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Winter 2025 Issue 4

The Next Pandemic: How Public Health Laboratories Are Improving Readiness and Response

ASSOCIATION OF PUBLIC HEALTH LABORATORIES

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The Association of Public Health Laboratories (APHL) works to strengthen laboratory systems serving the public's health in the US and globally. APHL's member laboratories protect the public's health by monitoring and detecting infectious and foodborne diseases, environmental contaminants, terrorist agents, genetic disorders in newborns and other diverse health threats.

Positioning APHL for the Future

A strategic guide. A theory of change. Five years, 10 years, one year. Across the nonprofit sphere, there are a variety of ways to describe how an association develops a plan outlining the goals and activities that support its mission, vision and values. The resulting plan acts as a roadmap to guide decisions, allocate resources and measure progress during a certain span of time.

APHL has been developing strategic plans since the early 1990s and has usually done so in three- to five-year increments. We have also taken the approach of rolling over certain initiatives that may not have been covered in previous versions of the strategic map, with the purpose of ensuring that there is a thread of continuity from year to year, from map to map. It has also involved many months of planning, of discussion and of temperature-taking around the organization, soliciting the views of APHL members, partners and staff to ensure that all are equally represented in the association's vision.

APHL President Scott Shone, PhD, HCLD(ABB), and **Chief Executive Officer Scott Becker**, MS

2025 has been … different. To say that there hasn't been a dull moment in our public health community would be a drastic understatement. And a large part of this year's strategic planning process—indeed the new strategic map itself—was different as well, for a variety of reasons.

In the first quarter of 2025, it became painfully obvious that the previous strategic map was out of sync with the world. In addition, that version of the map was basically an extension of the map that was created in 2020. And while it did a really good job of guiding the association, it was no longer realistic. With the events that happened during the first and second quarters of 2025, the Board of Directors deepened its discussions about how APHL could continue to function and also remain a bridge for members and partners in case of an existential crisis.

Though APHL had the assistance of the Clarion Group, who had helped us developed maps in the past, the majority of work was done by the Board of Directors, the Council of Chairs and the broader membership via an open call for

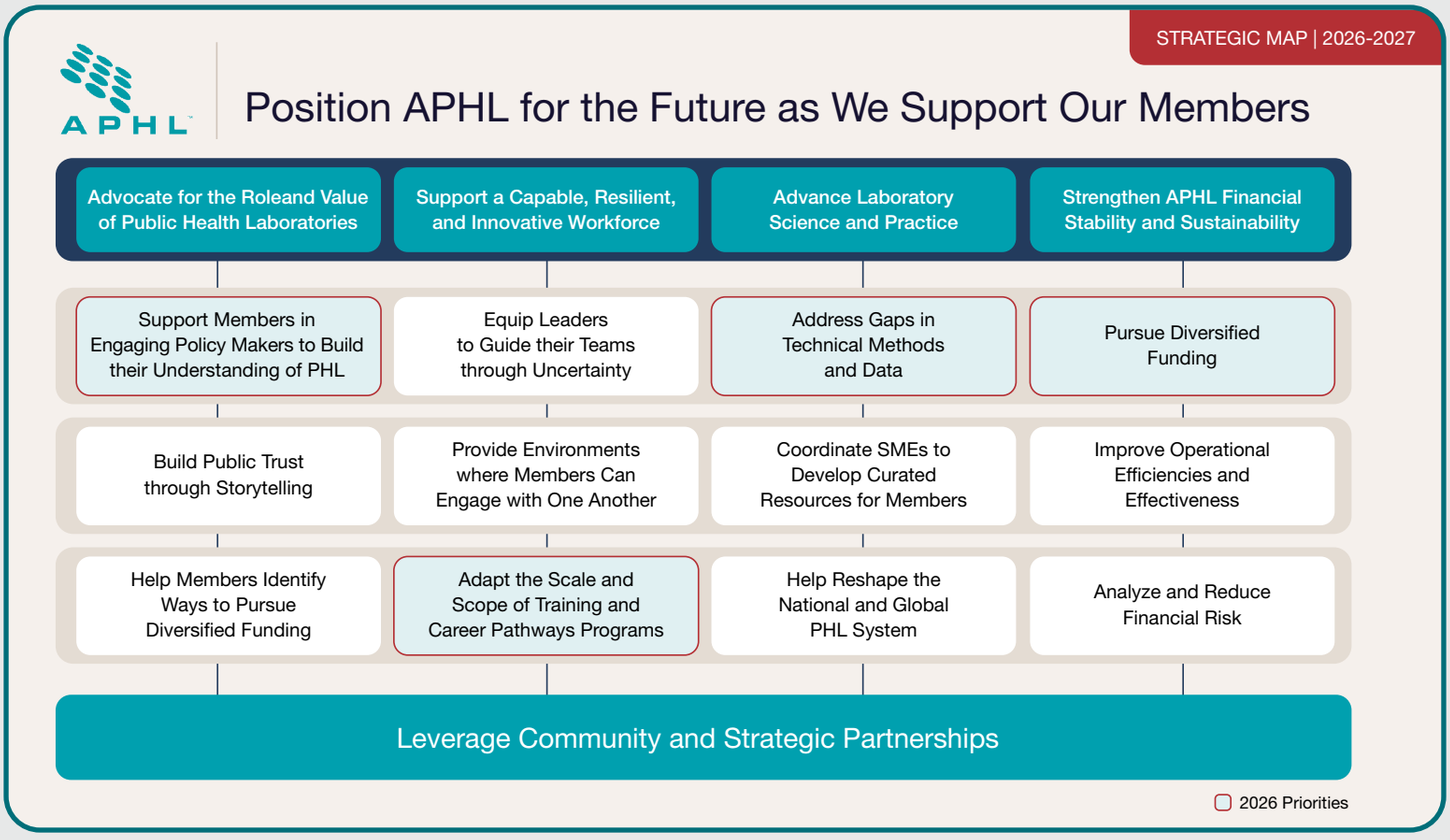


Figure 1. The 2026–2027 APHL Strategic Map with priorities for 2026 outlined in red.

input. We decided to begin planning with a completely clean slate. The leadership wanted to begin the process with not only fresh eyes on what was most important to the association and its members, but also what goals and activities would most help APHL change to meet a changing world. It was also clear that a two-year strategic map made the most sense for the current environment.

This iteration of the strategic map landed on issues that had been discussed by the Board since February: advocacy, communication, convening, technical assistance and workforce. And because APHL's leadership had been thinking about these topics over the past 10 months, when a survey was fielded to members and partners in August, the data gathered was very impactful to the process. You told us what really matters to you, and to the association … and we listened.

Our central challenge over these next two years is to "Position APHL for the Future as We Support Our Members," (**Figure 1**). The four main goals will be overseen by the APHL Board and Executive Leadership Team Members for the duration of the map. And though all the work described in the strategic map will be done through 2027, extra emphasis will be given to the following objectives in this coming year:

- Support members in engaging policy makers to build their understanding of public health laboratories
- Adapt the scale and scope of training and Career Pathways Programs
- Address gaps in technical methods and data
- Pursue diversified funding

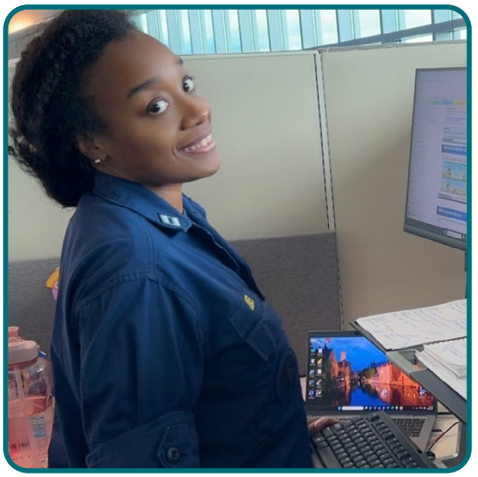
All goals and objectives are supported by the cross-cutting goal of "Leverage Community and Strategic Partnerships," without which APHL could not be as impactful in our work.

We, as an association, approach every strategic mapping process a little bit differently. Sometimes it takes a lot of negotiation to get all parties on the same page about goals and objectives. Other times it's the desire to work on the one or two things that we didn't get a chance to work on in the previous cycle that drives discussions. In this iteration of the map, however, there was something crystal clear in the interactions and discussion: our members and partners are committed to APHL, and APHL is committed to being a foundational resource for the public health community.

As APHL begins 2026, it will celebrate its 75th anniversary—a stellar milestone for any organization. While some of the year will be spent looking back at how the association has changed and where we are going, we will continue to look to the future of our members. We invite you to join us at our signature events, in our online communities, in our trainings and webinars. We invite you to reconnect with colleagues and friends, we encourage you to talk with your peers. But above all, we invite you along to navigate our new strategic map together, ensuring a healthier world through quality laboratory systems. ■

The Power of Early Exposure

By **Amra Handzic**, MBA, senior specialist, Academic Partnerships



LT Leandra B. Jones.

While public health laboratories are essential in protecting lives, many students are unaware of the rewarding career opportunities available to them until later in their academic or professional journeys. Early exposure through internship, fellowship and mentorship initiatives can be the spark that lights a pathway from curiosity to long-term career commitment. By creating intentional opportunities for students to explore public health laboratory science, the public health community strengthens its workforce pipeline and capacity to respond to emerging challenges.

Career Pathways in Public Health Laboratory Science: an APHL-CDC Initiative is designed to bridge this gap. These programs introduce students and graduates to the critical work of public health laboratories, offering them hands-on experience, professional development and mentorship. For many, these opportunities are a launchpad to permanent roles in state and local public health laboratories.

One pathway begins with an internship or fellowship in a laboratory, where participants gain technical and professional skills. Exposure to real-world laboratory projects allows students to apply classroom knowledge in meaningful ways while learning about laboratory operations, biosafety and quality assurance. Importantly, they build relationships with mentors and colleagues who guide them through the complexities of public health work.

"I discovered the APHL-CDC fellowship as a way to gain hands-on experience and apply my science to urgent, real-world issues."

***— LT Leandra B. Jones**, PhD, past APHL-CDC Infectious Disease fellow; current MSc Laboratory Leadership fellow and US Public Health Service officer, US Centers for Disease Control and Prevention (CDC)*

A mix of curiosity and passion often drives the decision to participate in an internship or fellowship. For many, the chance to apply scientific training to real-world health problems offers a sense of purpose that goes beyond traditional laboratory settings.

***Jones**: "I wanted my training in microbiology to have a direct impact on people's lives and the fellowship provided the opportunity to bridge science with service."*

"This fellowship opened my eyes to an entire realm of research beyond academia. No two days in the toxicology lab are the same, which keeps the work engaging and meaningful."

***— Alyssa Deeds**, fellow, Michigan State University Veterinary Diagnostic Laboratory (MSU VDL)*

Throughout these experiences, fellows and interns frequently emphasize the value of transferable skills, including data analysis, communication, teamwork and project management. These skills enrich their immediate contributions and prepare them for long-term career success.

***Jones:** "I gained technical expertise and, just as importantly, collaboration and communication skills. Effective public health depends on teamwork and trust."*

***Deeds:** "Presenting at conferences helped me become a more confident public speaker and taught me how to collaborate across disciplines."*

Transitioning from a training role to a full-time position can present challenges and provide growth opportunities. Fellows often note that their prior exposure to public health laboratories makes them more confident and adaptable when stepping into permanent roles.

As these journeys demonstrate, early exposure is more than an entry point; it is a foundation. Students who engage with public health laboratories early in their careers gain clarity about their interests, develop practical skills and build lasting professional networks. These experiences shape their career trajectories and strengthen the public health system.

***Jones:** "Public health careers are diverse—mentorship, communication and teamwork can make the difference between being a good scientist and an impactful public health leader."*

As of October 1, 2025, APHL supports 59 active interns in 54 host laboratories and 226 active fellows in 101 host laboratories. More details are available on the APHL Career Pathways webpage. By investing in student engagement and fostering pathways to long-term careers, APHL and its partners ensure that tomorrow's public health workforce is skilled and inspired. ■

One Mentor's Rationale for Hosting Fellows and Interns

By **Rudolph Nowak**, MPH, senior specialist, Marketing and Communications

Sin Urban (center, in dark safety glasses). Photo: Maryland Department of Health Laboratories Administration.

Since its inception, Career Pathways in Public Health Laboratory Science: an APHL-CDC Initiative has never lacked applicants for its fellowships and internships. But the same does not hold true for mentors. The program actively promotes how fellows and interns can help fill a workforce gap without costing the host lab a dime, and fellows come with a project supply fund that offers additional funding for hosting a fellow.

Those facts leave some mentors puzzled.

Sin Urban, PhD, Environmental Science Division chief at the Maryland Department of Health Laboratories Administration is one of the mentors who repeatedly signs up for fellows and interns.

"I think this is a really underutilized program. And I think people don't have a good understanding of the benefits it gives," Urban said. He gave one example of trying to get a project funded by writing a grant. A grant for $275,000 would require a 50-to-100-page request and take about a month to write. If the grant is approved on the first review, which, according to Urban, almost never happens, it could be eight months before the project could begin.

"I can do the same thing with one fellow. Their salaries are funded by APHL, they have a professional development allowance of a few thousand dollars, and they have a research supply allowance, which is (currently) $10,000 per year for two years. Boom, I'm at $275,000 having written three paragraphs."

Fortunately, some scientists and laboratories sign on to mentor cohort after cohort and some even mentor multiple fellows, interns or both. Urban currently mentors six fellows and also had one intern. He also oversees a staff of over 60 scientists. His way of getting everything done is straightforward: the entire process from the interview forward is a team effort.

"I'm their direct mentor and I take that very seriously. But they're not going to learn bench skills from me, or how to interface with the laboratory supervisor who's setting their schedule, approving their time sheets or a lot of quality assurance parts," Urban said. "I have them interfacing with various people day-to-day that can provide those skills."

Urban's plan of action is simple and direct.

"I tell them, 'Your project is to become a certified analyst in whatever area you're joining. So, if you're joining the per- and polyfluoroalkyl substances (PFAS) laboratory, your job is to learn the method, have training papers (and) demonstrate competencies to our high level'," Urban said.

That approach paid off when Jesus Bedolla, a food safety fellow at the Maryland laboratory, worked a weekend rotation and helped process samples of Boar's Head liverwurst that were eventually found to be contaminated by *Listeria*.

Curating Experiences

Urban also believes in the importance of customizing the fellowship or internship to the individual.

"I've had colleagues say, 'I went through (the candidate pool), I couldn't find a trained chemist. There's no one suitable

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Public Health Laboratory Ambassadors Collaborate to Enhance Outreach in Oregon

By **Akiko Saito**, MPH, MPA, business director, Oregon State Public Health Laboratory; **Lori Pillsbury**, MS, laboratory & environmental assessment division administrator, Oregon Department of Environmental Quality; and **Hailey Reiss**, specialist, Academic Partnerships

From left: Blair Adams, Dan Brown, Lori Pillsbury, Riley Evans and Allie Sayre at the Portland Workforce Alliance Northwest Youth Career Expo in March 2025.

While outreach and recruitment may seem like daunting activities, a little extra support can go a long way. APHL's Public Health Laboratory Ambassadors program provides participants with key resources, administrative support and a growing community of volunteers across the country to support outreach and recruitment efforts. This past spring, the Oregon State Public Health Laboratory (OSPHL) and the Oregon Department of Environmental Quality Laboratory took advantage of these resources and went a step further by working in collaboration to participate in the Portland Workforce Alliance NW Youth Careers Expo.

Initial Collaboration

When the APHL Public Health Laboratory Ambassadors program was first announced, both laboratories felt that it looked like a great opportunity to spread the word about careers in public and environmental health. Deciding to collaborate on outreach initiatives enabled the laboratories to have fun as well as share the workload, resources and events. Each laboratory brought a different perspective on public health, and together they were able to reach more interested students and share a wealth of information.

Planning and Event Logistics

Both laboratories were fortunate to have dedicated staff that assisted with planning. They took on the logistical challenges of signing up for the Portland Workforce Alliance NW Youth Careers Expo, attending informational webinars and gathering information and materials for the table. Volunteers were recruited to staff the event, and both laboratories worked on ideas for hands-on activities that complemented each other and highlighted similarities and differences.

Outcomes and Key Takeaways

The decision to attend this event took place closer to the date of the event than would have been preferred. On that note, one key takeaway is to allow plenty of time to plan. It takes time to come up with engaging activities to draw people to an exhibit booth. This event included over 200 exhibitors with more than 5,300 student attendees. This meant a lot of competition for the attention of the attendees!

Another key takeaway is to ensure materials and information are geared toward the audience. The attendees at this event were high school students. Therefore, next year, the plan is to bring more information on what to study in college, how to participate in an internship and other resources to help students start on a career path in public health.

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Interested in participating in outreach and recruitment activities in the future? Review the Public Health Laboratory Ambassador Quick Guide or complete the interest form on the website to become a Public Health Laboratory Ambassador.

If you are interested in potential opportunities for collaboration, you may contact the Academic Partnerships team: academic.partnerships@aphl.org.

Fellows and Interns

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for our laboratory.' I think that's the wrong approach," Urban said.

Urban's view is if someone has great training in chemistry and they tell him it is their passion, his team is going to think about a project and area where those passions and prior training can be utilized in the best possible way. He gives the example of a fellow applicant who had a degree in neuroscience but had never done any chemistry. After graduation, she moved to Alaska to give glacier tours. Urban, however, saw that almost every science course she took, she got a perfect score. And he realized she was interested in science and had the ability to master whatever she set her mind to.

"She moved to Alaska for the sense of adventure. She wants to do something new, unfamiliar—bingo, fantastic. She was our top applicant," Urban said. He added that the interview was essentially a conversation between himself as the mentor, the supervisor of the PFAS laboratory and the lead bench scientist.

Closing Argument

"One of the strengths of the program is that we're able to recruit outside of our normal pool, and our normal pool is almost exclusively Marylanders, but recruiting someone from upstate New York or from Alaska or anywhere else, those pools are very different for us and ones we don't really get to tap into," Urban said.

Ultimately, Urban believes there are three main perks to the Career Pathways Programs.

"Flexibility, additional staffing and discretionary funding for projects," said Urban. "If you look at it through the lens of those three things, I think this program is a winner." ■

Ambassadors

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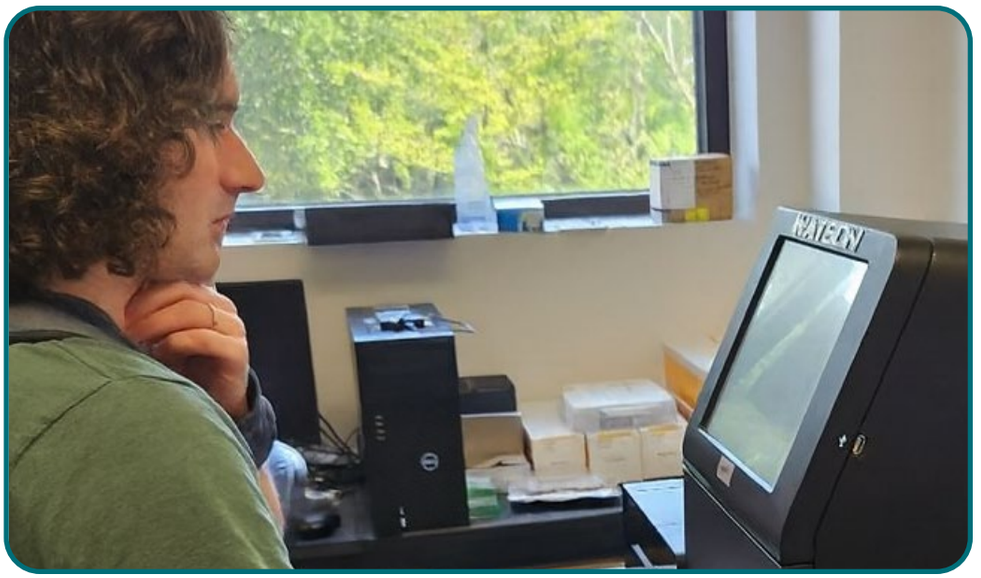
"We had a wonderful time being ambassadors for OSPHL," said Microbiologist 2 Allie Sayer. "It was an excellent opportunity to engage with the students of Oregon and southwest Washington and talk with them about what we do here at the public health laboratory. We also had fun comparing booths with other exhibitors and coming up with new ideas to connect with our community for next time."

Seeking opportunities to collaborate with other laboratories can enhance the overall outreach and recruitment process. It simultaneously alleviates some of the pressure while also allowing for more input of voices, enhancing the quality of the event. Outreach and recruitment initiatives are an important part of public health, but they do not need to be as daunting as they first seem with the right support. ■

Advancing Public Health Genomics Through Collaboration and Modernization

By **Paul Anderson**, bioinformatics software architect, Ruvos and **Juan Vasquez**, MHA, modernization project manager, Ruvos

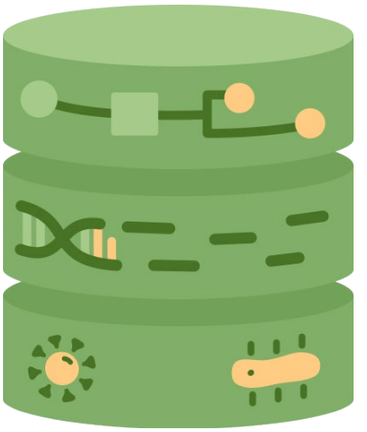


The Ruvos team observing a next-generation DNA sequencer during a laboratory visit. Photo: Ruvos.

Genomic sequencing is advancing by leaps and bounds, transforming how public health laboratories detect, track and respond to infectious diseases. Technology is finally beginning to keep pace with the ingenuity of the scientists, bioinformaticians and laboratory professionals driving this work. Together, they are reshaping how data moves through the public health ecosystem and how rapidly it can be turned into meaningful action.

According to the US Centers for Disease Control and Prevention, advanced molecular detection (AMD) combines genomic sequencing, high-performance computing and epidemiology to strengthen outbreak investigation, diagnostic support and vaccine development. Since the introduction of next generation sequencing, laboratories have been able to sequence increasingly large genomes within realistic timeframes and costs. Analysis of sequencer output produces valuable insights that guide both research and response. As the field grows, so does the need for scalable infrastructure, modern tools and skilled professionals.

In 2018, Ruvos partnered with APHL, Datapult and multiple state public health laboratories to strengthen the infrastructure supporting the national AMD sequencing hub. These collaborations established secure bioinformatics pipelines that manage simultaneous transmissions from national surveillance centers and analysis platforms, such as the Iterative Refinement Meta-Assembler (IRMA), ensuring consistent and reliable data exchange. Our teams also developed the "Ninja" Data Parser, which copies specimen-specific files to appropriate storage locations and automatically triggers pathogen-specific bioinformatics pipelines. More recently, Ruvos used AWS HealthOmics to deploy the new



A data platform built for pathogen genomics. Image: Ruvos.

MIRA pipeline to AIMS, adding real-time pipeline visualization through Amazon QuickSight. Ruvos continues to enhance the AMD environment to deliver high performance, scalability and security for participating laboratories nationwide.

As the technical arm of Datapult, Ruvos developed the Genomic Sequencing Transport solution to close a critical data-sharing gap between state public health laboratories and their contracted sequencing partners. This streamlined pipeline allows vital sequencing data for notifiable diseases to be efficiently and securely returned to a centralized cloud repository, eliminating data loss and giving public health officials the information they need to act quickly and confidently.

One state taking a leading role in this evolution is Florida, where Ruvos is partnering with the state laboratory to develop a custom genomic database application that supports the next generation of genomic surveillance. The system provides a dedicated environment for storing, managing and querying genomic data while complementing existing laboratory information management systems such as LabWare and Clarity. Designed with interoperability in mind, the application connects with existing surveillance systems to enable new applied genomic

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Ruvos is an APHL Diamond Level Sustaining Member.

Transformation, Timing, Technology, Timber: A New Era for Public Health Laboratory Design

By **Thomas Knittel**, director, Sustainability Design, HDR, Inc. and **Michael Mottet**, principal laboratory planner, Architecture, HDR, Inc.

Construction progress photo. Open laboratory environment with mass timber technologies. Photo: HDR, Inc.

In today's rapidly evolving testing environment, public health laboratories must be responsive to immediate public health events and flexible enough to manage unknowns of tomorrow. With renewed emphasis on collaboration and sustainability in modern laboratory environments, new construction technologies and material innovations can support a "One Health" goal by design. For example, hybrid mass timber structures, all-electric systems and prefabrication can work in concert to achieve interconnected initiatives related to environmental stewardship, improved project delivery schedule, agency resiliency and staff recruitment.

While designing a new addition for the Los Angeles Public Health Laboratory (LAPHL), these initiatives were valued, prioritized and viewed through a holistic, whole systems thinking design approach. Preserved green space, bringing nature inside with a mass timber structure, welcoming natural light with high glass and designing for future expansion support occupant well-being and anticipate new technologies with automation.

Dr. Nicole Green, director of the Los Angeles County Public Health Laboratory, emphasizes, "The term 'making a space for everyone' was a result of not only talking to LAPHL leadership, but also to the people who use it every day."

Facilitating Transformation

In an era of constant shifts within testing and technology, flexibility is paramount to the success, efficiency and comfort of laboratory environments. As advancements in automation and robotic technology for molecular tests and systems are integrated, designers are encouraged to respond with modular, adaptable solutions. For example, while maintaining an overall laboratory module from 10'6" to 11'0" is best practice for future flexibility, the new LAPHL addition will employ a 10-foot planning grid to accommodate a 70-foot-long automated molecular assay line and modular benches, allowing for future reconfiguration and integration of additional robotic lines.

The vertical distribution of a laboratory's mechanical system and penthouse, referred to as a "side core," is also crucial for adaptability. At LAPHL, the side core is offset, freeing the laboratory space of stairs and exit corridors and further maximizing the current space. This planning approach also results in opportunities for expansion, allowing the laboratory areas to be mirrored around the central core and doubled in size without having to build new cores.

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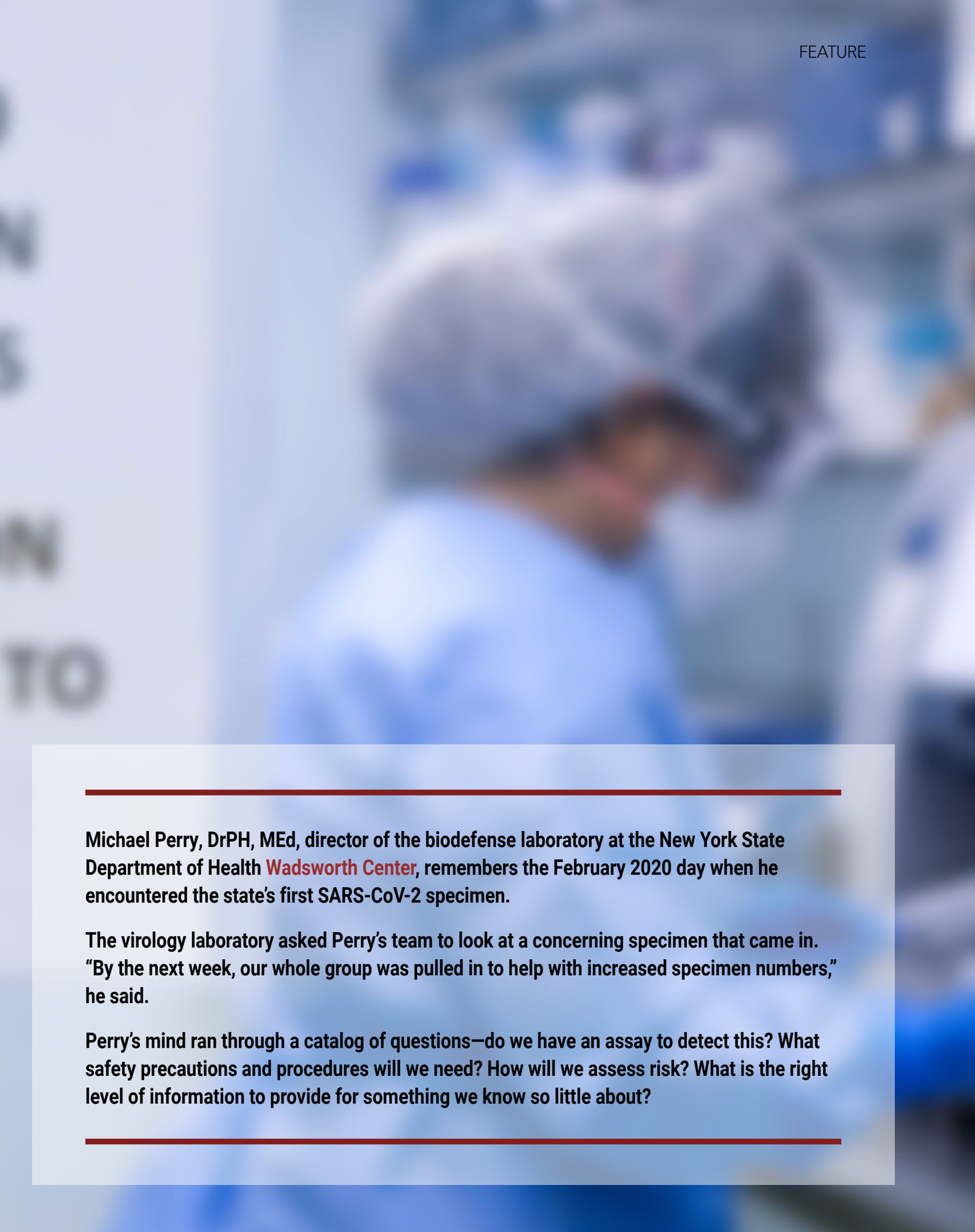
A rendering of LA PHL's automated molecular assay line and modular benches. Photo: HDR, Inc.

HDR is an APHL Platinum Level Sustaining Member.

The Next Pandemic: How Public Health Laboratories Are Improving Readiness and Response

By **Dara Chadwick**, writer



Michael Perry, DrPH, MEd, director of the biodefense laboratory at the New York State Department of Health Wadsworth Center, remembers the February 2020 day when he encountered the state's first SARS-CoV-2 specimen.

The virology laboratory asked Perry's team to look at a concerning specimen that came in. "By the next week, our whole group was pulled in to help with increased specimen numbers," he said.

Perry's mind ran through a catalog of questions—do we have an assay to detect this? What safety precautions and procedures will we need? How will we assess risk? What is the right level of information to provide for something we know so little about?

COVID-19 caught the world off guard—including many public health laboratories. Aging laboratory infrastructure, along with a lack of high-containment laboratory capacity to keep pace with the surge, impacted testing and response nationwide. Supply chain issues and rigid contracts meant some public health laboratories didn't have timely access to needed equipment. Shortages of staff properly trained for surge response led to laboratory team burnout.

How can public health laboratories ensure their infrastructure is ready for the next emergency? Lessons learned from the COVID-19 pandemic—and strategic use of pandemic-era funding and flexibility—are helping today's public health laboratories prepare for tomorrow's challenges.

Adjust Where Possible

Managing emerging needs during a pandemic surge can create challenges for public health laboratories. One such example is the need to train new staff members quickly.

Perry said it's impossible to train team members brought in during a surge in every task. A strategy that worked well for him was training for specific, limited roles—like accessioning, extractions or reviewing results—to keep work moving.

Readiness also requires constant assessment and improvement of workflows. Kayle Cirrincione, health, safety and preparedness manager and biosafety officer for the Dallas County Health and Human Services Public Health Laboratory, said workflow adjustments can help laboratories maximize surge capacity.

During COVID-19, her team set aside time to batch prep work for extractions that required premixing certain chemicals. "Instead of doing it in real time, we'd prepare what we needed for certain measurements so we could grab and go as we were putting runs together," she said.

Invest in Future Readiness

Many public health laboratories have used COVID-era funding to make changes that support readiness and response. Christina Egan, chief of the Biodefense and Mycology Laboratories and deputy director of the Division of Infectious Diseases at New York's Wadsworth Center, said her division used COVID funding from the US Centers for Disease Control and Prevention (CDC) and Prevention Epidemiology and Laboratory Capacity Program to address equipment needs identified during COVID.

"We acquired many computers," she said. "We brought in all these people during COVID, but they needed computers. We also acquired tablets, which offered flexibility for tasks such as inventory, laboratory surveys and inspections."

> **"The pandemic required everyone from senior scientists to new hires to pivot quickly to unfamiliar workflows. We realized how important it is to maintain a baseline of readiness across our entire workforce, not just among the specific response team."**
>
> ***Michael Perry, DrPH, MEd***

Management software was another critical investment, according to Egan. "These tools help track projects, inventory and personnel," she said. "There's so much that goes into running the laboratory outside of testing. We tried to be thoughtful in how we used these funds, anticipating our future needs."

Cirrincione, who recently moved into a newly built facility, said she kept future readiness and response in mind when designing her space. "Our new laboratory has multiple autoclaves, so we're not dependent on just one," she said. "We also have flexible use spaces and training areas that we can turn into functioning laboratories if needed. We also have some shell space that we can turn into whatever we need. It gives us a lot more flexibility to respond."

Flexibility and Redundancy

The COVID-19 pandemic demonstrated the importance of flexibility and redundancy in public health laboratories during emergencies. Procuring critical reagents, equipment and biosafety materials was often problematic. Planned redundancy can help ensure future readiness.

Cirrincione is using different equipment options to better manage supply chain issues that could affect laboratory operations. "Now, if one pipette tip is on backorder, we can switch to another," she said. "I also now fit, train and test my people with two different types of respirators. We use N95s, but we also use powered air purifying respirators. We have both options because we ran out of N95s during COVID and now we can switch back and forth."

Flexibility in contracts has also proved critical to managing both supply chain issues and needed personnel. In California, laboratorians who test specimens are required to have a state public health microbiologist license that requires a six-month training course and board exam—a requirement that severely limited capacity, said Jeremy Corrigan, DrPH, MS, director of agency operations and laboratory director at the San Diego County Public Health Laboratory. "During the federal public health emergency, some personnel requirements were waived," he said. "That opened doors for me to bring in bachelor-level scientists to support the surge."

A key responsibility of Corrigan's role is overseeing contracts and agreements. "Flexible language in contracts—such as the broader term 'pathogen of concern'—and in data use and material transfer agreements is important," he said.

Corrigan knows a thing or two about flexibility. Four weeks after moving to San Diego in 2022, his public health laboratory building was closed for structural deficiencies amid the COVID response. He stood up a temporary laboratory and recently opened a new, fully modernized laboratory building.

"This space is designed to be flexible, and to support new instruments," he said. "We know the instruments we use today are not the instruments we'll use tomorrow."

> **We can plan for all the scenarios, but it's rarely going to hit the way you planned. If we're not adaptable, we're more likely to crack under the pressure."**
>
> *Kayle Cirrincione*

Redundancy is also part of the readiness puzzle. Tactics like standing orders help ensure supplies are in place and eliminate administrative burdens. Multiple testing platforms also help keep work moving during a surge.

"We're looking at having multiple instruments that can be used and validated as part of these assays," Perry said. "The pandemic reaffirmed that supply chain resilience and data connectivity are vital to laboratory capabilities. Without access to reagents or the ability to share results in real time, even the best science stalls."

Corrigan noted that while redundancy is important, it can add cost and complexity. "Looking back, the only way I was able to survive was to have different platforms because I did run out of reagents," he said. "But with redundancy, you must validate each test and train your staff on them. So, redundancy is good and it's bad."

A Nimble Workforce

Perry said an agile, cross-trained staff is critical. "The pandemic required everyone from senior scientists to new hires to pivot quickly to unfamiliar workflows," he said. "We realized how important it is to maintain a baseline of readiness across our entire workforce, not just among the specific response team."

Cirrincione said Dallas County often sees unusual pathogens. "We're used to one-offs, but COVID was a different ball game," she said. "It was a lot of samples, and it was sustained. We can plan for all the scenarios, but it's rarely going to hit the way you planned. If we're not adaptable, we're more likely to crack under the pressure."

Repetitiveness and burnout affected her four-person team, which ran all the COVID samples, she said. "We would run 300 samples a day during COVID," she said. "We'd start first thing in the morning and fax out paper test results by 6 p.m. I still have dreams about filling out those little bubbles indicating positive or negative and making sure they were correct. It was just constant going."

Many laboratory teams took on new tasks that required new processes. "This was the first and only time in my 20-year public health career that we were asked to report results directly to patients," Corrigan said. "Creating an electronic non-manual portal process to report results was critical to our success."

Preventing team burnout during the next pandemic is something Perry thinks about a lot. "I'm not so worried about the next pathogen," he said. "I worry about my group and the burden a surge has on them, especially the longevity of it. They're the heart and soul of the testing and the work."

To help prevent burnout, Wadsworth offers training to help enhance and enrich the scientific lives of team members, focusing on career development, mentoring and leadership pathways. "We want to give people a sense of progression and purpose beyond the bench," Perry said. "We want to strengthen a creative and supportive culture that values work-life balance, celebrates achievements and recognizes the essential roles laboratorians play in protecting health."

Corrigan said it's important to monitor team morale, efficiency and burnout. It's also important to consider different approaches to short-term and long-term surges. Asking team members to cover extra hours may work temporarily, but it's not sustainable for a long-term surge. "In those instances, we need to bring in additional staff or rely on external partners such as commercial laboratories," he said.

Nurture Strong Partnerships

Building relationships with community partners helps support readiness and response. Strong relationships require visibility, which builds trust and enables mutual aid, said Corrigan. "We have to share the great things we're doing to keep the public safe on a day-to-day basis," he said.

Before he came to San Diego, Corrigan was laboratory manager of northern California's Humboldt County Public Health Laboratory. There, he partnered with United Indian Health Services (UIHS) to stand up a COVID testing laboratory.

Corrigan said that through a state partnership with PerkinElmer, Inc., the county received high-throughput testing equipment. "I didn't have space in my laboratory for these big instruments, but they did at UIHS," he said. "I helped their laboratory manager get set up and trained so they could handle high-throughput testing. There was no cavalry coming to northern California—it was on us to handle. It was a great partnership between the county and the tribal nations."

In San Diego, a laboratory testing task force met regularly during the pandemic to share resources and discuss challenges. Participants found the group so valuable that it has kept going. "It keeps us connected," Corrigan said. "Knowing who to call in a surge—before you need help—is really critical."

Perry said strong communication channels with epidemiologists, clinical laboratories, emergency management teams and first responders allow his team to move faster and more effectively. "The trust and shared experience that grows from training, exercising and communicating regularly makes real-world response faster, smoother and safer," he said.

Cirrincione said she plans to use her new training space to strengthen partnerships with sentinel and hospital laboratories. "I have an open-door policy on biosafety," she said. "My goal is to aid

> **Knowing who to call in a surge—before you need help—is really critical."**
>
> *Jeremy Corrigan, DrPH, MS*

> **“I have an open-door policy on biosafety. My goal is to aid these laboratories in risk assessments and teach them what to look for when it comes to highly infectious disease—what’s a red flag, what they can send to us and how we can help them. We’re working to strengthen all our relationships moving forward.”**
>
> **Kayle Cirrincione**

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Innovation Supports Readiness

Boosting surge capacity in future emergencies requires embracing high-throughput instrumentation and robotics, according to Corrigan. “There just really isn’t any other solution,” he said. “Human power is not enough to keep up with the volume we see in a pandemic.”

Corrigan said he is now adapting all laboratory assays to be performed on high-throughput instrumentation. “I want them validated and ready to go,” he said. “We’ll pivot back to our lower-throughput efficient platforms, but now, I’m ready to turn on my high-throughput instrumentation when I need it. Liquid handlers and continuous loading platforms enable higher volumes. I’m boosting all my automation right now to make sure we’re ready for anything that comes.”

Other technologies beneficial to readiness and response include whole genome sequencing and wastewater surveillance.

“I think of these capabilities as arrows in my quiver to look for pathogens of concern,” Corrigan said.

Yet ensuring public health laboratories are ready to respond also means not forgetting the lessons of the past.

“You can’t flip a switch on readiness. It has to be nurtured,” Perry said. “For me, that means building flexibility in staff and budgets, cross-training staff and maintaining supplier relationships long after a crisis ends. Sometimes, as we get separated from one incident to the next, it’s easy to think, ‘Do we really need to do that?’” But when something happens, you’re going to wish you maintained those capabilities for readiness.” ■

Laboratory Design

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Timely Advances and Adoption of Energy Technologies

As organizations aim to reduce carbon emission and use life cycle cost analysis (LCCA) to evaluate long-term savings, the combined push for sustainability and proof of financial benefits is driving investment in better energy systems.

In the case of the LAPHL, the design teams turned to all-electric, heat pump-based systems that can simultaneously produce chilled water for cooling and hot water for heating from the same machine. The LCCA for this system resulted in a significant reduction in operating costs over 40 years, including first costs, maintenance and replacement costs of the equipment.

Modern Mass Timber Laboratory Designs in Transformative Times

An engineered wood product known as mass timber is emerging as a low-carbon alternative and hybrid companion to traditional steel and concrete structures. Its biophilic characteristics are recognized for improving occupant well-being, its potential for prefabrication can improve construction timelines, and modularity aligns with adaptable, flexible designs.

At LAPHL, three prefabrication systems come together: mass timber floor panels, the primary steel frame that creates a flat slab and reduces floor-to-floor height, and a steel moment frame system—a structural framework designed to resist lateral forces—to meet the high seismic requirements of Southern California.

The exposed hybrid mass timber flat slab environment supports an open environment with an exposed ceiling and eliminates beam shadows, simplifying the routing and reducing connections needed for vertical offsets.

Guided by simplicity, the LAPHL addition supports a transformative work environment by leveraging technology to improve health outcomes while improving working conditions and the community it serves, which in the broadest sense, "makes space for everyone." ■

Modernization

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epidemiology tools. Built on a modern, cloud-based architecture, the platform empowers bioinformaticians with analytical and visualization capabilities that make complex data more accessible and actionable. This work reflects the proactive spirit and innovation that state laboratories are bringing to public health modernization.

Ruvos is also developing an on-demand, high-performance computing cluster to run Nextflow pipelines for bacterial and viral genomic analysis using AWS technologies such as HealthOmics, which supports capabilities from data visualization to reference genome comparison and detection. This approach makes advanced analytical tools available to programs with limited resources, reducing cost barriers while improving speed, scalability, and auditability. By leveraging flexible cloud infrastructure, this platform helps democratize access to genomic analysis, ensuring that every laboratory, regardless of size or budget, can contribute to a more connected and responsive public health landscape.

At its core, this work is about empowering people. The success of public health genomics depends not only on modern systems but also on the dedication, creativity and expertise of the professionals using them. By building the tools and infrastructure that support these experts, Ruvos and its partners are helping them do what they do best: Protect communities through science, collaboration and innovation. Together, they are advancing a vision of public health genomics that is faster, more inclusive and guided by the people who make it possible. ■

Con-GRAD-ulations! Laboratory Scientists Help Revive Nationwide Radiochemistry Workforce

By **Sydney Comet**, MPH, specialist, Environmental Health

Radiochemistry is a specialized branch of chemistry focused on radioactive materials, unstable chemical elements that spontaneously release energy as radiation. This radiation can damage cellular genetic material, increasing the risk of dangerous health concerns including cancer, cardiovascular diseases and more. Public health radiochemistry programs protect human and animal health, the food supply and the environment by monitoring, managing and mitigating the effects of both naturally occurring radioactive materials and those used for anthropogenic purposes. State public health and environmental laboratories play an integral role in monitoring by testing for radioactive contamination in matrices such as air, water, soil, food and clinical samples.

Radiochemistry programs are needed to protect humans and animals against common exposure to radioactive materials, such as radon, uranium and thorium, and accidental chemical spills. However, there have been concerns about the declining workforce given that half of the national nuclear and radiochemistry laboratory workforce are eligible for retirement in the next 5–10 years. Furthermore, there have been increasingly fewer formal US university-based radiochemistry programs, which results in an increased number of radiochemists relying on on-the-job training that focuses more on test completion. Given the considerable differences in proper sample handling and methods, and safety concerns between traditional chemistry and radiochemistry testing, laboratory scientists must acquire fundamental knowledge of radiation principles and receive adequate training in radiochemistry.

To address these concerns, APHL partnered with the University of Iowa in 2023 to develop the US Centers for Disease Control and Prevention (CDC)-funded Radiochemistry Graduate Certificate Program to equip students with the background, theory, practical knowledge and hands-on training required to address the routine and emerging radiochemistry challenges that state public health laboratories face. The 12-month program combines online graduate-level coursework with two in-person summer laboratory trainings and is specifically designed for working public health laboratory professionals.

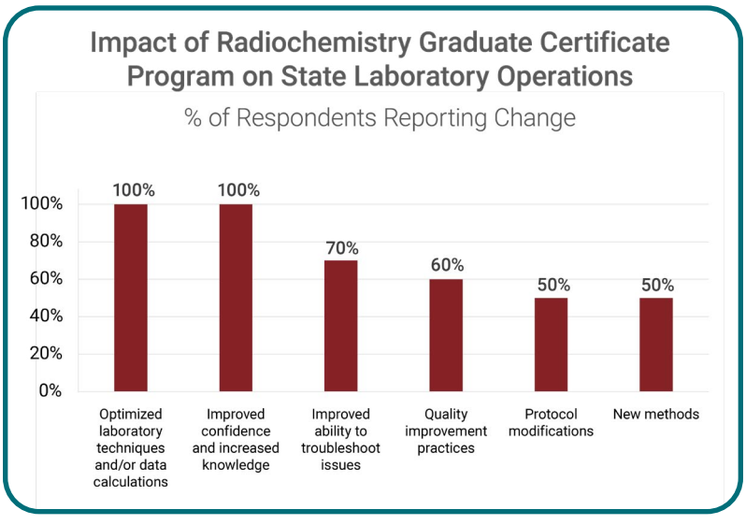

Figure 1. Impact of radiochemistry graduate certificate program on state laboratory operations.

Celebrating the First Year of the Program

In August 2025, the first class of 12 APHL-supported students completed the year-long certificate program. This required significant dedication and commitment while also fulfilling their full-time laboratory duties. A post-certificate survey was sent in September to the students to understand how the program impacted their careers and state laboratory work.

New Skills

Survey data was interpreted from 10 of the 12 students who are still employed at a public health laboratory. All survey respondents reported changes to their laboratory in at least one of the following areas: increased confidence and knowledge (100% of survey respondents), optimized laboratory techniques and/or data calculations (100%), improved ability to troubleshoot issues (70%), quality improvement practices (60%), protocol modifications (50%) and new methods (50%) (**Figure 1**). One student commented that with their increased knowledge of radiochemistry fundamentals, they are now better prepared to onboard new and more complex methodologies, increasing their laboratories' capabilities. Another student echoed these sentiments and reported that they were able to handle more responsibilities and train other personnel after completing the program.

Multiple students commented on their improved ability to properly analyze samples, perform calculations and interpret data. These improvements have already been made in several laboratories with one student remarking that they feel more confident in the data they share with their clients and that the data are more reflective of the true uncertainty.

Changes in Public Health Laboratories

Since completing the program this past summer, changes have been implemented in the students' laboratories. One student was able to increase the accuracy of a laboratory standard operating procedure through a wording change that reflected a better understanding of radioactivity calculations. They plan to look over all their laboratory's calculation spreadsheets to ensure these adjustments are made.

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Correcting Fentanyl Misinformation

By **Kelsey Granger**, MHS, specialist, Environmental Health

Fentanyl is a synthetic opioid that contributed to more than half of the 73,690 drug overdose deaths between April 2024 and April 2025 in the United States. However, misinformation on real-world risks posed by fentanyl continues to circulate. Here are a few facts on fentanyl:

Fact 1: Touching Fentanyl Will Not Cause an Overdose

A common myth is that an overdose can be caused by simply touching fentanyl, triggering unnecessary fear and stress in the workplace for those who encounter or handle fentanyl. However, there are no documented cases of overdose after dermal exposure to fentanyl. A 2024 statement from the American College of Medical Toxicology states "there is essentially no risk of illness from incidental contact with fentanyl." Fear fueled by misinformation can delay delivery of life-saving care like CPR or naloxone to those experiencing an overdose when time is of the essence. Having an accurate understanding of fentanyl and its risks enhances safety of those who may encounter fentanyl in the workplace, like first responders and laboratory scientists, by enabling selection of engineering controls, administrative controls and personal protective equipment that provide appropriate protections with limited interference to performing job duties.

Fact 2: Fentanyl is Not in "Everything"

While fentanyl is widely detected in counterfeit oxycodone pills and drug products sold as heroin, claims that fentanyl is in "everything" are unsubstantiated. Nationally, forensic laboratories did detect fentanyl in 50% of heroin samples tested in 2023; however, for cocaine, methamphetamine and club drugs (ketamine and MDMA), fentanyl was detected in less than 4%, 1% and 5% of samples, respectively, indicating

significantly less proliferation of fentanyl into non-opioid drug supplies. Further, fentanyl is not the only substance worthy of concern—laboratories have identified other harmful adulterants like xylazine and medetomidine, two sedatives posing significant health threats that emerged within the fentanyl supply. Beyond testing drug products, laboratory toxicology testing provides invaluable insight into which substances contribute to fatal and non-fatal overdoses. In 2023, fentanyl was implicated in 75% of all fatal overdoses in the US while stimulants were also present in 62% of all fatal overdoses. Overdose biosurveillance identifies substances implicated in non-fatal overdoses, and in South Carolina, fentanyl was detected in 16.8% of all non-fatal overdose specimens, while methamphetamine was detected in 33.6% and cocaine was detected in 20.8% of specimens tested in 2023. Fentanyl's ubiquity in the opioid supply does warrant extreme concern but reports of rampant fentanyl contamination across all drug types are not supported, and many fatal and non-fatal overdoses cannot be solely attributed to fentanyl.

Fact 3: Cannabis Products Have Not Been Contaminated with Fentanyl

Viral news stories around overdoses caused by fentanyl-laced cannabis are common, often associated with use of THC products purchased from unregulated "smoke shops." Initial reports have stated that seized products tested positive for fentanyl on field devices, but such reports are often corrected after confirmatory laboratory testing. While even regulated cannabis products purchased from a dispensary can include trace amounts of substances like pesticides and heavy metals, there have not been verified cases of fentanyl contamination in regulated or unregulated cannabis products. Products from smoke shops are highly unlikely to contain fentanyl, but such retailers often do carry products with significant health risks, including 7-hydroxymitragynine, tianeptine, and THC products like Delta 8, for which symptoms of an acute overdose may be confused with a fentanyl overdose.

Laboratories play a crucial role in combating misinformation by providing accurate and reliable information. Misinformation about fentanyl can perpetuate harmful stigma toward people who use drugs, cause life-threatening delays in providing care to individuals experiencing acute overdoses and overshadow awareness of other concerning substances. In a constantly changing drug supply, evidence-based approaches to risk assessment and safety, combined with reliable laboratory results are vital for swift public health intervention through identification of active health threats and transparent communication. ■

CaliciNet Outbreak Support Centers Provide a Laboratory Safety Net

By **Rhodel Bradshaw**, senior specialist, Food Safety

A net is only as strong as its knots. For more than a decade, CaliciNet has been that net, connecting public health laboratories across the United States to detect and track norovirus outbreaks. The outbreak support centers (OSCs) have served as the knots in that network, ensuring that states with limited capacity were not left without support.

Norovirus is the leading cause of acute gastroenteritis outbreaks in the US, responsible for thousands of illnesses each year. While some public health laboratories face staffing and resource limitations that influence their participation in CaliciNet, others have made thoughtful decisions to partner with regional OSCs. This approach allows states with lower testing volumes to maximize efficiency and ensure high-quality norovirus testing through shared regional expertise. The program was established to close that gap, providing surge capacity, sequencing support and timely outbreak data so that national surveillance remains strong.

From the beginning, APHL has played a central role in developing and sustaining the OSC model. In addition to managing contracts with the OSC sites, APHL maintains regular communication with OSCs and the sites they support, ensuring issues are addressed quickly and that results were routinely represented in CaliciNet. This collaboration became especially critical during the COVID-19 pandemic, when routine surveillance suffered as resources shifted to the emergency response.

Over the past decade, four state laboratories partnered with the US Centers for Disease Control and Prevention (CDC) as OSCs, each carrying responsibility for their own state while also supporting a region.

- The California Department of Public Health, Viral and Rickettsial Disease Laboratory supported Arizona, Utah and Washington, providing surge testing during busy outbreak seasons.
- The Wisconsin State Laboratory of Hygiene supported Iowa, Kansas and Missouri, helping Midwestern states identify outbreaks that might otherwise have gone untyped.
- The Tennessee State Public Health Laboratory processed an average of 30 out-of-state requests annually for Louisiana, Mississippi, New Jersey and Puerto Rico, serving as a backbone for the South.
- The New York State Department of Health, Wadsworth Center, supported Maine, Pennsylvania, Rhode Island and West Virginia, and helped identify the GII.17 Kawasaki strain during the 2015–2016 season—an emerging norovirus that might otherwise have gone unnoticed.

CDC also filled in coverage gaps by supporting additional states, including Connecticut, Illinois, North Dakota, Oklahoma and South Dakota. Together, these partnerships ensured that national surveillance was not limited by geography or individual laboratory capacity.

The OSC program has supported the detection of more than 115 outbreaks, expanding the reach of CaliciNet and preventing many cases from going undetected. The OSC model has shown how collaboration strengthens outbreak detection. What might have appeared as isolated cases in one county often proved to be part of a larger outbreak once OSC laboratories sequenced specimens and shared results through CaliciNet. By connecting results across jurisdictions, the network gave health departments invaluable information to act quickly and decisively.

Looking ahead, the need for this collaborative model continues to grow. Norovirus remains a major cause of outbreaks each year, and as molecular detection tools advance, laboratories will need expanded sequencing capacity, stronger bioinformatics pipelines and the next generation of trained laboratorians. The OSC experience demonstrates that when state laboratories, APHL and CDC work together, national resilience is strengthened.

Ten years in, the OSC program's success is measured not only by outbreaks detected but also by the system of support it built. California, Wisconsin, Tennessee and Wadsworth Center strengthened national resilience through regional partnerships. With APHL and CDC's guidance, the OSCs ensured consistent data for CaliciNet and provided coverage for states without capacity. Together, they formed a network that held firm, safeguarding critical surveillance. ■

Radiochemistry

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Another student remarked that small changes to laboratory techniques, such as using electrical tape to seal off Marinelli containers, have been implemented to prevent spilling and improve sample handling.

Another student commented that the program allowed them to see how other laboratories run the same methods, and the small differences in how these methods are run. Because of this, their laboratory is now considering trying the Flexible Collodion and Isoamyl Acetate film for microdeposition.

But perhaps the most important change made in these laboratories is increased ability of the scientists themselves. Several students commented that completing this program has given them the knowledge and confidence to improve their laboratory processes, take on new, complex methods and teach what they have learned to other colleagues. They were also able to network and build relationships with radiochemists from 11 other state laboratories, increasing the efficiency and effectiveness of how they operate and protect public health. ■

Sustainable Genomics Through Strategic Costing: A Genomics Costing Tool

By **Ashley Bolding**, specialist, Global Health

The COVID-19 pandemic accelerated the global adoption of next generation sequencing (NGS) and highlighted the need for sustainable financial planning in genomic surveillance. During the pandemic, international donors and governments increased investments in sequencing infrastructure and workforce development to strengthen SARS-CoV-2 genomic surveillance. While this surge in investment allowed countries to build capacity rapidly, it also revealed a structural challenge: much of the financing was short-term, reactive and tied to the emergency response. As the immediate crisis subsides, maintaining these systems requires new approaches that ensure laboratories can sustain NGS activities beyond a single pathogen focus. Without long-term investment and financial planning, there is a significant risk of losing both the technological gains and the skilled workforce developed during the pandemic.

The Genomics Costing Tool

APHL, FIND, The Global Fund to Fight AIDS, Tuberculosis and Malaria, the United Kingdom Health Security Agency (UKHSA), the International Pathogen Surveillance Network and the World Health Organization (WHO) formed a working group to develop a comprehensive Genomics Costing Tool (GCT) to support systematic costing for sustainable genomic surveillance. The GCT, an Excel-based tool, was first developed for SARS-CoV-2 sequencing. It enables users to calculate total sequencing costs, including reagents, consumables, equipment, human resources, facilities, transportation, bioinformatics and quality management, with results calculated by sample, year, cost category or workflow step. The tool is intended for a wide range of partners, including policymakers, laboratory personnel, procurement and quality managers, health administrators, economists and donor institutions. In 2023, the GCT was piloted and validated in countries within three WHO regions—Africa, Eastern Mediterranean and Europe—to assess accuracy, utility and functionality in diverse laboratory settings.

Looking Forward to GCT 2.0

Feedback from these pilots highlighted the importance of expanding the tool's scope. A global landscape analysis survey was conducted to assess the diverse needs and utilization of NGS, informing priorities for a new GCT. Respondents emphasized that NGS is now utilized or hoped to be utilized for a wide range of public health priorities, including influenza surveillance, antimicrobial resistance monitoring, foodborne pathogens, vector-borne diseases such as malaria and dengue, and emerging threats like mpox and Ebola viruses. The expansion beyond SARS-CoV-2 requires costing approaches that account for different throughput levels, diverse platforms and pathogen-specific workflows.

In response, a second edition of the GCT is in development to accommodate these expanded requirements. The updated tool will include compatibility with individualized annual throughput capacities, customizable laboratory workflows and support for additional sequencing platforms and pathogens. These enhancements reflect both the evolving needs of global public health systems and the technological diversification of NGS. By providing flexibility across surveillance contexts, the new GCT will expand its relevance for low- and middle-income countries where budgeting constraints are particularly acute and will enable laboratories and policymakers to generate comprehensive financial insights, identify cost-efficiencies and align resources strategically across both sequencing and bioinformatic processes. The second edition is expected to be published by WHO early in 2026.

Ultimately, the development of a second GCT edition underscored a broader principle: pandemic-driven investments must transition into sustainable, routine systems that serve multiple public health purposes. The global acceptance of NGS created an unprecedented opportunity to integrate genomics into routine surveillance, but progress will only be lasting if supported by consistent funding, skilled workforce development, appropriate use of equipment and infrastructure maintenance. By equipping participants with reliable costing data, the GCT provides a critical foundation for cost-efficient long-term planning, helping ensure that the gains made during COVID-19 translate into resilient, multipurpose genomic surveillance systems capable of addressing both current and future health threats. ■

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Preparing the Next Generation of Bioinformatics Leaders

By **Jacquelyn Faulkner**, MPH, senior specialist, Infectious Diseases

Bioinformatics leaders take a break during an in-person session at APHL HQ.

Over the past decade, next generation sequencing and bioinformatics have become integral to public health laboratories. Increased funding for sequencing activities has allowed laboratories to build infrastructure and welcome bioinformaticians to their team. Recognizing the diverse backgrounds of bioinformaticians entering the public health workforce and gaps in existing training opportunities, APHL launched the Bioinformatics Leadership Program (BLP).

This year-long program, designed for early- to mid-career public health bioinformaticians, provides training on foundational leadership skills and navigating the unique challenges of bioinformatics in a public health context. It includes a mix of in-person and virtual training sessions, along with a collaborative cohort project that allows participants to apply their skills in a real-world setting. Beyond training, the program also serves to build a community of bioinformaticians across different regions and states, offering opportunities for collaboration and networking.

"This program offers a way for [bioinformaticians] to work together to really learn valuable soft skills and move into leadership roles within their own laboratories," said Logan Fink, a former APHL-CDC Bioinformatics Fellow, now lead scientist at Virginia Division of Consolidated Laboratory Services and faculty member for the BLP. "I have always said that public health scientists are some of the brightest and most mission-driven people I have ever had the fortune to work with and now, having been a part of the BLP and getting to help these bioinformaticians mature into thoughtful leaders, I realize how incredibly valuable this program is."

Off to a Strong Start

The first BLP cohort launched in June 2025, welcoming 16 bioinformaticians from across the country. Despite the variety of different professional and academic backgrounds of participants, the group has quickly formed a collaborative and supportive community.

During early sessions, the cohort focused on networking with members and faculty, effective communication, navigating regulatory requirements and working through several simulated exercises to apply leadership skills. They also began working on their cohort project, planning and hosting a bioinformatics hack-a-thon at APHL 2026 that will be open for other bioinformaticians to attend.

Feedback from participants has been overwhelmingly positive, highlighting the value of connecting with peers and attending leadership training tailored for bioinformaticians.

"I initially applied to the program hoping to meet other bioinformaticians in a similar position to myself but was surprised to learn how different everyone's role can be in their laboratory," said Ellen Yoon, a bioinformatician at the Michigan Department of Health and Human Services. "Having the opportunity to share experiences with others in similar positions and talk through different scenarios we have encountered was invaluable. Our in-person meeting helped show multiple perspectives on issues and how different laboratories have overcome challenges, which I was very excited to be able to bring back to my team."

As this year's BLP continues, their experiences will help shape and refine the program for future cohorts. ■

APHL is excited to launch applications and nominations for the second cohort in Winter 2025. This unique professional development opportunity is designed for early- to mid-career public health bioinformaticians looking to strengthen their leadership, communication and collaboration skills. Check APHL's website for more information on the next BLP opportunity.

Stepping on the GAS: Accelerating Group A Strep Characterization for Improved Outbreak Response

By **Elizabeth Toure**, MPH, senior specialist, Infectious Diseases

When a cluster of invasive Group A *Streptococcus* (iGAS) cases appeared in a Colorado long-term care facility, the Colorado Department of Public Health and Environment (CDPHE) faced a crucial question: were these infections spreading from within the facility, or were they being introduced from the community? In the past, answering that question meant shipping samples to the US Centers for Disease Control and Prevention (CDC) and waiting for results. Now, with newly implemented GAS characterization capabilities in-house, including polymerase chain reaction (PCR) *emm* typing and whole genome sequencing (WGS), CDPHE could act rapidly and efficiently. Using their high-throughput Standard BioTools Biomark X9™ platform to run CDC's *emm* typing assay, the team generated same-day results that ultimately revealed the outbreak was likely driven by intra-facility spread. This critical information allowed public health officials to quickly zero in on infection prevention and control measures at the facility—demonstrating how local genomic capacity can accelerate outbreak response.

While GAS typically causes mild infections, such as strep throat, in rare cases, it can become invasive leading to severe and potentially life-threatening illness. Because iGAS can spread rapidly in healthcare and communal settings, timely and accurate laboratory testing is essential to detect outbreaks early, guide public health response and prevent further transmission. Characterization of GAS isolates, particularly *emm* typing using PCR or WGS, is necessary for quickly identifying whether cases are linked. *Emm* typing can rule out a single strain outbreak and support the initial investigation, while WGS can elucidate

CDPHE's Kevin Castro Vital prepares to run CDC's Group A Strep *emm* typing assay on the high-throughput Standard Biotools X9™ platform. Photo: Colorado Department of Public Health and Environment.

transmission patterns within and between healthcare facilities. For CDPHE, implementing these methods has been an important step in strengthening genomic epidemiology, especially as iGAS cases have been increasing in Colorado since 2022.

Colorado's new capability was made possible through Advanced Molecular Detection (AMD) funding from CDC, which has been instrumental in expanding sequencing capacity in public health laboratories nationwide. With support from APHL in collaboration with CDC's Division of Bacterial Diseases, AMD funds enabled CDPHE—along with two other public health laboratories—to strengthen their GAS testing by enhancing PCR and WGS capabilities.

On the other side of the country, the South Carolina Department of Public Health (SCDPH) used the AMD funding to successfully validate WGS *emm* typing, representing their first-ever bioinformatics validation.

"This was a landmark accomplishment for the molecular genomics program and has provided critical support for outbreak investigations across the state," said Cory Weaver, PhD, section director of Virology, Serology and Molecular at the SCDPH. Next door, the North Carolina State Laboratory of Public Health (NCSLPH) piloted a feasibility project of GAS sequencing for epidemiological investigations using AMD funding.

"We were able to successfully complete a WGS evaluation study for *emm* typing and multi-locus sequence type (MLST) utilizing a panel of diverse, banked isolates with 100% accuracy and precision when compared to sequencing results from the CDC *Streptococcus* group," noted William Glover, PhD, D(ABMM), MT(ASCP), NCSLPH assistant director of Infectious Diseases. "This project allowed us to demonstrate that the NCSLPH Sequencing and Bioinformatics Response Unit is prepared to respond to future GAS outbreaks in the state."

The success of these laboratories' expansion of GAS characterization demonstrates the value of federal support to advance AMD capabilities. Faster, more precise data help epidemiologists detect transmission, guide interventions and prevent further disease. These improvements not only strengthen the ability to rapidly respond to iGAS outbreaks, but also build broader infrastructure, technical expertise and capability for future assay implementation, enabling these laboratories to respond more efficiently to future emerging infectious threats. ■

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