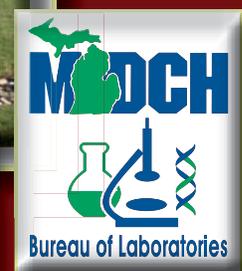


# Michigan Department of Community Health Bureau of Laboratories 2009 Annual Report





STATE OF MICHIGAN

DEPARTMENT OF COMMUNITY HEALTH  
LANSINGJENNIFER M. GRANHOLM  
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DIRECTOR

**2009.** A pandemic declared by the World Health Organization, economic crisis, and struggling health care insurance reform. The World, the State Of Michigan, and the Bureau of Laboratories have weathered challenging years, but I will personally remember 2009 as one of my most challenging.

### **Influenza Pandemic**

Epidemiologists and virologists had been predicting that a novel influenza strain was overdue to emerge. This year their predictions proved correct. The pandemic response plans that had been created, revised, exercised and revised again throughout the past 10 years were implemented. Although the public health system performance was on target, the MDCH laboratory learned many lessons.

Lesson 1. Centralized testing is not the only model for public health laboratories in support of a public health response.

The Centers for Disease Control and Prevention rapidly developed a test for the new strain, and more impressively rolled out the testing to state public health laboratories within weeks of the first recognition of the virus. While federal laboratory resources were directed at investigating the lineage, antiviral resistance, and other important issues, the states were able to provide testing to describe the emerging epidemic in their jurisdictions. The Michigan Department of Community Health Laboratory provided testing by May 5 and saw test volume escalate. Over 1800 H1N1 specimens were tested between May and the end of September. To assure that testing resources were used for surveillance and outbreak investigation, the MDCH laboratory discontinued testing for diagnostic purposes.

Decentralized testing did not stop at the state level in Michigan. With the availability of an H1N1 testing protocol from the WHO and FDA emergency use approval of commercial reagents, it became feasible for clinical laboratories to provide testing for diagnostic purposes. The MDCH laboratory developed specimen panels for clinical laboratories to determine the equivalency of their test results to those of the state laboratory. This enabled the MDCH laboratory to continue to focus on public health testing while improving access to diagnostic testing. This assistance also promoted cooperation by clinical laboratories to submit a subset of positive specimens to MDCH for viral strain monitoring.

Lesson 2. Communications with partners is essential.

It is an obvious conclusion but a lesson that must be reinforced repeatedly. Early in the spring and prior to the fall influenza waves, the MDCH laboratory sponsored conference calls to all interested clinical laboratories. These calls enabled the public health laboratory to clarify misconceptions about testing priorities and submissions, be transparent about plans to provide panels of previously tested specimens, and point laboratories to the most current source of information. This was an efficient and well-received method that will be employed for future public health emergencies.

Lesson 3. Rapid tests were of limited value.

Clinicians have become reliant on point of care influenza tests to diagnose influenza. Unfortunately, the predominant strain in 2009, the novel influenza A H1N1, was so antigenically different from the seasonal strains included in these tests that the new virus was not reliably detected. Some laboratories used rapid tests as a screening step, testing only rapid test positive specimens in amplification based assays, thus missing most infected with the novel virus. In a typical year, this is a sound approach. But as we learned, this was anything but a typical flu season.

### **Economic Struggles**

The impact of the national recession, Michigan's highest in the nation unemployment rate, and the automobile industry crisis were evident this year. Furlough days and threatened state government shut down caused the laboratory to invoke its continuity of operations plans and provide limited services on these short-staffed days. Lack of state revenues forced the laboratory to plan for the elimination of testing services and to bring contracted HIV serum antibody testing in house.

### **Organizational Strategic Direction**

The Bureau completed the fifth and final year of its organizational plan. Lead by the Action Core Team, six employee groups addressed key objectives to bring the Bureau to its vision. Our employees must be congratulated for their commitment to the organizational plan. Most organizational plans are forgotten the day they ink dries on the paper. But the ACT, vision priority teams, and volunteers continue to work toward improvements despite furlough days, unfilled vacancies, and an uncertain future.

*Frances Pouch Downes*  
Laboratory Director

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*Our Mission:* We are dedicated to continuing leadership in providing quality laboratory science for healthier people and communities through partnerships, communication, and technical innovation.

*Our Vision:* The Bureau of Laboratories is a stronger, more diverse team within an integrated public health system. We utilize advanced technology and innovative leadership to provide comprehensive public health services in our dynamic global community.

## 2009 Accomplishments

- The Bureau of Laboratories received the "Director's Choice Award for Internal and External Accomplishments" based on the national and global reputation that our quality work and commitment has built.
- The Bureau of Laboratories held its first all-state conference call with clinical partners on September 10, 2009 to discuss the 2009 Novel Influenza A, H1 pandemic.
- The Bureau of Laboratories successfully recruited our sixth Emerging Infectious Disease Fellow, Olivia Ellis, and established a Public Health Microbiology Rotation for a University of Michigan Pathology Resident.
- The Bureau of Laboratories completed the first grant (2003-2009) from NIH Food and Waterborne Disease Research Network. Areas of research included STEC, *C. difficile*, *Salmonella* spp. and Norovirus.
- The Bureau of Laboratories is now associated with Michigan State University as an internship for Clinical Laboratory Science majors.
- The Bureau of Laboratories hosted 4 undergraduate interns, 2 graduate fellows, a pathology resident, and 2 scientists from Mozambique in 2009 for a combined total of nearly 47 weeks!
- The Virology Section was reorganized from three Units into two. Cross-training and integration of staff and different unit cultures have been both challenging and presented opportunities for growth.
- The Virology Section initiated and validated a new 2009 Novel Influenza A, H1 PCR assay in record time (approximately one week) to meet the demands of the spring wave of the pandemic.
- The Virology Section was certified to participate in Calicinet, a national database run by the CDC to track Norovirus activity across the country.
- The Microbiology Section completed its fifth year of the TB genotyping contract with CDC. In FY 2009, over 5000 TB isolates from 27 cities and states were tested. BOL has been awarded a new 5 year contract to perform TB genotyping for the eastern United States.
- The Microbiology Section validated and implemented molecular based testing for STEC and *Salmonella* spp. in food, plus assays for *Plasmodium vivax*, *P. Malariae*, *P. Falciparum*, and *P. ovale*.
- The Laboratory Systems Section's HIV Rapid Test QA Program assisted MDCH HAPIS to bring an additional 12 agencies into the HIV Rapid Test Program.
- The Laboratory Systems Section assisted 8 of our clinical laboratory partners in the validation of 2009 Novel Influenza A, H1 molecular tests. Most of these assays were validated and in use by the fall wave of the pandemic allowing these partners to serve as surge capacity for the state laboratory.
- The Chemistry and Toxicology Division sponsored a 3 day biannual meeting for the CDC/Laboratory Response Network.
- The Trace Metals Section implemented two new test methods: a LC/ICPMS for Lewisite; and Selenium and Chromium in fish tissue for the fish advisory program.
- The Newborn Screening Section added several tests to their test menu: Tyrosinemia II, III, and Transient Tyrosinemia. The Section also increased their Saturday test menu by adding Biotinidase, Hemoglobin, TSH, and IRT testing.
- The Houghton Laboratory was remodeled for the addition of rabies testing to their test menu.

## *Food Bank Garden*

The Bureau of Laboratories created a Food Bank garden for the growing season of 2009, in a sunny spot at the south end of our building. The garden was established by members of Vision Priority Team 6. The garden's purpose was to grow produce to donate to Lansing area food banks in response to the economic down turn. Money, time, and seeds/starter plants were generously donated by MDCH staff. Four sturdy raised beds of cedar wood were constructed by group member Steve Haskell and Hammond Farms Landscape Supply generously donated topsoil to fill the beds. Cucumbers, squash, cabbage, beans, and several varieties of tomatoes and peppers were grown and each week volunteers signed up to water and weed the beds, harvest the veggies and transport them to area food banks. Food banks such as the Holt Area Food Bank, Cristo Rey Community Center, Fay Letts Community Center, and DeWitt Area Food Bank were very glad to accept the produce. We were happy to be able to contribute fresh produce to their shelves. The garden was a successful volunteer effort. It has inspired MDCH employees to start their own home gardens. The Bureau of Labs newest EID fellow, Olivia Ellis, also attended a free garlic growing seminar in her spare time and has planted garlic for harvest in 2010. VP6 members plan to continue the garden next summer and look forward to another growing season.



## *Laboratory Systems Section Formed*

In June of 2009, the Laboratory Systems Section was formed to oversee the laboratory information system and to formalize outreach activities. The new laboratory information system, StarLIMS, should be completely implemented in the Bureau of Laboratories (BOL) and our Regional Labs by the end of the first half of 2010, at which time our labs will be PHIN compliant. The Section is responsible for maintaining channels for internal and external client input as well as overarching laboratory information system and technical training needs including bioterrorism, chemical terrorism, and antimicrobial resistance. Goals of the Section include: completing the StarLims implementation by mid- 2010; develop a multi-year plan for antimicrobial resistance surveillance in the state; support clinical lab partners in their detection of antimicrobial resistance; coordinate activities for the various BOL grants including drills and exercises to meet program requirements; coordinate and provide training to our clinical partners; expand communication and cooperation between Michigan Laboratory System Partners through the Lab Advisory Group; and expand QA support for the MDCH Rapid HIV testing program.

## *Michigan Laboratory System Improvement Assessment*

The Bureau participated in a Laboratory System Improvement Project Assessment in March 2009 and completed its assessment of the Michigan Laboratory System. The assessment was based on the Ten Essential Public Health Services and Core Functions and Capabilities of State Public Health Laboratories. The evaluation of Michigan's performance measured against a standard describing optimal performance was completed by participants representing the spectrum of system constituents. The following were identified as next steps: 1) re-establish the Lab System Advisory Group, 2) identify areas where system partners can share information to enhance services, 3) identify a means of improving communication between system partners, and 4) identify ways to promote and lead standardized messaging of systems' data exchanges.

## *Michigan Laboratory System Advisory Group*

The first meeting of the reinvented Michigan Laboratory System Advisory Group (LSAG) met on November 17, 2009. The reinstatement of this group was deemed a priority in the Lab System Improvement Assessment held in March of 2009. The intent of the LSAG is to provide a forum where Lab System partners can meet, discuss issues affecting system partners, and participate in workgroups by interest and need to solve common problems. During the LSAG meeting, a brainstorming session created a list of areas where System partners felt there was a need for improvement. The items on this list were prioritized by voting as high, medium, or low priority. This list will be used to guide the LSAG going forward by providing detailed action items identified by System members. The items voted to be of highest priority were then expanded into four categories and various workgroups. The four categories are 1) improved communications; 2) improved testing services; 3) advocacy; and 4) a miscellaneous category. The next step for the LSAG is for individual members to self-select a workgroup in which they are interested in participating. Workgroups will be tasked to work on their priority item and report back at each quarterly LSAG meeting on progress, roadblocks, or requests for input from other System partners.

### *Vision Priority Team 6*

Vision Priority Team 6 was established after the 2009 All Staff Meeting presentation of "The Healthy Nation Alliance." We created a mission statement: "We are a team focused on building a healthy nation by promoting healthy lifestyles in our lives, workplace, and community," and developed some short and long term goals. Our first goal was to make a Food Bank garden, which would grow vegetables to donate to Lansing area food banks. We were able to build raised bed gardens due to generous donations of money, time, and plants/seeds from MDCH staff. Our first growing season was successful, and we plan to continue the garden next spring. VP6 has also hosted several Brown Bag seminars on healthy topics and plan to continue the Brown Bags in 2010.

#### VISION PRIORITY TEAMS

VP 1: We are a motivated, dedicated, diverse team that values each individual.

VP 2: We are a recognized leader in public health at the local, state, and national levels.

VP 3: We are a laboratory with the capacity to respond to unanticipated needs and events and the ability to apply technology to address changing health trends.

VP 4: We establish and maintain strong collaborative relationships with all our partners.

VP 5: We use innovative strategies to secure adequate resources to support Bureau projects.

VP 6: We are a team focused on building a healthy nation by promoting healthy lifestyles in our lives, workplace, and community.

### *Newborn Screening Updates 2009*

June 2009 marked the one year anniversary of Saturday testing. Saturday testing translates into earlier treatment for babies in Michigan and thus improved health outcomes for the baby. During the first month of expanded testing, a baby with argininosuccinic acidemia (ASA) / citrullinemia was identified on a Saturday. The child was examined that day by specialists at Children's Hospital and found to have a high ammonia level. Treatment was started immediately, avoiding medical crisis and perhaps even death. Saturday testing likely saved this baby's life.

Because of aggressive cross training, the section was able to provide full-testing/reporting operations during furloughs, vacations and creative "work arounds" in response to planned/unplanned disruptions to building electricity, air exchange, and construction.

NBS Update continued on page 6

## Expansion of Laboratory Tours

Lab staff have embraced the concept of sharing their knowledge and promoting the value of our work by becoming more involved with tours of the Bureau of Laboratories (BOL). Previously conducted mostly by administrative staff, tours now feature a cadre of microbiologists, scientists, technicians and others who are enthusiastic tour guides. Staff members from every unit and section have written scripts and prepared visual displays about their work areas, so that anyone in BOL can act as escort or presenter for tours.

Laboratory staff conducted approx. 20 tours for 44 people (visitors, staff and students) in 2009. The number of hours spent by the laboratory staff in tours increased 164% over the previous year, from 31 in 2008 to 51 hours in 2009. The average length of a BOL tour in 2009 was 1.7 hours.

New in 2009 is an on-line survey, which is sent by email to participants after each tour for their confidential feedback. Staff involvement in internships has also expanded. An internship, unlike a quick tour overview, is a more in-depth experience; involving several days or weeks and often including detailed research and/or hands-on time at the bench. BOL hosted 4 university program interns (4-5 weeks each) in 2009: 3 molecular biology students from MSU and one pathology resident from U of M. In addition we hosted 1 intern for 5 months in the Trace Metals lab, 2 EID fellows, Sara McNamara and Olivia Ellis; and 2 visiting scientists from Mozambique. Four students from two high schools visited BOL for 3-4 hours in a laboratory "job-shadow" experience. We estimate the total staff-hours spent in these activities to be about 1256 hours, the equivalent of more than 31 work weeks!

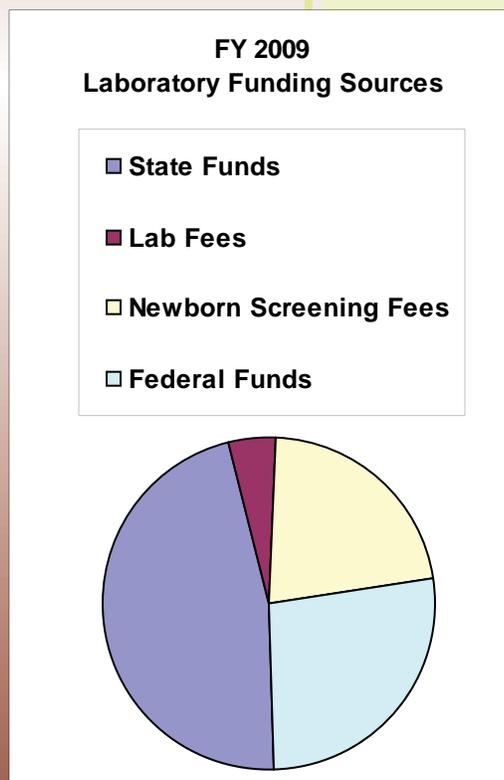
Though perhaps not readily apparent, these activities benefit BOL in many ways. Studies have shown that most people outside the laboratory field (and even many of those working in labs) have no idea what our work entails, or how it benefits everyone. Educating others about our work promotes the importance of laboratory testing; and may help attract interested young people, many of whom know nothing about the opportunities, into laboratory careers. Time spent at BOL can also serve as a job interview of sorts, bringing qualified people to our attention. We have hired 4 former interns /fellows (3 in BOL and one in the Bureau of Epidemiology) and continue to collaborate with others after they move on.



## *Reasons for the Lack of Severity in the 2009 Novel Influenza A, H1N1 Pandemic*

To date, the WHO considers the overall severity of the 2009 Influenza Pandemic to be moderate as national levels of severe illness from the 2009 virus appear similar to levels seen during local seasonal flu periods, although high levels of disease have occurred in some local areas and institutions. One of the reasons for the moderate severity would be the virus composition but Public Health has also played a unique role in this Pandemic that may be, at least partially, responsible for keeping people well. Pandemic planning has been an on-going Public Health concern for the last 10 years. During this time, we have educated the populace on cough etiquette; staying home when ill; hand washing; vaccines; antiviral medications; avoid touching eyes, nose, and mouth; and social distancing. We have partnered with schools, businesses, hospitals, and places of worship to pass along information on pandemics, assist with pandemic planning, and provide educational tools and materials. The CDC and the Association of Public Health Laboratories worked with state public health laboratory partners to plan for surge testing, surge exercises, and rapid assay implementation. The MDCH laboratory assisted our clinical partners with test algorithms, specimen collection and submission instructions, packaging and shipping, and, ultimately, in new assay validation. Thus, when the 2009 virus emerged, Public Health was prepared and had helped ensure that everyone else was ready as well.

### *Funding Sources*



### *Local Health Department Laboratory Accreditation*

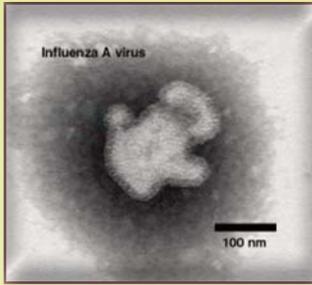
Sixteen Local Health Departments received onsite reviews for the Laboratory Section of the accreditation tool this year. One regional laboratory, had an additional site visit as requested by its Laboratory Director. Two additional individuals were trained on the onsite review process and have each completed one review independently.

### *NBS Update continued*

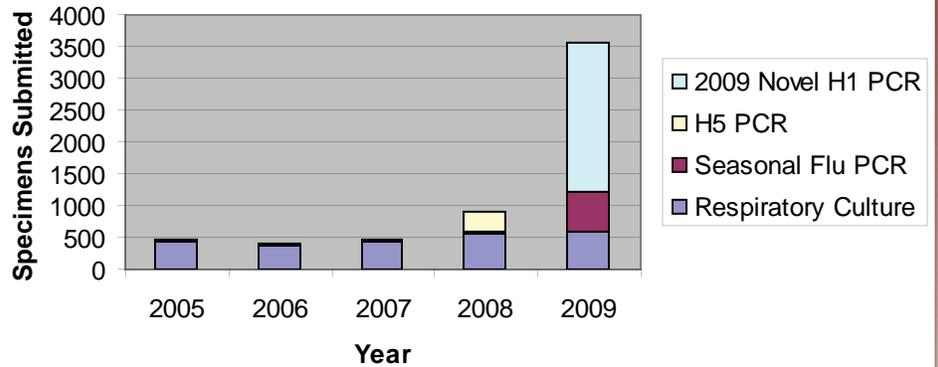
The Newborn Screening program added cystic fibrosis (CF) to the disorders included in the screen, aligning Michigan with the American College of Medical Geneticists' recommended tests. Thirty confirmed cases of CF were identified in 2009. Quality of life and life expectancy will be improved due to early diagnosis and comprehensive disease management.

Additionally, the laboratory now provides courier service to decrease the transport time for specimens from hospitals and birthing centers to the laboratory. We continue to explore methods for making reliable results available to the infant's care provider in the shortest time from specimen collection.

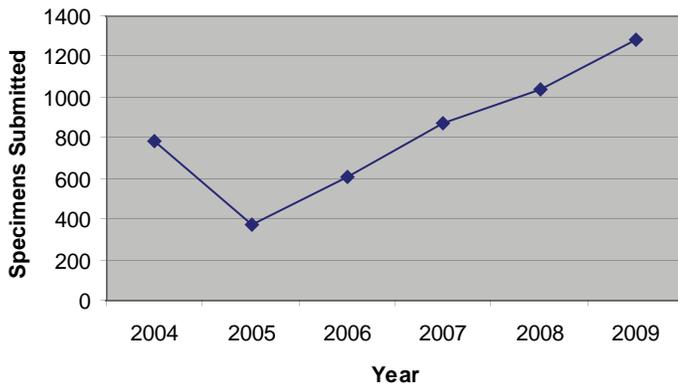
# By The Numbers



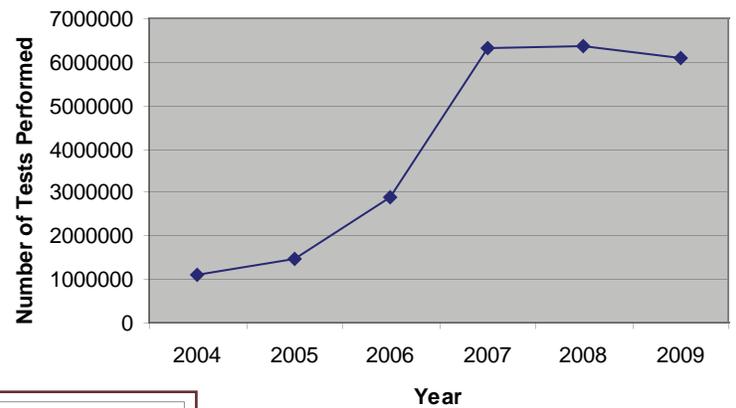
### Influenza Test Volume



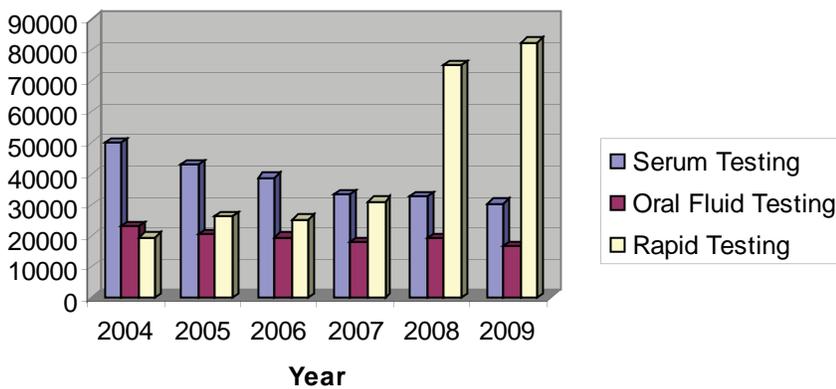
### Fungal Antibody Testing



### Newborn Screening



### HIV Testing by Specimen Type





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