Thinking Big: California PHL Hits its Stride

It has often been said that as goes California, so goes the nation. If the saying holds true in the realm of public health laboratory practice, expect a modernizing trend. Last year the California state public health laboratory finished a five-year move into a brand new, 500,000-square-foot facility that its director, Paul Kimsey, calls "world class."

"Our old facility," said Kimsey, "was designed in the 1940s, built in the 50s and went out of date in the 70s." In the early 1990s, the state government committed to a serious investment in public health that now yields considerable benefits to the people of California.

The new state public health laboratory (PHL)—situated in the East Bay of San Francisco in the city of Richmond—occupies 12 interconnected buildings on a 39-acre campus that also houses the health department's 1200 Bay-area staff members, including key laboratory customers, such as state epidemiologists. Kimsey said, "There are lots of advantages to that [co-location]: morale, communications and operational efficiency."

The state public health laboratory itself actually comprises seven separate laboratories: two environmental laboratories, two infectious disease laboratories, a newborn and prenatal screening laboratory, a food and drug laboratory and a central services laboratory. Collectively, these facilities cost $200 million and can accommodate 500 workers.

The sheer size of the state laboratory—which boasts, for example, five BSL-3 suites—may come as a surprise to those in less populous states. As Kimsey points out, "States like New York and Florida and California have more people and larger public health infrastructures, so there's a bit of a proportionality." California, after all, is home to 37 million residents and has the world's fifth largest economy, surpassed only by the United States, Japan, Germany and the United Kingdom. The state population is so diverse that the Los Angeles County school district must contend with over 120 different languages.

The primary mission of the state PHL is to serve California residents by providing reference testing for the state's 38 independent local public health laboratories in county health jurisdictions. "We like to describe it as the California PHL Network," said Kimsey. Again, the scale of the network is somewhat outsized, containing 15 Laboratory Response Network confirmatory laboratories.

But California is notable on other counts as well. The state is well known for having public health standards that exceed those of the federal government, especially related to pollution control and food quality. Kimsey noted that some of California's environmental standards probably pre-date corresponding federal standards. This may explain why the state public health laboratory has significant involvement in farm-to-table issues and a focus on indoor air quality, both of which are rare among public health laboratories.

Currently, the state is at the forefront of a movement toward more proactive disease control. Kimsey explained that "when you're looking at the significant time lapse from the first physician visit to diagnosis, one of the new ideas is that governments make just the ordering of [certain] tests reportable to state health authorities before waiting for the test results." California health authorities are in the process of implementing this requirement for the H5N1 influenza test. Epidemiologists can then begin follow-up with physicians immediately to determine why they suspect a patient is at risk for avian influenza.

Kimsey, who became director in 1997 after doing research for some years at the Massachusetts Institute of Technology and the University of California at Davis, has nearly completed all of his initial major goals. "When I was appointed," he said, "my supervisor said I had no higher priority than the construction and the move," both of which are complete. A concurrent priority for the past seven years has been implementation of a laboratory information management system (LIMS), a task that will be completed this summer (using STAR LIMS). "Prior to this effort," said Kimsey, "no two of our labs, if they had a LIMS, had the same LIMS."

As in many states, staffing has become the new focus. The state public health laboratory staffing level has fallen between 10% and 15% in each of the laboratory units over the last ten years. Kimsey said recruitment is a challenge "even at the lowest levels of bench tech and laboratory assistants, but it gets harder the further up you go." He blames part of the problem on salaries. "We routinely have scientists leave our facility and go down the street to a county lab or a place like Kaiser Permanente or a biotech company and they'll make $20,000 or more per year. I don't want to say that we're grossly understaffed, but that staffing is a challenge for us." Now that the state has invested so heavily in the laboratory's physical infrastructure, Kimsey is pushing for a comparable investment in the human infrastructure.

Other priorities for this California native and Napa Valley vintner are implementing the new all-hazards risk assessment module and simply "keeping this a world-class facility," a task big enough for anyone.

'All Kinds of Things' Happening in CA PHL

Paul Kimsey says that the seven co-located public health laboratories that he directs are "doing all kinds of things." Here's a sampling, in his words.

Food and Drug Laboratory

"The food and drug laboratory has a state responsibility for food and drug product safety and works with the USDA and FDA on food recalls and food safety investigations. That's a little bit unique. Generally speaking, the dividing line between food safety issues is that the federal government handles the farm-to-table part of the food chain and public health gets involved when the food is on the table and someone gets sick. This laboratory cooperates with federal, state and local agencies in looking at the farm-to-table issues. I think historically this work started because we're such an agriculturally intensive state. We also get called in to do analyses on herbal supplements that are implicated in consumer illnesses or injuries. At various times, we've found high levels of lead in imported candies. The lab also regularly tests shellfish for Domoic acid, a dangerous toxin that causes shellfish poisoning."

Newborn & Prenatal Screening Laboratory

"This laboratory assures the quality of newborn screening testing for 500,000 infants each year. The screening is done by eight contract labs across the state. Confirmatory is done by either contract reference testing laboratories or by our own laboratory. Last summer a new state law went into effect expanding the panel of standard newborn screening tests to include tandem mass spectrometry testing for 35 genetic conditions."

Laboratory Central Services

"Central Services provides centralized specimen receipt and handling, purchases and maintains laboratory animals and performs all the glassware washing, hazardous waste disposal and media preparation. This spring, we expect to receive an all-hazards risk assessment module, which will be exterior to the main laboratory. This is where unknown, potentially hazardous samples will be assessed for the presence of toxic chemicals, radioactivity and select agents and made safe before being brought into the main facility where we can conduct simultaneous chemical and biological analyses."

Environmental Laboratories

"This is where our sanitation and radiation testing is done. The environmental laboratories constitute the drinking water reference laboratory for the state under the EPA primacy rules and are part of a network of water analysis laboratories monitoring the public water supply for the introduction of chemicals or toxins. This facility also oversees 12 sites across the state where sensors have been set up to detect low-levels of ambient radiation. After the Chernobyl nuclear accident, for example, they were picking up and monitoring the levels of radioactivity coming across the Pacific into the United States."

Environmental Health Laboratory

"The environmental health laboratory is the reference laboratory for the blood lead testing program in California and also performs indoor and outdoor air quality monitoring. They have a monitoring chamber where products—things like carpets and chairs and desks—can be assessed for out-gassing toxic chemicals. This indoor air quality function is unique among public health laboratories. Outdoor air monitoring is tied into the community. There are several sites across the state—including the roof of this building—where sensors have been set up to monitor local air quality. Here in Richmond air quality monitoring is important because of the presence of chemical and petroleum refineries."

Viral & Rickettsial Disease Laboratory

"This laboratory handles all of our viral disease diagnostic work. They do West Nile virus testing. They do influenza surveillance. And they have been involved in pandemic flu preparations. We've calculated that between 10,000 and 13,000 people a day fly into California from areas that we know have endemic bird flu. If physicians report that a flu patient has traveled to any of these countries with bird flu, we type that virus to assure it's not H5N1. Since February 2004, we've ruled out three dozen flu isolates as not being the H5N1 strain. The VRDL is also involved in international surveillance as part of the World Health Organization's influenza monitoring network."

Microbiology Disease Laboratory

"The MDL turned 100 years old last year. The laboratory was originally housed in the basement of the old Hygiene and Pathology building on the University of California campus in Berkeley. It got its start with scientists doing plague work just prior to the 1906 earthquake. Plague, as you may or may not know, is endemic in California and we've been testing for it for 100 years. The MDL is the classic public health laboratory. It handles all our bacteriological diagnoses, food outbreak microbiology testing and environmental microbiology testing. They do all the shellfish monitoring for marine biotoxins—like the red tide and Domoic acid. A special pathogens unit here performs all of our white powder testing for the FBI. For the past 15 years, this laboratory has provided all the *Salmonella* serotyping test reagents for the whole country." APHL

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