

IDAHO BUREAU OF LABORATORIES: A BREED APART

by Nancy Maddox, writer

The Idaho Bureau of Laboratories (IBL) dates its roots to 1903, when this western state was best known for its mineral wealth, softwood trees and prolific production of russet potatoes. Bureau Chief Rich Hudson said the laboratory was started to provide precious metal assays to answer the most pressing question of the day: “Is my gold good?”

From this beginning, the facility has grown to provide a full range of services to meet the needs of Idaho’s current 1.5 million residents and is looking ahead to the future.

State governor “Butch” Otter has said his goal in office is to empower Idahoans to be “the architects of their own destiny.” For reasons of both necessity and principle, the IBL, at least, has made this ambition its own.

THE NECESSITY

“Our state is no longer wanting to fund us just because we’re a public health laboratory,” said Hudson. “We work very hard to differentiate ourselves from our clinical

and environmental laboratories. We have to be very cognizant of what we do to make sure we don’t compete with those laboratories—that’s been a big issue here—and we provide something that those laboratories don’t.”

The “something” that the IBL provides is actually a little bit of everything. As the only public health laboratory in the

gem state, its 38 employees support the work of the state health agency, seven local health departments, the Idaho Department of Environmental Quality (DEQ) and the Department of Water Resources.

Laboratorians handle routine clinical work, perform year-round influenza surveillance, test mosquito pools, birds and clinical specimens for West Nile virus—a big problem last year—and test environmental samples for volatile organics, nitrates, pesticides, arsenic, lead and mercury.

Five staff members run a laboratory improvement section in charge of licensing private clinical laboratories under contract with the Centers for Medicare and Medicaid Services, certifying Idaho’s 400 or so x-ray

machines on behalf of the state, conducting quality control on air monitors for the DEQ and certifying mammography instrumentation under contract with the FDA.

“We don’t do a whole lot of any one thing,” said Hudson, “so it can make it a little difficult.”

The IBL is also the sole reference laboratory within Idaho and coordinates a network of 37 sentinel labs. “The laboratory community in Idaho is not large and it’s pretty general in its expertise,” Hudson said. “We don’t have a hospital that might be a center of excellence for, say, bacteriology. No laboratories in the state do virology work. And there’s not one big diagnostic laboratory like Quest®.”

Anything unusual or requiring specialized testing goes to the IBL, including the occasional plague, Hanta virus or unknown specimen. As the state laboratory of last resort, the IBL necessarily fills a distinct and crucial niche as public health leader and jack-of-all-trades.

THE PRINCIPLE

As new molecular approaches enable scientists to detect ultra-low levels of pathogens and environmental contaminants, public health laboratories are experiencing a data explosion. Hudson, quite simply, believes these data should be useful, especially when it has been methodically collected at some expense.

“What do you do with all this information that appears not to be part of an epidemic?” he asked.

A novel IBL effort to squeeze value from seeming background noise centers on *Salmonella*. The IBL is an active member of PulseNet, a national network of public health and food regulatory agency laboratories that perform standardized molecular subtyping (i.e., DNA “fingerprinting”) of foodborne disease-causing bacteria. In this capacity, the Idaho laboratory has created a “library catalog” of all the *Salmonella* organisms state clinicians and clinical laboratories have submitted to it for subtyping and antibiotic sensitivity testing.

IBL molecular biologists have found that some *Salmonella* genotypes are characterized by geographic uniqueness. For example, one particular genotype is

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found only in a portion of the southern end of the state. The same is true of specific phenotypic markers, such as antibiotic resistance.

“We don’t know that it isn’t an artifact,” said Hudson. “Maybe the science that we’re doing has exceeded the ability to interpret the data. Or maybe as an institution we’re not defining endemic and epidemic appropriately, given the technique. If you don’t ask the right questions, you miss some of this.”

In any case, said Hudson, “I’m convinced that public health laboratory work really is changing. We’re going to be much more molecular in our approaches and we’re going to have to figure out what to do with our data.” The *Salmonella* project is one effort to shape the future of the IBL as a leader in the field and a uniquely valuable Idaho institution.

IDAHO’S PLACE IN THE FIRMAMENT

Hudson himself is a Chicago native who, as a teenager, hankered to follow the advice of 19th century newsman Horace Greeley and “Go West, young man.” He studied microbiology at the University of Wyoming and eventually earned a doctorate in the field from the University of California, Los Angeles. After completing a post-doctorate, Hudson began what has been a lifelong career directing public health laboratories; first in Memphis, then Wyoming and, for the past 16 years, in Idaho.

Embracing the Western lifestyle, Hudson owns a 10-acre spread in the tiny town of Star, keeps four horses and grows his own hay. But he cites other advantages to living in the rural West.

“We don’t have problems that are associated with population density. We don’t have heart-breaking, heart-wrenching poverty in this state. We have migrant workers coming through seasonally. They bring few infectious diseases; the occasional TB case, but nothing unusual and nothing dramatic.”

In addition, he said, “I really love working in a smaller state because you have a real fighting chance of knowing everybody. I am absolutely blessed in this position to be working with the folks I am. We just have high caliber, high quality folks who are constantly questioning and challenging themselves and us. Scary, but challenging and stimulating questions to ask: ‘Why are we here? Are we doing the right thing, and, if not, what can we be doing?’”

The IBL is located in Boise, the capital and most populous city in Idaho. It sits on the east side of town, down the street from the old state penitentiary, now a tourist attraction. Said Hudson, “If we look to the south, we see houses, but in the overall scheme of things, it’s desert.”

The facility is within sight of the Owyhee Mountains, the center of a gold and silver rush in the 1860s, and 16 miles from the Bogus Basin Ski Resort. The Boise

River courses through not more than a quarter mile from the lab and every once in a while laboratory staff spot mountain lions in the vicinity.

“This is a very pretty part of the country. The hills are very dry and not as forested (as some parts of the country), but it’s a scenic place,” said Hudson.

FACILITY RENOVATION HAMPERED BY FIRE, WATER DAMAGE

The state laboratory complex comprises two connected buildings dating to the 1960s and houses both the IBL—occupying roughly 40,000 square feet—and the state agricultural laboratory.

Given its age, the facility is in need of upgrades. Renovation, though, has been complicated by a major fire that caused \$1.5 million worth of damage. The fire stemmed from a refrigerator failure over Labor Day weekend, 2002. Flasks of ether spontaneously ignited in the warm refrigerator, and the ensuing flames engulfed the organic chemistry section. When fire crews went in to squelch the flames, they inadvertently flooded the virology section located under the chemistry lab. Virtually a third of the total laboratory was rendered inoperable.

Although everything was eventually replaced or fixed, it took two years to do so. The problem, said Hudson, was that a lot of equipment suffered smoke damage. And even after the clean-up, low levels of byproducts from the combustion of plastics contaminated gas chromatographs and other equipment used to detect those same chemicals in environmental samples.

“You have to prove (to insurers) that the equipment doesn’t work the way it’s supposed to,” said Hudson. “Of course that took a lot of time and expense.” Five years later, he said, “We’re now just beginning to get our organic chemistry lab back into gear.”

Work on a new BSL-3 suite—for bioterrorism, TB and respiratory virus testing—has also been a struggle. Owing to either a flawed design or poor implementation, the suite never met expectations and is now the subject of litigation. In the meantime, additional work to make the suite functional is due to be completed by year’s end.

Despite such trials—and despite shrinking state revenues that may affect the lab’s \$4 million annual budget—Hudson loves his job.

In the foreseeable future, he aims to continue to demonstrate that the IBL is far different from a standard clinical or environmental laboratory and to assure that the laboratory is prepared “for whatever may face us in the future.”

A final goal is to answer the ultimate question: What does the government expect us to do? Said Hudson, “As simple as that may be, it’s exquisitely difficult to get a precise answer, other than, ‘We expect you to do everything.’ But on the other hand, I think that’s what the answer is. I think that’s the challenge.” ■