

UTAH'S PUBLIC HEALTH LABORATORY: NOT ISOLATED FROM MAJOR PUBLIC HEALTH CHALLENGES

by Emily Mumford, writer

Being a relatively small state does not protect Utah from experiencing the wide range of public health challenges, including terrorism. In 2008, Utah's public health laboratory fielded a rogue ricin event and "a slew of white powder letters," said laboratory director Patrick Luedtke, MD, MPH.

In March 2008, the FBI converged on a suburb of Salt Lake City to investigate the home of a man who had been hospitalized in Las Vegas due to exposure to ricin. In subsequent months, "our laboratory handled the initial testing for ricin on the property and the subsequent clean-up testing," said Luedtke. "Thankfully there ended up being minimal exposure to the public."

And in November and December, politics in California managed to keep the Utah lab busy. Mail poured into the Salt Lake City headquarters of the Church of

Jesus Christ of Latter-day Saints when national news reports highlighted the Mormon Church's support of California's Proposition 8, an attempt to overturn a State Supreme Court ruling supporting gay marriage.

Some of the mail contained threats and unknown white powder that quickly became the public health laboratory's problem.

FINALLY A NEW FACILITY

These events, plus others, sustain the 2007 decision of Utah's state legislature to fund the construction of a new public health laboratory complex. That new facility is well under way and should be completed by the early 2010. According to Luedtke, its completion can't come fast enough: "Our current lab is chocked full, overflowing, out of currency," he said. "It was designed in the 1960s for a state population of 800,000 persons. We now serve nearly three million but haven't grown a square inch." Over the years the 35,000 square foot lab has been retrofitted to handle new technology, increased testing needs and safety concerns, ending with scientists shunted into tiny-closets-now-workspaces without safety showers and eye wash stations. "Our ventilation system is funda-

mentally inadequate," said Luedtke. "We routinely have to shut-down testing in our BSL-3 lab—a safety nightmare—but also a major annoyance to our staff." In addition to the safety hazards of the poor ventilation, temperature instability in summer months results in many lost hours of testing.

The new laboratory will resolve these dangers and increase capability. Located in nearby Taylorsville, the 82,000 square foot facility will expand from one to nine BSL-3 spaces, all properly ventilated and outfitted with modern efficiencies. "We spent a lot of time designing the lab around efficient and safe workflow," said Luedtke. Samples will move in a logical progression from maximum to minimum contamination. The lab will also have a loading dock and a high-hazards receipt area. "In the current lab, we've had to take our glove box out into the parking lot for sample evaluation—something my staff do not enjoy when it is minus 20 in January or plus 105 in July," said Luedtke.

SHARED SITE PROMOTES COLLABORATION

One of the best things about the new lab, according to Luedtke, is that the entire 16-acre site has been master-planned to accommodate the state agriculture, crime and medical examiner's laboratories too. "I was amazed when I first visited the Ag labs," said Luedtke. "They have the exact same equipment we have, as well as very similar testing processes. For example, while we perform clinical and water microbiology testing, they perform the same work on dairy samples; and while we search for pesticides and organic chemicals in air, water and soils, they do the same in seeds and meat. As we transition to the new site, we are actively looking for opportunities to collaborate—not only through sharing equipment and 'lessons-learned,' but also on grant writing and method development."

This kind of collaboration may help ease one of the lab's biggest challenges. "We have what I call

"We have what I call 'Small State Syndrome'," said Luedtke. "We are relatively isolated, so hiring can be difficult."

‘Small State Syndrome,’” said Luedtke. “We are relatively isolated, so hiring can be difficult. Having a low testing volume poses difficulty for efficiencies of scale. It can also be hard for us to win grants over the large states that have the same problems, just more of them. It’s really surprising how deeply the small state issues permeate.” The other laboratories plan to be on the group site by 2014, but are still scraping together the appropriate funding.

The plans don’t stop there though. When engineers evaluated the public health lab’s portion of the site, they discovered an earthquake fault. After the ensuing geotechnical research, which included digging trenches as deep as 100 feet and spending “an unwelcome portion of my new lab budget,” said Luedtke, the lab was pushed into the easternmost corner of its lot. With some design modifications, such as a deeper slab and reinforced beams, the lab will be safe there, but the shift left behind a swath of fallow land.

But Luedtke knows exactly what to do with that land. “We are building a Power Park,” he said. The park will be open to the community and will include a running track and gardens. Interspersed will be geothermal, solar and wind collection devices that will provide more than 100 kilowatts of electricity. The park will be a valuable perk for the 100 laboratory personnel, but the idea also resonates with town residents. “People are often wary about a laboratory moving so close to their homes, but building this park gives the lab a good face to the community,” said Luedtke.

The serendipity of the Power Park plan is evocative of Luedtke’s path to public health laboratory work.

FROM MUSICIAN TO LAB DIRECTOR

As a student at the University of Wisconsin in Madison, Luedtke was also a musician, playing a mixture of light rock, easy listening and his own compositions. He dropped out of school to play nightly in bars, nightclubs and at private parties. But after a few years, Luedtke decided that a day job would make his life a little easier. A pamphlet on laboratory science and an open house convinced him that the work was interesting and would not be too stressful. He earned a two-year laboratory degree and worked in a lab “on the side” for eight years. Eventually Luedtke went to medical school at Marquette on a Navy scholarship. He practiced internal medicine, but the ever-practical Navy also utilized his laboratory experience.

“Everywhere I went, there was a lab that needed a director,” Luedtke laughed. “Navy ships are floating cities so each has pharmacy, x-ray, industrial hygiene and

laboratory departments.” He became familiar with CLIA and EPA lab requirements, and grew increasingly interested in public health as the Navy engaged in nation-building efforts around the world. “I volunteered for every nation-building exercise that I could,” he said. This work led to a master’s degree in public health. When his wife got her dream job in Utah, he separated from the Navy and taught for a few years at the University of Utah in Salt Lake City; waiting for a good position in the local public health field to open. In time Luedtke became deputy director of epidemiology at the health department, and then later, in 2005, accepted the chance to direct the public health laboratories. “I jumped at it,” he said. “Turns out, I love the lab.” He has served on APHL’s board of directors since 2007.

LAB SERVICES

Utah’s public health laboratory is split into four areas: microbiology, environmental, forensic toxicology and laboratory improvement. The laboratory improvement section oversees CLIA certification for clinical labs in the state. The section also certifies environmental labs that work in the state, making the Utah lab one of only thirteen state programs that serves as a NELAP accrediting body. “We’re a small state to do this type of work,” said Luedtke, “and it makes us a little unusual.” The public health laboratory conducts the majority of environmental testing for the state’s Department of Environmental Quality and does “every kind of water testing, Superfund sites, soil, environmental spills,” said Luedtke.

The varied water testing and the state’s newborn screening are the lab’s highest volume tests. The lab screened 58,000 babies in 2008—an incredible number for a state with fewer than three million residents. It recently added cystic fibrosis to its panel and now fully complies with the March of Dimes’ recommendations for newborn screening. “This is a big success for the lab,” said Luedtke. “A few years ago, we only screened for a handful of things and now we screen for 37 disorders. There were a lot of growing pains along the way, especially with our IT infrastructure.” To handle the enormous volume of data that came with the change, the lab spent three years integrating a laboratory information management system (Lab-

The park will be open to the community and will include a running track and gardens. Interspersed will be geothermal, solar and wind collection devices that will provide more than 100 kilowatts of electricity.

Ware) into the workflow.

"Our LIMS has made a surprisingly large difference in efficiency," said Luedtke. "We've actually managed to shave a week off of our turnaround time for toxicology

tests and continue to see improvements in other areas." The forensic toxicology section is an unusual facet of the public health lab's work: lab staff liaison with the crime labs, routinely re-enacting crime scenes at a hangar at the airport. Eighty percent of its work is law enforcement toxicology and twenty percent is medical examiner toxicology.

"Our LIMS has made a surprisingly large difference in efficiency," said Luedtke. "We've actually managed to shave a week off of our turnaround time for toxicology tests and continue to see improvements in other areas."

TWINNING PARTNERSHIPS

In reality, despite the lonely image of lab work, Utah staff spend a significant amount of time teaming with other organizations. Through an APHL and WHO grant,

it has a "twinning" partnership with the country of Barbados, exchanging laboratorians for training exercises. The ultimate goal is to improve capacity and capability at the island facility. "The major effort of our twinning project is to put Barbados on the path of ISO 15189 certification. We're standardizing tests, equipment and conducting leadership training," said Luedtke.

The teaching and partnership experience gained is pertinent at home as the Utah lab gears up an effort to build a comprehensive state-wide public health laboratory system. "We intend to reach out to clinical labs on all fronts, not just bio and chemical terrorism," explained Luedtke. "We want to coordinate our response on every issue—whether it's a mumps outbreak or pandemic influenza." The effort will require enormous outreach from state lab staff to build the appropriate connections and conduct necessary training.

Meanwhile, the Utah laboratory is about to launch a new twinning project with a laboratory in Mozambique, proving that its scope and expertise extend far beyond the borders of a small state. "The partnerships have been helpful to us," said Luedtke. "You don't always realize how much you know or don't know until you start to teach others." ■

An artist's rendering of the new Utah lab (photo courtesy of the Utah Public Health Laboratory).

