

WISCONSIN STATE LABORATORY OF HYGIENE

Wisconsin's Public & Environmental Health Laboratory • The University of Wisconsin – Madison

2007 Annual Report

Wisconsin Leads Nation Detecting Foodborne Illnesses



Spinach, peanut butter, cheese, beef – It sounds like every family's grocery list.

But over the past year, these foods have made headlines and endangered lives due to bacterial culprits like *E. coli* and *Salmonella*.

Last fall's national spinach contamination outbreak sickened nearly 200 people across 26 states, including three deaths. Here in Wisconsin, the outbreak killed one and sickened dozens.

But our state also has one of the nation's top defenses to limit foodborne outbreaks – a network of clinical laboratories, the Wisconsin Department of Health and Family Services (DHFS), the Department of Agriculture, Trade and Consumer Pro-



tection (DATCP) and the WSLH working together that first identified this specific

Foodborne Illnesses continued on Page 2

Expertise, Leadership Just Part of the Job at State Lab



As a part of the University of Wisconsin-Madison, the Wisconsin State Laboratory of Hygiene embraces the philosophy of the *Wisconsin Idea*, that "the boundaries

of the university are the boundaries of the state".

Our laboratory follows this belief in working to improve the health, quality of life and environment of Wisconsin, the nation and around the world.

This is most clearly demonstrated through the work of WSLH staff members who step beyond the laboratory and are members of national committees and workgroups helping to set national priorities, develop consensus methods, establish guidelines for laboratory regulation and guide the national laboratory environment.

WSLH scientists conduct and publish independent research, while providing analytic services and technical guidance in support of UW and other academic and governmental agency researchers.


Staff members also conduct epidemiological research to optimize diagnostic lab testing strategies for public health surveillance.

"This is important from several perspectives," said Wisconsin Occupational Health Laboratory Director Terry Burk. "The WSLH is considered a player at the national level and our expertise is sought out to help make decisions and explore opportunities. From our perspective, our staff is working in groups on the cutting

edge of technology where we work with academic and accreditation professionals. We can bring our bench-level experience, the practical expertise, from working in our laboratory."

WSLH staff also teach UW courses and provide training and education for various professional audiences and businesses in Wisconsin and nationally.

Over the past year, WSLH staff members:

- Taught or lectured 56 UW courses, including in the UW School of Medicine and Public Health Departments of Medical Microbiology and Immunology, Pathology and Clinical Laboratory Sciences, and the UW College of Engineering.
- Taught 38 programs, workshops or courses sponsored or co-sponsored by the WSLH.
- Provided 110 presentations and training opportunities to other professional, technical and academic audiences.
- Represented the WSLH on more than 155 committees or workgroups at the UW and across the nation.
- Presented papers at 32 scientific meetings, including the American Society of Microbiology, the American Society of Cytopathology, the American Academy of Forensic Sciences and the American Industrial Hygiene Association.
- Published 36 articles in peer-reviewed journals, including *Aerosol Science and Technology*, *Journal of Applied Microbiology*, *Journal of the National Cancer Institute* and the *Wisconsin Medical Journal*. 

Letter from the Director

Dear Public Health System Partners,

Welcome to the 2007 annual report of the Wisconsin State Laboratory of Hygiene (WSLH), your state's public, environmental and occupational health laboratory – a part of the University of Wisconsin – Madison.



In my first year as Director of our laboratory, I truly saw how the WSLH reflects the Wisconsin Idea – "the borders of the University are the borders of the state" - reaching out to serve the citizens of Wisconsin and beyond.

Within the pages of our report, we're going to share with you how our laboratory strives to accomplish our continuous vision of "Healthy People in Healthy Environments" in our community, in our state and across the nation.

The WSLH and Wisconsin led the nation last fall in identifying and responding to the deadly *E. coli* outbreak in spinach, one of several foodborne outbreaks that affect our community and many others throughout the U.S. every day.

Our Environmental Health Division is also expanding its expertise in endocrine disruptor research through a \$700,000 EPA Star Grant.

This three-year grant seeks to determine the presence, persistence and biological effects of natural and synthetic hormones that may be released into the environment from the livestock waste of large farms.

Endocrine disrupting compounds are a growing concern and crucial work like this bridges together how public health and environmental health are strongly interconnected.

Standing out strongest in my mind over the past year, however, is not what you might have read about in the news or seen on television, but the day-to-day work of the staff here at the WSLH.

It's been exciting to see how our staff works "on the bench" here in our laboratories, but also how they reach out as experts in their given fields and serve as a resource for Madison, the state of Wisconsin and our nation.

Thank you for helping the WSLH continue to be a world-class laboratory in 2007. I look forward to future years of great science here at our laboratory and with all of you.

Sincerely Yours,

Charles D. Brokopp, Dr.P.H.
Director, Wisconsin State Laboratory of Hygiene

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Outreach and Training a Key Component to Building Partnerships for WSLH



Just one year after the Wisconsin State Laboratory of Hygiene was established in 1903, University of Wisconsin President Charles Van Hise declared that he would “never be content until the beneficent influence of the university reaches every family in the state.”

It was this statement that gave rise to the *Wisconsin Idea* and the idea of outreach – *reaching out* – across Wisconsin and beyond that still guides the Wisconsin State Laboratory of Hygiene more than 100 years later.

The Association of Public Health Laboratories defines 11 core functions that every state public health laboratory, like the WSLH, should fulfill such as “Disease Prevention, Control and Surveillance”. But it’s the core functions of “Education and Training” and “Partnerships and Communication” that provide the WSLH with the charge to actualize the *Wisconsin Idea* every day.

WSLH outreach and training activities play a key role in Wisconsin and the nation’s preparedness efforts for both natural and manmade health issues.

One example is the Wisconsin Laboratory Response Network (WLRN), a collaboration of approximately 130 hospital and

clinical laboratories in our state facilitated by the WSLH’s Communicable Disease Division. The WLRN provides training, consultation and reference testing to member laboratories and the people they serve.

In the past year, the WLRN hosted a national virology conference, several teleconferences and webcasts, regional meetings across the state and four microbiology wet workshops that were requested by WLRN members to provide additional training for people working in clinical laboratories who want to strengthen their skills.

WSLH Advanced Microbiologist Erik Reisdorf traveled to Bangkok, Thailand three times this past year as part of a U.S. Centers for Disease Control and Prevention (CDC) team to train scientists to perform molecular diagnostic testing for avian influenza.

Closer to home, WSLH Inorganic Supervisor George Bowman joined forces with Rick Mealy, a Regional Certification Coordinator with the Wisconsin Department of Natural Resources Environmental Laboratory Certification Program, to provide several workshops across the state for members of the Wisconsin Wastewater Operator’s Association and the Wisconsin Rural Water Association. These workshops marked the first time that the WWOA and WRWA partnered together and provided

advice and training on successfully passing a laboratory audit with the DNR. Additional classes included chlorine testing at WWOA pre-conference workshops.

The for-credit audit workshops help staff from wastewater treatment, commercial and public health laboratories improve the overall quality of the data they report to the DNR. In turn, this improved data helps the DNR better manage and serve the needs of the laboratories and water systems while protecting Wisconsin’s environment.

“These workshops are incredibly rewarding,” said Bowman. “We have built a great rapport and the WWOA and WRWA hold us in high regard. We’ve been very successful in improving data quality and the WSLH and DNR have become a great resource for laboratorians continuing their education and licensing. We hope to continue these workshops to aid Wisconsin’s environmental laboratorians in critical training to improve this important data.”

Here in our community, WSLH Environmental Health Division Director William Sonzogni, Ph.D., also considers outreach a local responsibility as he serves as a member of both the City of Madison (Wis.) Commission on the Environment and the City of Madison-Dane County Joint Board of Health. 🏠

Wisconsin Leads Nation Detecting Foodborne Illnesses, continued



strain of *E. coli* O157:H7 through Pulsed-Field Gel Electrophoresis (PFGE), or in simpler terms, a method of DNA “fingerprinting”. PFGE is a way of characterizing the genetic material of bacteria.

It involves cutting the DNA into pieces, then measuring the number and size of those pieces. The WSLH has been using this technology since 1995.

PFGE is an important tool to support the epidemiologic investigations of outbreaks conducted by state, local and federal public health agencies in outbreak investigations and can also detect otherwise undetectable outbreaks, linking sporadic cases that seem epidemiologically unrelated.

It’s especially helpful in the detection of multi-state outbreaks through PFGE band patterns submitted to the national PulseNet database, operated by the U.S. Centers for Disease Control and Prevention (CDC).

PulseNet is a network of the nation’s public health laboratories that catalogs bacterial band patterns obtained by PFGE.

Laboratories submit PFGE patterns to the PulseNet database to determine if their PFGE results match those of other states. If so, it may indicate a multi-state outbreak is occurring.

“All of us work together to help protect the health of the people of Wisconsin, and in many cases, the country...”

After identifying the spinach strain of *E. coli*, the WSLH’s PFGE lab staff alerted other laboratories across the nation via their

message on PulseNet, “Wisconsin has a cluster of eight *E. coli* O157:H7” — the first step in laboratories and epidemiologists across the country working together to save lives and alert the public as bags of spinach were removed from grocery store shelves.

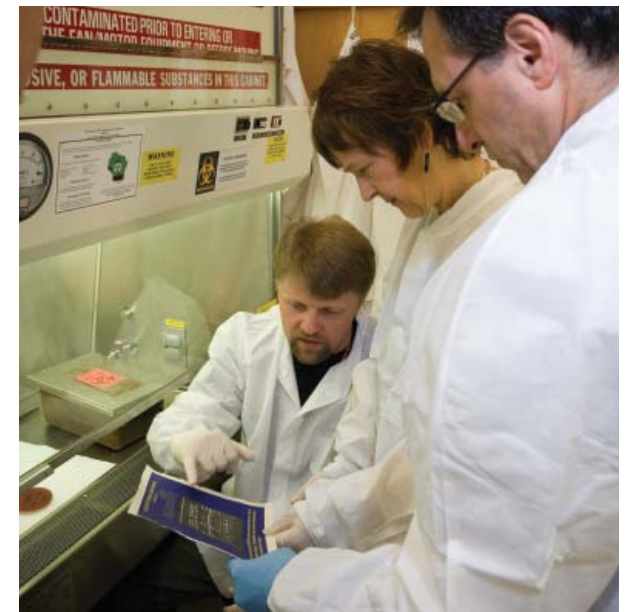
The CDC would later congratulate the WSLH for having results that “were the best in all the states involved” and having the “shortest average turn-around-time from the date of onset”.

The CDC and the Association of Public Health Laboratories also chose the WSLH PFGE laboratory staff as the 2007 PulseNet PulseStar Award honorees for exceptional contributions to foodborne disease surveillance and outbreak response.

The PFGE staff’s work on the nationwide *Salmonella* in peanut butter outbreak in the Fall of 2006 and early 2007 and a large *Campylobacter* in cheese curds outbreak in northern Wisconsin in the Summer of 2006 were also cited as reasons for this year’s award. This is the WSLH’s second time winning this prestigious honor.

WSLH Food and Waterborne Disease Program Manager Tim Monson accepted the award on behalf of the PFGE team – microbiologists Linda Machmueller, Simone Warrack and Nate Woolever.

The WSLH PFGE team was nominated for the award by a coalition of public health partners, including the Wisconsin Division of Public Health (State Epidemiologist Dr. Jeff Davis, State Public Health Veterinarian Dr. Jim Kazmierczak, epidemiologists Diep (Zip) Johnson and John Archer), the Michigan Department of Community Health-PulseNet Area Laboratory and WSLH Communicable Disease Division Deputy Director Dr. Dave Warshauer.



WSLH Food and Waterborne Disease Program Manager Tim Monson describes the pattern of a PFGE gel identifying a strain of *E. coli* to former Secretary Helene Nelson and State Epidemiologist Dr. Jeff Davis of the Wisconsin Department of Health and Family Services (Photo by Del Brown).

For Monson, the WSLH’s success can only be called a team effort.

“In one of the news stories during the spinach outbreak, it said that Wisconsin has one of the highest rates of identifying the causes of foodborne outbreaks in the country,” Monson said. “This is because of the commitment shown by the clinical laboratories that quickly submit their isolates to us for surveillance, the staff in the Wisconsin Division of Public Health – Bureau of Communicable Diseases and the local health departments who do the ‘shoe leather’ epidemiology work of investigating outbreaks and interacting with the people affected, and the Michigan PulseNet laboratory, our PulseNet Area Laboratory, who we consult for PFGE guidance.

“All of us work together to help protect the health of the people of Wisconsin and, in many cases, the country.” 🏠

Waste Not: WSLH Scientists and Wisconsin Farmers Join Forces on Endocrine Disruptor Research



Scientists from the Wisconsin State Laboratory of Hygiene's Environmental Toxicology Unit and the University of Wisconsin-Madison are teaming up

with Wisconsin farmers on a multi-year research project to determine what impact hormones released from livestock waste may have on the environment.

The three-year \$700,000 endocrine disruptor study is funded by an Environmental Protection Agency (EPA) STAR grant.

According to the EPA, endocrine disruptors are chemicals that may interfere with the body's endocrine system and produce adverse developmental, reproductive, neurological, and immune effects in both humans and wildlife.

"This is an excellent collaborative effort between the State Lab, the UW and Wisconsin farmers."

In prior years, the WSLH Environmental Toxicology Unit has received research grants from the American Water Works Association Research Foundation, the Water Environment Research Foundation and the Wisconsin Groundwater Coordinating Council to study endocrine disruptors in wastewater resulting from humans excreting hormones.

Looking at the presence, persistence and biological effects of natural and synthetic hormones from concentrated animal feeding operations (CAFOs) is a logical extension of this previous research since livestock also leave behind hormones in their waste.

The STAR grant research will examine not only the types and amounts of hormones in the livestock waste, but also evaluate how various animal waste handling/management strategies affect the fate, transport, potential exposure and associated effects of hormones discharged from the CAFOs.

Researchers believe the study's results can help guide CAFO operators on the best management practices to reduce environmental problems associated with hormones discharged from their farms.

That's what Dennis Frame, co-director of the University of Wisconsin's Discovery Farms hopes, too. It's the working, commercial, Wisconsin farms that comprise the UW-Madison College of Agricultural and Life Sciences/University of Wisconsin-Extension Discovery Farms program that are providing the livestock waste samples for this research.

Farmers that are part of the Discovery Farms program agree to participate in on-farm research to evaluate management strategies and practices aimed at reducing non-point source pollution while protecting farm profitability.

According to Frame, endocrine disruptors were a specific area in which the Discovery Farms members wanted to conduct research.

"When we started Discovery Farms our producers wanted us not only to look at nutrient sediment losses, but also look ahead 5-10 years to what are going to be the issues down the road," Frame explains.

"They told us not to wait for governmental regulations, but get ahead of the issues. Endocrine disruptor research is one the areas they told us they wanted us to be watching for."

Frame also notes that because research is being done on real farms, farmers will believe the data.

"Most of the major agriculture groups in Wisconsin ask us to present data from our various research projects on an annual basis," Frame said.

"This lets us reach thousands of people in the ag industry in the state."

For Bill Sonzogni, Ph.D., director of the WSLH Environmental Health Division and UW-Madison professor of civil and environmental engineering, this research project is another example of the Wisconsin Idea in action.

"This is an excellent collaborative effort between the State Lab, the UW and Wisconsin farmers," said Sonzogni.

"Our scientists deserve a lot of credit, as national competition for this grant was fierce. I am quite proud of the proposal team, and am expecting important infor-



Photo courtesy of USDA

mation for safeguarding our environment to result from this research."

Jocelyn Hemming, Ph.D. will be leading the WSLH portion of the research project focusing on chemical analysis to determine what hormones are present in the livestock waste and biological testing to know whether they are causing any hormone-like effects.

Terence Barry, Ph.D., an associate scientist in the UW-Madison College of Agricultural and Life Sciences, will be performing analyses on fish to discover whether diluted waste creates any effects on growth, hormone levels and the ability to reproduce.

He'll also be looking for any changes in gene expression in the fish that would indicate "feminization" of male fish, the most obvious endocrine disrupting effect seen in wildlife so far. 🐟

WSLH Notables

Celebrating the Achievements of Wisconsin State Laboratory of Hygiene Staff

Fall 2006

John Shalkham, Program Director of the WSLH School of Cytotechnology and Manager of the Disease Prevention Division, was selected to receive the 2006 Cytotechnologist Award for Outstanding Achievement from the American Society of Cytopathology.

Senior Cytotechnologist **Traci Arts** successfully passed her American Society for Clinical Pathology board exams to be certified as a Specialist in Cytotechnology.

Winter 2007

Toxicology Supervisor **Patrick Harding** received the National Safety Council's Committee on Alcohol and Other Drugs' 2007 Robert F. Borkenstein Award. The award recognizes individuals who have made outstanding contributions through a lifetime of service consistent with the ideals and achievements of Dr. Robert Frank Borkenstein, the inventor of the breathalyzer.

The WSLH celebrated the first-ever combined meeting of the **OSHA Health and Safety Consultation Programs**, together as WISCON, along with **BLS Statistics**, after these programs joined **WOHL** as part of the WSLH's own "OSHA Propeller" to help Wisconsin companies provide healthy and safe work environments for their employees.

Spring 2007

The **WSLH Pulsed-Field Gel Electrophoresis (PFGE) laboratory staff** earned the 2007 PulseNet PulseStar award from the Centers for Disease Control and Prevention (CDC) and the Association of Public Health Laboratories. The award was given for the WSLH's work on the nationwide *E. coli* O157:H7 in spinach outbreak where our staff was the first in the nation to identify the bacterial strain that sickened hundreds and caused three deaths. WSLH Food and Waterborne Disease Program Manager **Tim Monson** accepted the award at the annual PulseNet conference on behalf of the PFGE team – **Linda Machmuelier**, **Simone Warrack** and **Nate Woolever**.

The Wisconsin Society of Cytology and the WSLH celebrated the 50th anniversary of the **WSLH School of Cytotechnology** in May. Since 1957, more than 500 students graduated from the WSLH.

The WSLH's **Water Micro and Glass Washing Media Units** earned a flawless audit from the Department of Agriculture, Trade and Consumer Protection in May. This is the second audit where the departments had no deficiencies on the audit report.

WSLH Director **Charles Brokopp, Dr.P.H.**, was appointed to a full professorship in UW Population Health Sciences in June.

The Wisconsin State Laboratory of Hygiene



Attached to the University of Wisconsin-Madison since its founding in 1903, the Wisconsin State Laboratory of Hygiene provides public, environmental and occupational health laboratory expertise to a wide variety of national, state and local partners.



As the state's public, environmental and occupational health laboratory, we help maintain the public health of all Wisconsin's citizens, safeguard the state's environment and educate state residents on public health issues. Staff also serve as members of the UW-Madison faculty.

Through our wide ranging activities, we directly or indirectly touch the life of nearly every Wisconsin citizen every day.

WSLH Leadership

FY 2006-2007 WSLH Board

Member Name	Represents	Term Expires
Robert Bagley Laboratory Director, City of Racine Health Department	Local Public Health Departments	May 1, 2008
Michael Ricker (<i>Appointed May 1, 2007</i>) Synergy Environmental Laboratory	Private Environmental Testing Laboratories	May 1, 2010
George Million Retired, Marathon County Health Department	Public Member	May 1, 2010
Michael Russell Senior Industrial Hygienist, Lead Occupational Safety & Health Auditor, Earth Tech, Inc.	Occupational Health Laboratories	May 1, 2009
John Stanley Dane County Coroner	Medical Examiners and Coroners	May 1, 2010
David Taylor Director of Special Projects, Madison Metropolitan Sewerage District	Public Member	May 1, 2009
Deborah Turski, M.D. Associated Pathologists, St. Marys Hospital (<i>Currently Vacant</i>)	Clinical Laboratory Physicians	May 1, 2007

WSLH Strategic Leadership Team

Name	Title
Charles D. Brokopp, Dr. P.H.	Director
Ronald H. Laessig, Ph.D.	Emeritus Director
Daniel Kurtycz, M.D.	Medical Director & Director, Disease Prevention Division
Peggy Hintzman, MBA	Deputy Director
Mark Buechner, CPA	Chief Fiscal Officer
Terry Burk, CIH	Director, Wisconsin Occupational Health Laboratory & Asst. Director, Environmental Health Division
John Chapin, M.S.	Director, Public Health Informatics & Surveillance Division
Sharon Gehl, MBA	Director, Resource Division
David J. Hassemer, M.S.	Director, Laboratory Improvement Division
Peter A. Shult, Ph.D.	Director, Communicable Diseases Division
William C. Sonzogni, Ph.D.	Director, Environmental Health Division

The following WSLH Board Members are Agency or University Appointed with No Official Expiration Date:

Member Name	Appointed By	Represents
Darrell Bazzell	University of Wisconsin-Madison	Chancellor John D. Wiley
Sheri Johnson, Ph.D.	Wisconsin Department of Health & Family Services	Secretary Helene Nelson Secretary Kevin Hayden
Susan Buroker	Wisconsin Department of Agriculture, Trade & Consumer Protection	Secretary Rod Nilsestuen
Amy Smith (<i>Through Dec. 2006</i>) Jack Sullivan (<i>Jan. 2007 - Present</i>)	Wisconsin Department of Natural Resources	Secretary P. Scott Hassett Secretary Matt Frank
Ronald H. Laessig, Ph.D.	Director, WSLH (Ex Officio) (<i>Through Oct. 2006</i>)	WSLH
Charles D. Brokopp, Dr. P.H.	Director, WSLH (Ex Officio) (<i>Oct. 2006 - Present</i>)	WSLH

WSLH Financials

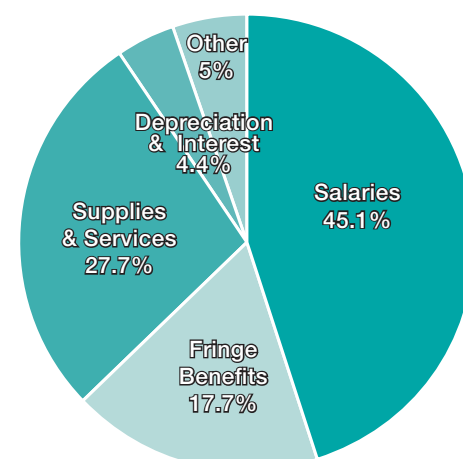
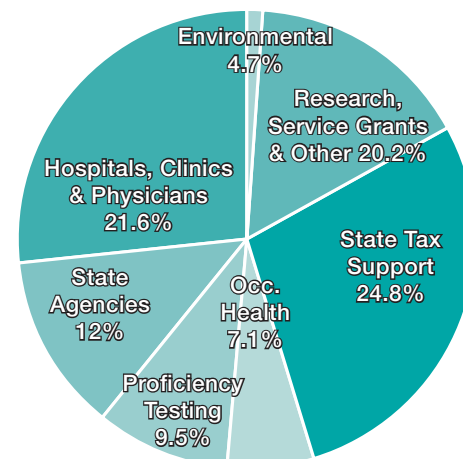
FY 2006-2007 Revenues

State Tax Support	\$9,254,053
Laboratory service fees from:	
State Agencies	4,475,119
Hospitals, Clinics, Physicians	8,081,977
Environmental/Water Testing Services	1,750,823
Occupational Health Services	2,660,847
Proficiency Testing Programs	3,569,212
Research, Service Grants, and Other	7,558,818
Total Revenues	\$37,350,849

FY 2006-2007 Expenses

Salaries	\$17,245,142
Fringe Benefits	6,779,318
Supplies and Services	10,596,000
Depreciation and Interest	1,698,490
Other Expenses	1,924,202
Total Expenses	\$38,243,152

Net Change in Assets \$(892,303)



REVENUES

EXPENSES