbell says, and what he and other speakers will address in “Biosafety Practices for Today and Beyond,” is for laboratories and for the laboratory community at large to develop the systemwide processes of quality laboratory safety practice.

Dr. Campbell will discuss instrument decontamination as a component of laboratory safety. While new disinfecting approaches—vaporized hydrogen peroxide is one example—emerged in the aftermath of the 2014 Ebola outbreak, “compatibility of different decontamination products and processes with all the complicated parts and materials in an instrument” remain ill-defined, says Dr. Campbell, who is also director of clinical laboratories, VA Connecticut Healthcare System.

One issue, he says, is that instrument manufacturers don’t often provide comprehensive documentation or instruction on decontamination. “There may be ways of decontaminating the sample-facing parts of the

instrument, by running bleach through them, for example," he says. "But instruments aren't that simple. And when laboratories have done studies of contamination, you find nucleic acid from things like hepatitis C on the outside of the instrument."

Though there are more disinfecting approaches today than in years past, "it's still very much a work in progress," Dr. Campbell says.

Dr. Campbell

A good place for labs to start in performing safety risk assessments of laboratory hazards, instrument contamination, and exposure is with the Association of Public Health Laboratories website, which has a risk assessment best practices template. The Clinical and Laboratory Standards Institute is developing a document on decontamination procedures, to be released early next year.

Decontamination of point-of-care instruments could serve as a start for more comprehensive efforts, he says. "That's a place where we can move forward and think about how we might do things in the central lab, because we do have the POC experience and it's so enmeshed in the rest of the hospital's infection control processes."

More direction by way of CLIA or from regulatory agencies would help, he says. "We need to have some kind of incentive to more forward with this because it takes resources, and resources are hard to come by these days."

Dr. Campbell will present several case scenarios, from the simple to the complicated. One example: A technologist who is testing a rack of serologies removes the rack from the instrument and then accidentally drops it back into the instrument. One of the samples is hepatitis B surface antigen positive. "So we'll ask the audience: What's your procedure? What's necessary to decontaminate hepatitis B? Does it depend on where it spilled? What other protections are in place, and how can you minimize the subsequent risk of such events?"

Also presenting in the biosafety session will be Nancy Cornish, MD (recent history of biosafety and lessons learned), and Elizabeth Weirich (risk assessment and mitigation) of the CDC and Michael Pentella, PhD, of the University of Iowa (biosafety and quality management).

Charna Albert is CAP TODAY associate contributing editor.