



(Photo courtesy of the Maryland public health laboratory)

## MARYLAND'S PUBLIC HEALTH LABORATORY: RESPONDING TO COMMUNITY NEEDS

by Emily Mumford, writer

Like other public health laboratories, Maryland's laboratory has grown over the years in direct response to the needs of its community. It was founded in 1898 with a \$2,500 budget and one biologist. Today the public health and environmental chemistry lab has a \$23 million budget and 250 employees—and a scope that encompasses every person in the state, from screening newborns to ensuring drinking water quality; from inspecting pharmacies to testing for dangerous communicable diseases.

Building laboratory services around specific state needs has created a unique institution. The lab founded its radiation program in the 1970s to support a large local nuclear power plant. Since 9/11, there has been an added emphasis on this program, and several grants have introduced new instrumentation, developing the lab's relevance.

State radiation labs are becoming scarcer as budgets shrink and fewer laboratory scientists are trained to work in the field. Yet Maryland—which surrounds the District of Columbia on three sides—is called upon frequently to support the capital and its federal agencies in response to chemical, biological, radiological or nuclear threats and to participate in preparedness exercises. Their need for superior emergency response practices is well-proven: in 2001, the Maryland lab completed more than 3,000 tests for anthrax and in 2003 confirmed the presence of ricin in the Dirksen Senate Office Building.

Despite its advanced capabilities, the laboratory struggles with an aging facility. Designed in the 1960s,

the current building opened in 1974. It is part of a larger state office complex and has 227,000 square feet and seven stories of laboratory space. Security risks worry the laboratory's director, Jack DeBoy, DrPH. "There are three levels of an underground garage beneath the lab, and we're connected through the lobby to other state offices," he said. The facility also has continuing HVAC problems, no all-hazards receipt facility and inadequate BSL-3 space, challenging the staff's safety and work quality.

Plans for a much-needed new facility began in 2002 and are proceeding. "We have not chosen a site," said DeBoy, "but we're researching a spot just a few blocks to the north of the Johns Hopkins School of Public Health." Late this summer, the lab will release an RFP seeking an architectural design firm; this is not, however, the lab's first foray into design—staff have already worked with two architects on two preliminary designs. "It's been well worth the time and money," said DeBoy. "We've managed to trim 50,000 square feet

Maryland's public health laboratory, known as the Laboratories Administration of the Department of Mental Health and Hygiene, is located in downtown Baltimore, a few blocks from the University of Baltimore and next door to the city's symphony. Just a couple of miles away are the Johns Hopkins medical institutions and the University of Maryland medical and law schools. Maryland's state public health laboratory system is one of the largest in the country.



and \$30 million from the initial plans.”

The new facility will replace the lab’s current modular system with a flexible, open design that will maximize efficiency and actually downsize it to 198,000 square feet. It will have more than a dozen BSL-3 spaces and will eliminate the other building and staff security issues. DeBoy hopes it will be completed in 2013.

The lab will leave behind some of the quirks of its old facility, including a large incinerator used by the local Federal Reserve Board to burn worn-out currency retired from circulation. Routinely, armored trucks bring loads of cash for incineration. “It’s fair to say that the MD laboratory burns through money,” joked DeBoy.

And yet money is rarely a light-hearted topic in the lab. The economic downturn, coupled with already tight budgets, has forced the lab to make some tough decisions on staffing. “For most laboratories, salaries are about 70% of our cost. Here, we haven’t had layoffs in years, but every new vacancy is scrutinized. We are currently about 10% understaffed,” said DeBoy.

To make up for staff losses, DeBoy said, “We have been transferring scientists to other areas. We are cross-training. We are increasing our automation to make up for losses in manpower. We’re trying to keep

our heads above water. Because, of course, the mission doesn’t shrink. All we can do is look at everything we can do to cut back and maintain some balance.”

In 2008, the lab’s \$22.93 million budget drew 79% from general funds, 16% from federal funds and 5% from special and reimbursable funds. Several million

of the general funds are earned through programs like newborn screening. “The Maryland laboratory is extremely lucky to have such a high percentage

from general funds, rather than fees. We do have to ensure that the General Assembly meets our needs, but we don’t have to compete with private laboratories,” said DeBoy.

To ensure its relevancy to the state, the lab continues to work with other state agencies and stay on the cutting edge of laboratory practice. The lab has documented its rich history of scientific discovery, spanning more than 100 years and ranging among discoveries of new pathogens, development of new methods, enforcement of regulatory and safety measures and identification of novel information about disease.

Last year the lab performed nearly 11 million analytical tests. Approximately 10 million of those were in its newborn screening program, which tests babies for 53 hereditary disorders that are treatable if diagnosed upon birth.

The state’s environmental chemistry program is a good example of why federal funds are so critical to the lab, despite its state funding. “For many years, labs have been dependent on grants and federal funds to replace instrumentation, because it continues to get more expensive,” explained DeBoy. “We recently purchased a LCLCMS and it cost more than \$500,000. There is no way the state could have bought that for us. Without these funds, it would be difficult to avoid becoming second-tier labs.”

DeBoy has learned the ins-and-outs of laboratory science and management through a career in university hospital and research laboratories, in military and state veterinary laboratories, and in state and federal public health laboratories. Fittingly, it all began in the same lab he now directs: his first job out of college, in 1969, was as a serologist in Maryland’s syphilis lab. “About four or five months later, I received a draft notice. About the same time, a notice on the lab’s bulletin board appeared, advertising the University of North Carolina and CDC public health laboratory practice program. The Army noticed my training and sent me to the Army Medical Laboratory in Fort Sam Houston,” he said. Later, DeBoy earned a master’s and a doctoral degree

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—Jack DeBoy, DrPH, director



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in public health laboratory practice at UNC's School of Public Health. After years afield, DeBoy returned to his hometown of Baltimore and the Maryland public health laboratory as a division chief. Moving through the administrative ranks, DeBoy became deputy director in 1998 and finally director in 2003.

As laboratory director, DeBoy feels a sense of responsibility to the community. "Our food, dairy and water labs go back to our founding, and they are totally state-funded. It is often hard for states to support programs like this because as funding for environmental microbiology goes up and down over the years, it can be difficult to maintain FDA certification," he said. If the Maryland lab ever lost its certification, dairy farmers would be unable to sell milk outside of the state and the industry would effectively come "to a crashing halt."

The lab monitors the state's drinking water quality, as well as swimming pools, the Chesapeake Bay and beaches. Because of Baltimore's large port, the lab may soon increase its food safety testing of imported food products. Currently Maryland is one of two labs in the nation that have an FDA grant to test for radio-nuclides in food.

Almost since its founding, the lab has been responsible for regulating the quality of prescription drugs. Currently state regulations require all practitioners who prescribe drugs to receive controlled dangerous substance (CDS) permits from the laboratory. Five pharmacists and supporting staff conduct inspections of pharmacies, nursing homes and doctors' offices, and a new prescription drug monitoring program is under development. In 2008, due to the laboratory's investiga-

tions, several pharmacists were convicted in a large-scale OxyContin fraud case involving millions of dollars.

Vast regulatory programs like this one led the laboratory to incorporate a laboratory information management system called StarLIMS. The final module is almost complete after a five-year process and \$2 million of hardware and software. Six IT staff maintain the system, which contains separate software modules covering drug control, clinical testing, newborn screening and environmental chemistry. "Our StarLims is really helping the lab get CDS permits distributed on time," said DeBoy, noting that permits are updated biannually, and are required to vend drugs legally.

"The LIMS and our improved customer service are going to save us money. But, also importantly, it is going to improve our quality systems," predicted DeBoy. The lab is developing a myLIMS system for two-way data exchange of test requests, demographic data and test results among the newborn screening program, large birthing centers and county health departments. The technology will eliminate the current double-entry of the 11 million annual test requests.

The lab is also focusing on training—and retaining—its valuable personnel by offering a graduate tuition reimbursement program to employees seeking advancement in the laboratory field.

Continuing its diverse testing programs and sharpening the focus on technology and workforce development—plus the construction of a state-of-the-art laboratory facility—will keep laboratory staff busy and, hopefully, DeBoy said, "ensure we're around for the next hundred years, too." ■

Implementing new technologies and equipment continues to be a priority for the lab, and DeBoy hopes to expand the use of rapid molecular techniques from molecular biology and virology/immunology into the environmental and public health microbiology divisions.