

# Illinois Department of Public Health Laboratories: Preparing for “Nearly Anything”

Bernard (Tom) Johnson, acting director of the Illinois Department of Public Health Laboratory, calls his state “the middle of the Midwest.” With 12.5 million people dispersed across “every size town and city you can think of,” Johnson said his biggest challenge is simply being prepared for “whatever the state might need.”

In 1998, for example, 66 athletes fell ill with a febrile condition that turned out to be leptospirosis, a zoonotic disease that is uncommon in the United States, and particularly so in northern states. Although epidemiologists never pinpointed the source, Johnson said the bacterium was probably transmitted in Lake Springfield during the swimming portion of a triathlon. The laboratory responded by developing a polymerase chain reaction (PCR) test that can distinguish between pathogenic and non-pathogenic strains of the disease in one procedure.

More recently, the laboratory has responded to fears of anthrax (testing 2000 samples in 2001), West Nile virus (testing 9,500 specimens in 2002 when 884 human cases were confirmed in Illinois), and monkeypox, an exotic disease that was contracted by 10 people in Illinois in 2003 from prairie dogs sold as pets. The laboratory also has been called upon sporadically to rule out respiratory illnesses (specifically, avian influenza and SARS) as the cause of illness in airline passengers passing through O’Hare International Airport.

Just last year Illinois responded to 107 food and waterborne outbreaks involving several thousand people, and reported 51 rabid animals, 50 of which were bats. This was the largest number of food-related outbreaks and the largest number of positive animal rabies ever documented in the state in one year. Illinois also has been part of the national Biowatch surveillance program for bioterrorism agents since the program’s inception, conducting daily testing on samples collected in Chicago and in Milwaukee. (No confirmed positives to date.)

“We’ve been able to meet every challenge so far,” said Johnson. “We have an incredibly dedicated staff and all of our success belongs to them.”

The many challenges facing the laboratory are perhaps to be expected in a state as diverse as Illinois. The busy Chicago metropolitan area is home to five million people and the world’s busiest airport, but the prairie state also supports a significant agricultural base—producing corn, soybeans, hogs, cattle, and dairy products—as well as a mix of heavy industries—turning out automobiles, tractors, machinery, electric equipment, and chemical and fabricated metal products.

The Department of Public Health Division of Laboratories consists of three facilities strategically located across the state: an administrative and testing laboratory in Springfield (35 employees), a laboratory in Carbondale in southern Illinois (nine employees), and a 65,000 square-foot laboratory on the west side of Chicago (94 employees).

Most of the state’s public health testing takes place in the Chicago laboratory, a 35-year-old building that is shared with the University of Illinois School of Occupational and Environmental Health and the midwest regional office of the National Laboratory Training Network. The building is located near downtown Chicago and Johnson said it

was built to be energy efficient, which in 1969 meant no windows. In part because the laboratory was not designed to meet BSL-3 safety standards, Illinois is attempting to secure state and federal funding for a new facility—hopefully with windows.

The biggest chunk of the laboratory’s routine work is newborn screening: the laboratory tests approximately 180,000 infants a year for 34 different metabolic and genetic diseases. Johnson said his shop has been “ahead of the curve” in the use of tandem mass spectrometry, implementing the new technology three years ago with the full support of the Illinois legislature and the state’s newborn and metabolic advisory council.

Other high-volume clinical work requires the annual testing of approximately 200,000 sexually transmitted disease (STD) specimens, 90,000 HIV specimens and 95,000 pediatric blood lead specimens. The environmental workload encompasses dairy testing, analysis of swimming beach water and private and commercial well water, and testing of environmental samples suspected of lead contamination as a follow up to positive pediatric blood lead tests.

In addition to general disease surveillance for the state, the Illinois Department of Public Health Laboratories performs testing on behalf of 95 local



**Downtown Chicago skyline at night.**

Photo courtesy of the Illinois Department of Public Health Laboratories.

public health agencies, including the city of Chicago. Johnson explained that Chicago's public health laboratory was combined with the state laboratory in 1993, a union resulting in "a major culture shock for everybody." But the addition of the city's workload has meant increased economies-of-scale, particularly for STD and food testing. The state laboratory also acquired new technical expertise and inherited a close relationship with Chicago fire, police and FBI officials.

Johnson, a self-described "lab rat" who worked previously as a scientist in private environmental laboratories and as a high school science and math teacher, said it is "difficult to be everything to everybody." However, his biggest challenge is recruiting qualified staff to fill critical vacancies.

Budget cuts, a problem for many public health laboratories, have not been particularly severe in Illinois, a situation Johnson credits to "a growing recognition over the years of the role that public health plays." "You usually can't pick up the paper without seeing a foodborne outbreak or something that involves public health," he said. And "while there's never the luxury of enough funding or extra funding, we've been able to meet our challenges." The laboratory gets roughly one half of its operating budget from general state funds and the remainder from grants and fee-for-service testing.

Looking towards the future, Illinois is building the laboratory infrastructure for emerging infectious disease testing and expanding its molecular (PCR, PFGE) program to complement traditional methods to check for enteroviruses and enterotoxigenic and enterohemorrhagic E. coli. Staff are also exploring the feasibility of adding cystic fibrosis to the state's newborn screening panel. Software for a new, NEDSS-compatible laboratory information management system was recently purchased and implementation is underway.

"To me, the biggest challenge is to be ready for nearly anything." Johnson said, "Basically, it's just a matter of being prepared."

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## Behind the Membership Scenes:

### Little-Known Benefits Sweeten APHL Membership

Most APHL members are familiar with the basic benefits provided by the association. The E-Update and the Minute arrive regularly; national meetings on hot topics are arranged; fourteen active member committees work to influence policy and effect change on behalf of the laboratory community; workforce development and training needs are addressed through strategic surveys, hands-on courses, and discounts to services like our online Career Center. (Unfamiliar with the online Career Center? See [http://careers.aphl.org/home/index.cfm?site\\_id=249](http://careers.aphl.org/home/index.cfm?site_id=249).)

The list could easily go on, but these are the benefits that are *easy* to list. The benefits of APHL membership aren't always tangible. And yet, the collaborative work of the association results in a better workplace, improved training opportunities, increased funding, and recognition in the wider scientific and policymaking communities. A few recent highlights:

#### Advocacy—Effecting Change

In 2004, the FDA, citing regulatory concerns, seized thousands of newborn screening test kits that were in production, causing a crisis for the nation's public health laboratories. APHL intervened with the FDA and shortly thereafter the agency agreed to release the test-kits for use with special quality control safeguards.

Additionally, public health laboratories have long identified significant gaps in the nation's approach to protecting against chemical terrorism—the association's focused advocacy on this subject has captured lawmakers' attention. In 2004 public health laboratories received funding under Focus Area D of the CDC Cooperative Agreement on Public Health Preparedness and Response for Bioterrorism dedicated to chemical terrorism readiness.

#### Rapid Test Deployment During Emergencies

Due to an effort led by APHL in partnership with the CDC and Centers for Medicare & Medicaid Services, laboratories can now temporarily deploy newly developed tests during crises (such as SARS) using alternate quality control methods when it is impossible to meet the original requirements of the Clinical Laboratory Improvement Amendments of 1988.

#### Building a Solid LIMS

The association released the *Public Health LIMS Design Document*, a blueprint that laboratories can use

to develop Laboratory Information Management System (LIMS) software that is inter-operable across laboratories at the local, state and national levels.

#### Grant Monies Distributed to Members

Among other awards, APHL granted a total of \$250,000 to six state laboratories to develop innovative and transferable methods to improve food safety.

#### Poised Ahead of the Thought Curve

A team of APHL members released a report under the auspices of the National Public Health Leadership Institute outlining strategies public health laboratories can use to correct the growing imbalance between laboratory funding and public health mandates.

#### Workforce Development: Facing a Crisis

APHL's fellowship program boosted its recruiting efforts and was rewarded with a thousand downloads of the application packet within a month.

The National Center for Public Health Laboratory Leadership hosted its first orientation for incoming state laboratory directors, began work on *A Practical Guide for the Public Health Laboratory Leader*, and conducted several regional leadership forums and skills-building workshops on risk communication, team and leadership building, media relations and grant-writing.

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